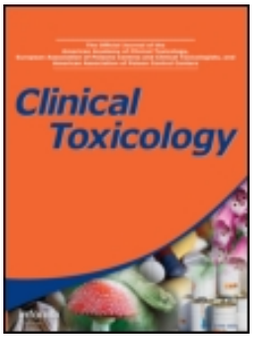

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ABSTRACTS

Abstracts of the 2009 North American Congress of Clinical Toxicology Annual Meeting, September 21–26, 2009, San Antonio, Texas, USA

1. Communication Patterns for the Most Serious Poison Center Calls

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Introduction: There is an increasing focus on establishing competency in communication skills for all health care practitioners. Little is known about how specialists in poison information (SPIs) communicate to callers, particularly for the most at-risk cases. The objective of this study was to examine the communication patterns for potential high severity poison center cases. *Methods:* Digitally recorded calls from 2008 were selected from a regional poison center database based on SPIs initial perception of the severity of the exposure. We adapted the Roter Interaction Analysis System (RIAS) and applied it to calls of moderate or major severity. The RIAS is a medical communication coding system in which the smallest phrase is coded into one of 48 discrete categories for each speaker (e.g., closed-ended psychosocial question). *Results:* A total of 988 calls were evaluated. The RIAS inter-coder reliability was excellent ($r > .80$). Patient age ranged from 1 month to 80 years, calls were predominately made by family members of the patient (63%), and 56% of exposures were unintentional in nature, 37% were intentional. On average, 42.7% of total call statements were made by callers. The majority (63.3%) of caller statements were devoted to providing information about the exposure. Only 4.0% of caller statements were devoted to asking questions and even fewer statements were devoted to expressing emotional concerns (1.3%). SPIs devoted 21.5% of their total talk to providing information and advising the caller about the poisoning. 22.3% of their talk was asking closed-ended questions and 3% was open-ended questions. Of interest, SPIs engaged in a significant proportion (18.8%) of talk devoted to establishing alliances with the caller and 3.4% of their communication reflected an attempt at empathic understanding of the caller's situation. *Conclusion:* These results demonstrate that SPIs use a range of communication strategies. They not only provide information on exposures but respond at both an emotional and rapport building level. This was a large and systematic examination of SPI communication. It is the beginning step to understanding SPI communication competencies.

2. Does Your Charting Reflect the Actual Content of the Call?

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Background: Although our poison center has taped calls for over 15 years, we consider the legal record to be the written record. Call tapes are used by online staff for clarification of information and by management for training, quality assurance, and performance reviews. After three months, the taped records are overwritten. Since 2003, to ensure documentation accuracy, our center has been doing a tape to chart comparison review. Our goal is to ensure written documentation is an accurate reflection of the call, therefore eliminating any falsification of records. *Method:* Each month one chart from each online staff member is randomly selected for review. The notes section of the chart is evaluated and scored against the center's guidelines for documentation. In addition, the documentation in the notes section is compared for accuracy to the coded clinical effect and therapy areas of the electronic record. After the documentation is reviewed, a tape of the call is evaluated against the center's guidelines for call handling. Finally, the tape of the call is compared to the documented legal record. The evaluated chart is retuned to staff for their review with inconsistencies highlighted. Although staff scoring less than fully proficient are reviewed more frequently until they have returned to a fully proficient level, only intentionally falsifying the case record results in corrective action. *Results:* When the tape to chart review was initiated in 2003, only 13% of the charts were consistent. The most common inconsistencies were in gender, age units, species, and caller relationship. In 2008, almost 62% of the charts are consistent, the most common inconsistencies are gender, age units, species, caller relationship, and (due to the introduction of caller id) asking for or confirming the caller's phone number. Unexpectedly, during this same period (2003 to 2008), overall documentation scores increased from 94.9% to 96.7% and overall tape review scores increased from 86.4% to 95.5%. *Conclusion:* In addition to the increase in tape to chart consistency, we saw an improvement in call handling and the overall quality of documentation. The improved documentation was most noted in staff whose documentation had been marginal before.

3. The Value of Poison Center Data in Predicting Poisoning Trends

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Background: Reports of trends in unintentional poisoning deaths from a variety of dataset sources have all indicated increased poisoning deaths in the United States are mainly attributable to abuse or misuse of prescription opioid analgesics. None of these dataset sources included data reported from poison centers. Unintentional poisoning trends may not accurately be reflected by the population studied in these datasets. The objective of our study is to compare our poison center's data with the Oklahoma medical examiner's data for the northeast region of our state. *Methods:* The medical examiner reported all investigated fatalities in the selected region resulting from exposures to chemicals, drugs, or other toxins during 2008 to the Oklahoma Poison Control Center (OPCC). Autopsy reports excluding suicide as the manner of death were reviewed. OPCC cases selected for review included all direct reports of human exposures treated in a healthcare facility (HCF) with fatal, major, or moderate outcomes. Suicide, malicious, or tampering cases were excluded. Medical examiner and OPCC cases from the northeast region were compared. *Results:* During the study period, 117 deaths were indirectly reported by the medical examiner. Most of the indirectly reported decedents were male, between 40 and 59 years of age, and died at their residences or shortly after transport to emergency HCFs. The cause of death was mainly attributable to prescription opioid analgesics. OPCC cases meeting the study criteria totaled 169. Exposures were more evenly distributed by age and mainly attributable to stimulants/street drugs and sedative/hypnotics/antipsychotics. Findings are summarized in Table 1: *Conclusions:* Collaboration between medical examiners and poison centers will yield a more accurate picture of poisoning trends.

Table 1.

	Indirect Reports (n = 117)	OPCC Cases (n = 169)
Age (Range in Decades)	13–19 yr: 5.1% 20–29 yr: 19.7% 30–39 yr 18.8% 40–49 yr: 28.2% 50–59 yr: 23.9%	13–19 yr: 15.4% 20–29 yr: 13.0% 30–39 yr 13.0% 40–49 yr: 10.1% 50–59 yr: 13.0%
Sex	Male: 63.3%	Male: 60.4%
Substance (Top 5)	Oxycodone, Hydrocodone, Methadone, Fentanyl, Alprazolam	Cocaine, MDMA, Amphetamines, Benzodiazepines, Atypical antipsychotics

4. A Novel Collaboration between a Regional Poison Center and State Medical Examiner

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Background: Collaboration between poison centers and medical examiners has not been frequently reported. In addition, concordance between medical examiner and poison center fatality reports has been poor. *Description:* Since 2007, the medical and managing directors, fellows, and rotating trainees from the a regional poison center (PC) have participated in a weekly "Difficult Case Conference" (DCC) with the medical staff, fellows, residents and rotating trainees of the state medical examiner's office (ME). *Restuls:* In 2008, a total of 142 cases were reviewed and 67 (47%) of those involved toxicological issues regarding cause and/or manner of death. Of the 67 cases requiring toxicologic interpretation, opioids were involved in 51%, ethanol in 37%, and sympathomimetic drugs in 4%. In 49% of cases involving toxicologic interpretation, multiple drugs were involved. As a result of discussions in DCC, 15 of the 67 cases (22%) were referred to the poison center for more in-depth analysis, and one case was further developed as a case report for publication. Poisoning fatalities in the ME database previously unknown to the PC have been added to the PC database to improve concordance and the accuracy of PC statistics. In addition, the PC-ME relationship has led to the development of forensic toxicology and poison center rotations for pharmacy toxicology fellows and pathology residents,

respectively, collaborative research projects and manuscript submissions, strengthened state legislative initiatives, and improved state-wide toxico-surveillance efforts. *Conclusions:* A weekly combined case conference between a regional poison center and a state medical examiner's office has had numerous benefits for both entities, including improved detection, attribution, and tracking of poison fatalities, and increased academic, educational, and public health activities.

5. Rattlesnake Bites in the United States: 2000–2007

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Introduction: Rattlesnakes (*Sistrurus and Crotalus*) cause the most snake envenomations in the United States. There are many different species of rattlesnakes that inhabit nearly every state. However, there have been no large national studies of rattlesnake bites published recently. *Objective:* Our goal was to describe the characteristics of rattlesnake bite victims and their geographic location reported to US poison centers. *Methods:* Retrospective, observational study of telephone calls to all US poison centers (National Poison Data System) for rattlesnake bites from 2000 to 2007. *Results:* There were 9,581 total rattlesnake bites. The annual number of bites reported increased by 33.0% during the 8 year study period. Rattlesnake bites were reported every month including the nadir in January (1.1%) and the peak in August (15.5%). Rattlesnake bites occurred in all but 5 states (AK, DE, HI, RI, VT), and 4 states (AZ, CA, FL, TX) accounted for almost two-thirds of all bites. Two states (AZ and NM) had incidence rates greater than 30 bites/million population/year. Most victims were adult (56.9%) and male (79.6%). Only 3,014 (31.4%; 95%CI: 30.5% – 32.4%) had no or minimal clinical effects ("dry bites"). Almost half (46.7%; 95%CI: 45.7% – 47.7%) of the victims had moderate effects, and 754 (7.9%; 95%CI: 7.4% – 8.4%) had major effects. Poison centers were unable to record an outcome for 1,171 victims (12.2%). Sixteen victims died (0.17%: 95%CI: 0.10% to 0.27%) in 10 states. The major limitation of this study is the volunteer reporting of information to poison centers. *Conclusion:* This is the largest analysis of US rattlesnake bites. These results may be useful for snakebite prevention and the planning for snakebite management in each state.

6. Factors Associated with Failure To Achieve Initial Control with Fab Antivenom in Snakebite Patients

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Background: The prescribing information for Crotaline Fab antivenom (FabAV) instructs clinicians to administer FabAV until initial control (IC) of the envenomation syndrome is achieved. Risk factors for failure to achieve IC are not known. *Objective:* The study aim was to identify patient characteristics associated with failure to achieve IC. *Methods:* We conducted a retrospective study of all patients presenting to one of 17 centers and receiving FabAV from 2002–2004. Data about 9 specific venom effects were collected at specified time points. An expert panel used standard criteria to determine if IC was achieved. We then compared the group that achieved IC against the group that did not by calculating odds ratios (OR) for dichotomous variables and using nonparametric comparisons of means for ordinal or continuous variables. If an OR could not be calculated because of cells containing 0, then Fisher's exact test was used. Factors with significant ORs were then used in a logistic regression model to calculate adjusted ORs. *Results:* The final analysis included 209 patients. Progressive swelling, pain, coagulopathy, cardiovascular and GI effects were not associated with failure to achieve IC. Mean INR, fibrinogen, and time to treatment did not differ significantly between groups. Thrombocytopenia, respiratory, neurologic symptoms, and severe bites were associated with IC failure and were used in our logistic regression model. Bleeding was significantly associated with failure to achieve IC, but could not be used in a logistic model. Table 1 shows factors that remained significant. *Discussion:* We identified factors associated with failure to achieve IC. These factors may indicate a more severe envenomation or venom effects that do not respond as well to FabAV treatment. *Conclusion:* Thrombocytopenia and the presence of neurologic effects independently predicted the failure to achieve IC.

Table 1.

Factor	IC	No IC	Adjusted OR (CI)
Thrombocytopenia	31/173 (17.9%)	16/35 (45.7%)	3.4 (1.2–7.6)
Neurologic	41/174 (23.6%)	21/35 (60%)	4.2 (1.7–10.4)

7. Immediate Adverse Events (AEs) after Administration of Crotalidae Polyvalent Immune Fab (FabAV)

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Background: FabAV is purified Fab immunoglobulin fragments used to treat North American pit viper envenomation. This study describes immediate AEs in a patient cohort treated with FabAV. *Methods:* This is a retrospective cohort study of all patients treated with FabAV from 2002 to 2004 at 17 sites. AE data were abstracted by site abstractors who determined occurrence of AEs and immediacy. An independent reviewer determined seriousness and relatedness. *Results:* 247 patients were treated with FabAV. Median age was 27 yrs, and 83.3% were male. 15/247 (6.1%) patients had immediate, 2 (0.8%) delayed, and 230 (93.1%) no AEs. Of the 15 patients with immediate AEs, 13 were mild/moderate envenomations, 1 severe and 1 not classified. Patients received 4 to 19 vials of FabAV (mean 9.9). There was no difference in total number of vials between those with an AE (mean 9.9) and those without (11.5). There was no difference in proportions of immediate AEs in the mild/moderate and severe groups (p = 0.70). Of 15 patients with immediate AEs, 12 had evaluable data and experienced 33 related AEs. 4 patients reported 11 serious AEs (hypotension 2, tongue swelling 2, lip swelling 1, angioedema 1, tracheal edema 1, chest discomfort 1, bronchospasm 1, wheezing 1, and shortness of breath 1). 12 patients reported 22 nonserious AEs (tachycardia 1, rash 4, pruritus 4, urticaria 3, erythema 1, swelling 1, hyperhydrosis 1, dizziness 1, headache 1, musculoskeletal chest pain 1, chills 1, cold feeling 1, nervousness 1 and tachypnea 1). There were no deaths, but one patient required cricothyrotomy. *Discussion:* In prospective pre-marketing trials, 6/42 (14%) patients had immediate AEs. In our retrospective cohort the reported AE rate was 6.1%. AEs were not related to envenomation severity. *Limitations:* This is a retrospective study. AEs, particularly non-serious, are underreported in retrospective studies. *Conclusion:* In this cohort immediate AEs were uncommon, largely nonserious, and occurred less frequently than in pre-marketing trials.

8. Digital Imaging: Consistency amongst Mycologists

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Background: Our poison center has classically relied upon descriptions provided by a health professional in a hospital or a member of the public to consulting mycologists in an attempt to identify a mushroom involved in an exposure. We have always been concerned about relying upon the ability of an untrained or inexperienced observer to describe the mushroom. Recently we request digital imaging to help improve reliability. This study was designed to determine the rate of agreement between toxic and non toxic species of mushrooms by a group of consulting mycologists based on digital images of selected mushrooms. *Methods:* The principal investigator prepared 25 sets of mushroom images from cases managed by our center. These images were e-mailed to participating mycologists who act as on call consultants to our center. They were asked to complete a mushroom identification table and e-mail it back to the principal investigator. We then evaluated intermycologist reproducibility. *Results:* One hundred percent agreement was seen in 10 of the 25 sets of images returned. Of these, 3 were toxic. They included 2 Amanita species. 7 were considered non toxic, including a Stinkhorn. Each mycologist rated 7 out of 10 sets of images as good or better quality, 3 sets as poor quality. Eighty-three percent agreement was seen in 7 of the 25 sets of images returned. Of these, 4 were toxic including a Lepiota species. 3 were considered non toxic including an Amanita Vaginata. Each mycologist rated 4 out of 7 sets of images as good or better quality, 3 sets as poor quality. 8 out of 25 sets of images had little agreement. All 8 sets of images were rated as poor quality. *Discussion:* Digital imaging allows the mycologist to focus on the mushroom itself without having to interpret a verbal description. A good quality image offers visible characteristics that an experienced mycologist can identify. A poor quality image can make differentiation difficult. Consistency among the mycologists solidifies the important role digital imaging plays in regards to pcc management of mushroom exposure. *Conclusion:* Digital imaging is a tool that can help differentiate between toxic and non toxic mushrooms. Images can play an important role in pcc management of mushroom exposures.

9. Medication Errors with the Antidotes Ethanol and Fomepizole

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Objectives: Objectives of this observational study were to describe the frequency, type and outcome of medication errors related to two antidotes for toxic alcohol poisoning, fomepizole (4-MP) and ethanol (EtOH) and estimate the effect of antidote type on the occurrence of error. *Methods:* Cases were included if the patient was ≥13 years, hospitalized for toxic alcohol poisoning (identified by ICD-9 & 10 codes) between 1996 and 2005 and treated with ≥1 dose of EtOH or 4-MP. Charts from 10 hospitals were independently reviewed by 2 abstracters who recorded treatment and symptom details. A consensus panel of 1 pharmacist and 3 toxicologists used abstracted data to identify errors and classify error outcome as "no harm" or "harm" using the National Coordinating Council for Medication Error Reporting and Prevention index. "Any medication error" and "any harmful error" were the primary study outcomes. The adjusted odds ratio (OR) of error, determined by logistic regression, was used as a measure of the effect of antidote type. *Results:* The study included 145 cases who received EtOH and 44 who received 4-MP. Any medication error occurred in 113/145 (78%) EtOH and 20/44 (45%) 4-MP cases and any harmful error in 28/145 (19%) EtOH and 3/44 (7%) 4-MP cases. After adjusting for poison control consultation and study year, the likelihood of error was 20% less during 4-MP treatment relative to EtOH treatment: OR (95% confidence interval) for any error 0.8 (0.3, 1.6) and any harmful error 0.8 (0.2, 2.4). For both treatments, errors which delayed antidote start or delivered too high a dose were harmful in a higher proportion of cases (Table). *Conclusions:* There is a modest advantage to fomepizole versus ethanol in reducing the likelihood of medication error.

Errors	EtOH Treatment (145 cases) Any Harmful Error/ Any Error	4-MP Treatment (44 cases) Any Harmful Error/ Any Error
Any error, per case	28/113	3/20
By Error Category*		
Delayed antidote start	5/6	1/1
Antidote dose too high	21/49	2/7
Antidote dose too low	4/39	0/16
Inadequate pH monitoring	1/52	0/5
Inadequate serum ethanol monitoring	4/62	n/a
Antidote duration too long or short	1/16	0/0

*Each error category counted once per case

10. Case Series of Intravenous Lipid Emulsion Rescue for Drug Cardiotoxicity

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Background: Intravenous lipid emulsion rescue (IVLE) is an emerging therapy for refractory cardiotoxicity from lipid soluble drugs. We report our experience with a series of patients who have received IVLE for drug-induced cardiotoxicity. *Methods:* The ToxIC Collaboration performed a multicenter retrospective chart review of patients receiving IVLE for drug-induced cardiotoxicity. *Results:* Data are presented in Table 1. We found 7 cases from 3 institutions. Age range was 18 to 60 years. All patients received 20% lipid emulsion. Three patients died despite IVLE. IVLE was given for refractory hypotension in 6; of these, 4 survived. The implicated drug was verapamil in 3, amlodipine in 2, and tricyclic antidepressant in 3 (total >7 due to co-ingestion). Two of 3 (67%) with verapamil ingestion died. Two of 3 (67%) with tricyclic antidepressant ingestion survived. Four of 6 (67%) with antecedent refractory hypotension survived. A single patient presenting in cardiac arrest died. There were no adverse effects from IVLE. *Discussion:* Animal studies have demonstrated reduced mortality from lipid-soluble drug cardiotoxicity with IVLE.[1] Human case reports indicate recovery from cardiovascular collapse in local anesthetic and bupropion/lamotrigine intoxications.[1, 2] We report a series of 7 gravely ill patients, 4 of whom survived after receiving IVLE. We did not observe any adverse effects related to IVLE. Future, prospective study will be needed to document clearer benefit from IVLE. *References:* 1. Weinberg G. Toxicol Rev. 2006; 25(3):139–45. 2. Sirianni AJ, et al. Ann Emerg Med. 2008;51(4):412–5.

Cases receiving IVLE

Age/Sex	Implicated Drugs	Indication	Received	Survived
28 M	Verapamil	Refractory Hypotension (RH)	Bolus ×2	No; Exp HD 8
34 F	Amlodipine	Cardiac Arrest (CA)	Bolus ×3	No; Exp in ED
18 F	Amlodipine	RH	Bolus ×2	Yes
33 F	Amitriptyline	RH/Post CA	Bolus	Yes; DC HD 60
60 F	Verapamil, Amoxapine	RH	Bolus + Gtt	Yes
30 F	Amitriptyline, Cyclobenzaprine	RH (First round); CA (Second Round)	Bolus + Gtt; Repeat bolus 12 h later	Yes; DC HD 29
44 F	Verapamil, Amitriptyline	RH	Bolus + Gtt	No; Exp HD 3

11. Immunosuppressive Therapy in Patients with Paraquat Poisoning in Vietnam

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Introduction: Paraquat poisoning (PQP) is a potentially life threatening event characterized by pulmonary fibrosis, multiple organ failure and death. We describe a cohort of PQP patients treated with pulsed methylprednisolone, dexamethasone and cyclophosphamide. *Methods:* We prospectively collected data on PQP patients presenting to NPCCV from 1/2004 to 8/2008. Data was collected on demographics, poisoning characteristics, treatment and outcome. Descriptive statistical analysis was performed. *Results:* 53 patients with PQP presented during the study time: mean age was 23.8 years with 50.9 % males. 90.6% were suicidal ingestions and 9.4% were accidental pediatric exposures. Time from exposure to presentation was 1.9% in <6 hrs, 18.8% in 6–12 hrs and 79.3% in >12 hrs. The estimated doses were <10 ml in 50.9%, 10–20 ml in 47.2%, and >20 ml in 50.9%. Clinical manifestations are noted in the Table 1. Leukocytosis and neutrophilia occurred in 83.6% and 77.5% of patients respectively. Acutely progressive pulmonary fibrosis and multiple organ failure were indicators of poor prognosis while smaller ingestions and early time to presentation appeared to be indicators of good prognosis. All patients received supportive care as well as methylprednisolone (15 mg/kg/day for 3 days), cyclophosphamide (15 mg/kg/day for 2 days) followed by dexamethasone (8 mg 3/day for 14 days). *Discussion:* Historical mortality from PQP has been described as 75%. In our cohort of patients treated with immunosuppressive therapy with supportive care mortality was 52.8%. Because our sample is small, further study is needed to evaluate treatments of PQP. *Conclusions:* Immunosuppressive therapy may be effective in reducing mortality in patients with PQP.

Table 1.

Finding	N (%)
Mortality	28 (52.8%)
Caustic Burn	52 (98.1%)
Nausea/Vomiting	52 (98.1%)
Renal Failure	32 (60.4%)
Hepatic Injury	40 (75.5%)

12. Toxicoeconomic Comparison of Enteral and Intravenous Acetylcysteine in the Management of Acute Acetaminophen Poisoning

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Background: Acetaminophen poisoning is one of the most common exposures and causes of poisoning-related fatalities as reported to US poison information centers. Acetylcysteine is indicated for the antidotal treatment of acetaminophen poisoning to prevent or minimize acetaminophen-related hepatotoxicity. Available as either an enteral or intravenous formulation, both forms of acetylcysteine have been proven to be efficacious. Due to the differences in the acquisition costs and the length of treatment, it is unclear which treatment route is the most cost-effective. The purpose of this study was to compare the total hospitalization charges associated with patients who received either enteral or intravenous acetylcysteine therapy. *Methods:* A retrospective, IRB approved, cohort study of patients treated with either enteral or intravenous acetylcysteine at a university-related hospital was conducted. Patients included were over 18 years of age, admitted during the five year periods of 1996–2000 (enteral) or 2004–2008 (intravenous), had an ICD-9 discharge diagnosis for acetaminophen overdose, no transplant history, and were admitted within 24 hours of the overdose. The primary endpoint was the total cost associated with the hospital stay. The Consumer Price Index inflation calculator from the US Bureau of Labor Statistics was used to adjust all monetary values to 2008 dollars. *Results:* Of a total of 528 patients, 317 met the inclusion criteria with 120 patients being treated with enteral acetylcysteine and 197 patients treated with intravenous acetylcysteine. The mean length of stay for the enteral group was 3.00 days and the intravenous group was 2.85 days. The average total cost per patient in the enteral group was $50,686, compared to $35,875 for the intravenous group. *Conclusions:* Patients who were treated with intravenous acetylcysteine had a decreased length of stay and cost of hospitalization compared to those patients who were treated with enteral acetylcysteine.

13. Trends in Teen Opioid Abuse

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Objectives: To describe the trend of prescription opioid medication abuse by teens over the last 8 years as demonstrated by calls to poison centers. *Methods:* We queried the AAPCC NPDS database for the years 2000–2007 for all exposures involving humans aged 13 y/o to 19 y/o, where the reason was intentional abuse or intentional misuse and the substance was codeine, fentanyl, hydrocodone, hydromorphone, methadone, morphine, oxycodone or tramadol. Adverse outcome was defined as clinical effect of moderate, severe or death. Extracted data was entered into a SQL Server database with a multidimensional analytic architecture. Data was analyzed by first mentioned opioid so each case is a unique call. For secular trend comparison, we also sought data on the total number of AAPCC NPDS pharmaceutical exposures. The teen opioid abuse trend was compared to trends in national retail prescription opioid sales (ARCOS). The trends were analyzed using least squares methods. *Results:* There were 13,302 Individual cases related to teen users of prescription opioid medication abuse from 2000–2007. There was a 15% annual increase in the number of users, for an overall increase of 104%. Hydrocodone represented the largest percentage of substances abused (40%), followed by oxycodone (25%). Methadone had the largest percentage increase over time (55% annually, total 385% over the 7 years), and the only decrease was seen with codeine (–2.5% annually, total –17.5% over the years). Males represented 58% of cases, but 74% of fentanyl cases. The majority of cases were managed at healthcare

facilities (68%) and almost half of exposures had significant adverse outcomes (46%). Fentanyl's adverse outcome rate higher rate was higher (72%) and more were managed at a healthcare facility (86%). 60% of the individual cases had only one substance exposure, 23% of the cases had 2 substances. Sales of prescription opioids rose in parallel with total sales rising 100% over the seven years. The annual rate of total NPDS pharmaceutical exposures increased 49%. *Conclusion:* The sharp increase in NPDS cases involving teen prescription opioid abuse suggests a rising problem with teen abuse. Of particular concern, is the rise of fentanyl and methadone abuse.

14. The Ethics of Reporting "Body Packers"

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Study objectives: To determine the perceptions and practices of physicians in the ethical care of adult body-packers not under the custody of law enforcement (LE). We hypothesized that despite violating patient-physician confidentiality, clinicians would report such individuals to LE. *Methods:* This was a prospective, observational study that sought to enroll 50 emergency medicine (EM) residency programs, and 10 toxicology fellowships. A standardized, 15-question survey instrument was used. The survey presented the definition of body-packing and assessed the perspectives of clinicians at various levels of training on reporting body-packers to LE. *Results:* Physicians from 50% of the enrolled sites responded. 35 alternate sites were randomly selected to replace programs that declined to participate. Amongst the responding sites, 321 physicians responded out of a potential 1508 (21.2%). All reported data is presented with 95% confidence intervals. 95.6% (94.3, 98.5) of subjects knew what a body-packer was and 18.4% (14.3, 23.1) had treated one in the past. When asked: "Would you notify LE of the presence of a body packer in your ED?", 37.2% (31.9, 42.8) responded "Yes," 37.2% (31.9, 42.8) responded "No" and 25.6% (20.8, 30.7) were "Not sure." Of the 118 subjects responding "Yes" to notifying LE, the most common reason (61%; 51.6, 69.9) was: "The individual was breaking the law." Of the 118 physicians responding "No" to notifying LE, the most common reason (85.6%; 77.9, 91.4) was: "Violation of physician-patient confidentiality." Thirteen (4.0%; 2.2, 7.0) subjects reported to have had a body packer present in their ED without a LE escort, 5 of whom reported this to LE. *Conclusion:* Despite violating physician-patient confidentiality, some physicians would report body-packers to LE. Physicians may find themselves with divergent obligations or responsibilities, instances where their duty to society might directly conflict with their obligation to their patient. The overriding principles of patient autonomy and privacy are in direct conflict with the concept of the "greater good" and illustrate the confusion and inconsistency that many feel when faced with competing values.

15. Unintended Consequences: Increasing Adolescent Opioid Use and Complications Following the 2000 JCAHO Pain Initiative

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Background: The 2000 Joint Commission on Accreditation of Healthcare Organizations (JCAHO) Pain Management standards resulted in increased opioid prescriptions. Adolescents are susceptible to prescription opioid misuse as they view them as easier to obtain, safer and less addictive then illicit drugs. This study's objective was to determine if adolescent opioid usage and complications increased in the 7 years since the JCAHO pain initiative. *Methods:* A retrospective case review of the Indiana Poison Center (IPC) database for the years 1994–2007 identifying cases involving persons aged 12–18 with an opioid analgesic exposure. Two evaluators reviewed each case using a standardized data collection form. The primary outcome was the percentage of total adolescent opioid cases from 1994–2000 compared to 2001–2007. Secondary outcomes compared, between time periods, the percentage of cases with outcome severities listed as Moderate, Major, or Death and trends in specific opioid usage. Response proportions between observation periods were compared using Fisher's exact test. Relative risks and 95% CI were calculated using a Poisson regression model. *Results:* From 1994–2007 there were 1769 adolescent opioid cases; 216 cases had outcomes listed as major, severe or death. Compared with 1994–2000, opioids adolescent cases in 2001–2007 were 1.8 (CI 1.6, 2.0; $p < 0.001$) times more likely to have occurred and 3.1 (CI 2.2, 4.2; $p < 0.001$) times more likely to have outcomes listed as moderate, severe or death. Compared to 0 in 1994–2000, there were 15 deaths in 2001–2007 ($p = 0.013$). Usage trends showed increases in hydrocodone ($p = 0.038$) and methadone ($p < 0.001$) and decreases in codeine ($p < 0.001$) and propoxyphene ($p = 0.003$) cases. *Conclusions:* An increase in the number and severity of IPC cases involving adolescents and prescription opioids has occurred in the 7 years following the JCAHO pain standards. In addition, adolescents have increased use of potent analgesics (methadone and hydrocodone) and decreased use of less potent analgesics (codeine and propoxyphene). This data can be used to target drug education and preventative strategies to adolescents.

16. Do Medical Examiners and Medical Toxicologists Agree on the Cause of Death?

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Background: Poisoning is the 2nd leading cause of injury-related death in the US. Epidemiologic studies rely on medical examiner (ME) assessment of poisoning related fatality (PRF), while clinical studies typically depend on medical toxicologist (MT) assessment. We tested agreement between the cause of death determined by the ME (death certificate) and an MT adjudication panel (MTAP) in cases of PRF. *Methods:* This retrospective 7-year cohort evaluated all deaths in one city attributed to poisoning. Data were obtained from death certificates and the Poison Control Center (PCC) electronic records. A cross-matched database included only PCC cases that were also evaluated by the ME. PRF was defined as: (1) ME cause of death based upon ICD-10 codes for poisoning; and (2) independent formal adjudication of cause of death with 3 board-certified MTs. Descriptive statistics, odds ratios (OR), 95% confidence intervals (CI) and agreement (kappa) were calculated. *Results:* There were 7050 poisoning fatalities (73% male, mean age 43.6) determined by death certificate and 375 PCC fatalities. Only 256 of these 375 PCC calls were also ME cases. ME and MTAP agreed on poisoning as cause of death in 124 cases (48%), non-poisoning death in 46 cases (18%) and disagreed on 86 cases (34%). Agreement between ME and MTAP was only fair (kappa 0.26, 95% CI 0.14–0.38), whereas inter-MT agreement was moderate to substantial (range 0.53–0.80). Factors associated with ME/MTAP disagreement were peri-mortem exposures to: (1) fires (OR 5.2, $p = 0.03$); (2) anticonvulsants (OR 3.0, $p < 0.01$); and (3) sympathomimetics (OR 1.8, $p = 0.1$). Disagreements were more likely involved chronic drug toxicity ($p < 0.01$) and less likely involved prehospital cardiac arrest ($p < 0.04$) or antidote administration ($p = 0.09$). *Conclusions:* Agreement for cause of death between MEs and MTs was less-than-moderate. The ME and MT are least likely to agree on PRF when cases involve fires and chronic toxicity. Although underreporting to the PCC may have introduced a bias, our data has identified disagreement among ME and MT about cause of death in poisoning.

17. Epidemiology of Accidental Poisoning Caused by Storage of Non-Food Substances in Food Containers and Unmarked Bottles/Containers

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Background: Though our poison center has frequently observed poisoning from this mechanism, its epidemiology is not described in the US medical literature. *Methods:* CPCS records from 1998–2009 underwent search of free-text entries. Search terms included soda or Snapple bottle, glass, cup, unmarked bottle or container, or death. Only accidental ingestions occurring because the substance was not in its original container were included. *Results:* We identified 1,462 cases of accidental poisoning caused by storage of non-food substances in soda/Snapple bottles (627), unmarked bottles (358) or containers (309), cups (99) or glasses (64), or other (5). These resulted in 455 ED visits, 94 hospital admissions (52 ICU) and 8 fatalities. 831 cases developed either GI (772) or respiratory (107) symptoms. Average age was 24.7. Substances accidently ingested were overwhelmingly cleaning products and hydrocarbons. Bleach (226 cases), gasoline (73), paint thinner (62), pine oil (54), degreasers (52), hydrogen peroxide (51), unknown (45), carpet shampoo (43), isopropanol (42) and insecticides (40) were the substances most commonly ingested. Fatalities occurred from ingestion of citronella oil in a secondary bottle, essential oils in an apple cider bottle, pine oil in a baby bottle, Lime-sulfur concentrate in a tea cup, HF in a Snapple bottle, paraquat in a coffee cup, bone marrow tissue fixative in an unmarked bottle and an unknown clear liquid in a Coke bottle. *Discussion:* Our search strategy probably identified only a fraction of the cases reported to CPCS, but our study provided a significant epidemiologic glimpse into this cause of accidental poisoning. These cases had a high rate of ED utilization (31%) and a mortality rate of 0.55%. (Overall, the annual mortality rate for poisonings reported to US poison control centers averages about 0.05% in NPDS data.) *Conclusion:* Cases of accidental poisoning caused by storage of non-food substances in food containers are not rare. Serious morbidity and mortality can occur. Public education re: this preventable hazard is appropriate.

18. Health Seeking Behavior after Unintentional Poisoning in Greater Accra, Ghana

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Introduction: Poisoning is among the top three causes of injury worldwide, and developing countries share the highest mortality burden from poisoning. Specific risks for poor outcome are varied and complex. We report the results of a qualitative study designed to assess health-seeking behavior after poisoning in Greater Accra, Ghana, preliminary to developing a regionally appropriate public health intervention to limit complications of unintentional poisoning. *Methods:* Semi-structured interviews were developed using a health belief model of behavioral change, and conducted with a convenience sample of 101 community members. Probing questions assessed understanding of the dangers associated with various readily available agents, susceptibility to unintentional poisoning in the home, barriers to safe storage, and self-efficacy for poison prevention. Specific questions in the probe series assessed first-aid responses and health-seeking behaviors in emergency situations related to poisonings. *Results:* Unintentional ingestion of kerosene by young children was the most common poisoning scenario described (36% of interviewees), followed by ethanol (3%). 47% of interviewees stated they would force emesis by immediate

ingestion of quantities of palm-oil as first aid for all poison exposures. A majority stated they would seek the help of a physician, but 11% stated they would rather go to an herbalist (traditional healer) first. *Discussion:* Community members in Greater Accra are concerned about the danger of unintentional poisoning, especially kerosene ingestion. Belief in the utility of forced emesis is common. However, this procedure is often associated with aspiration. *Conclusion:* A secondary prevention campaign promoting observation for symptoms and timely medical evaluation is suggested.

19. Liver Aminotransferase Abnormalities Are Common with Rhabdomyolysis in the Absence of Signficicant Hepatic Injury

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Introduction: Rhabdomyolysis is an uncommon finding in the emergency department. However, the clinical implications of rhabdomyolysis are important, with a significant minority of patients developing acute renal failure and multi-organ failure. When present, the cause of elevated liver function tests (LFTs) in the setting of rhabdomyolysis is unclear. *Study objective:* We sought to determine the incidence of abnormal aminotransferases (defined as AST or ALT > 40 U/L) in the setting of rhabdomyolysis and how the LFTs decrease relative to the creatine phosphokinase (CPK) concentration as rhabdomyolysis resolves. *Methods:* A retrospective chart review of 215 cases of rhabdomyolyis with CPK of ≥ 1,000 U/L was performed. *Results:* The incidence of an abnormal AST in the setting of rhabdomyolysis was 93.1%. An abnormal ALT was much less common, and found in 75.0% of patients with a CPK of ≥ 1,000 U/L ($P < 0.002$). All cases with an elevated AST also had an elevated ALT. In only one instance was the ALT > 40 U/L while the AST was < 40 U/L. Furthermore, AST concentrations (and not ALT) fall in parallel with CPK during the first 6 days of hospitalization for patients with rhabdomyolysis. Mean INR of all patients not on coumadin was 1.2 ± 0.8. *Conclusions:* LFT abnormalities, particularly AST, are common in the setting of rhabdomyolysis without significant hepatic injury. AST concentrations decrease in parallel to CPK, suggesting skeletal muscle may be a significant source of AST elevation in these patients.

20. In-Vitro Release of Fentanyl from Transdermal Patches in Gastric and Intestinal Fluid

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Background: While treatment of opioid toxicity is relatively straight forward, ingestion of fentanyl transdermal patches offers a unique mode of drug delivery with unknown drug release characteristics. Rapid and prolonged clinical compromise has been seen after patch ingestion. It is unclear whether release of fentanyl can occur without disruption of patch integrity. We evaluate the in-vitro release of fentanyl from undamaged patches in gastric and intestinal fluid. *Materials and methods:* Ten ER 75mcg/hr fentanyl transdermal patches (Mylan Pharmaceuticals Inc., Morgantown, WV), simulated gastric fluid without enzymes (0.2% w/v NaCl in 0.7% v/v HCl at a pH of 1.2) and USP simulated intestinal fluid (Ricca Chemical Company, Arlington, TX) were obtained. One fentanyl patch was placed into each of 5 100mL aliquots of simulated gastric fluid and 5 100mL aliquots of simulated intestinal fluid. Flasks were agitated at 24rpm and incubated at 36.8ºC. Fluid was sampled at time zero and at 5, 15, 30, 60, 120, and 180 min after the patch was added. Fentanyl was assayed using UPLC-MS/MS (detection limit:0.5ng/mL). *Results:* Average cumulative release of fentanyl was determined for each time interval for each fluid type. An average of 239mcg and 1962mcg was released into the gastric fluid by 5min and 3hr, respectively. An average of 338mcg and 3139mcg was released into the intestinal fluid by 5min and 3hr, respectively. *Discussion:* Our results demonstrate release of fentanyl from undamaged transdermal patches, beginning within 5min of patch submersion, with an average of 26% and 41% of the 7.65mg of fentanyl contained within the 75mcg/hr patch being released into the gastric and intestinal fluid by 3hr, respectively (t-test 1.511 with p value two-tail 0.169). *Conclusion:* Our results demonstrate fentanyl release following patch submersion into gastric and intestinal fluid. These results help support that the rapid and prolonged clinical compromise seen after patch ingestion can occur without patch disruption. This represents the initial stages of research on the pharmacokinetics of fentanyl absorption following patch ingestion.

21. The Evolution of the Zip Code: From Streamlining Mail Delivery to Decision Support and Surveillance

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Background: In the early 1960s, the United States Postal Service implemented ZIP codes to facilitate mail delivery as mail volumes exploded in the US. Over the years, ZIP codes have come to be used for data reporting and analysis of public health information because it is easy to collect and offers a reasonable amount of anonymity. In many cases, it is the most specific geographic identifier collected. Issues can arise when analyzing and aggregating data collected by ZIP codes because of conflicts between the intended use of the coding system and the actual uses that have evolved over the last 50 years. This paper will examine these conflicts and their impacts in the context of drug identification call data collected by the Maryland Poison Center from 2005–2008. *Methods:* Drug identification calls from 2005–2008 reported to the Maryland Poison Center were reviewed for inclusion of a valid Maryland ZIP code. ZIP codes extracted from the data were used to facilitate the comparison of two ZIP code datasets and the ZIP Code Tabulation Areas ZCTAs) outlined by the US Census Bureau. ZIP code and ZCTA datasets were compared to one another to assess the differences in geographic extent of the datasets and the ability to aggregate the tabular and geographic data into standard reports based on county boundaries. *Results:* Nearly 87,000 drug identification calls were analyzed for the inclusion of a Maryland ZIP code. Within Maryland, differences in geographic extent had significant impacts on reporting and analysis. The differences in extent complicate not only aggregation of call data for reporting at the county, state and national level, but also its comparison to Census summary data for analysis. Mitigating these impacts involve recording more specific geographic identifiers, such as address, as part of the call taking process. *Conclusion:* A number of challenges exist when reporting and analyzing data aggregated by ZIP code because of its non-conformance to a hierarchical system, and its ever changing spatial and temporal definitions. These challenges introduce inconsistencies into reporting, analysis and surveillance that must be carefully considered when attempting to portray the most accurate and true picture of a particular phenomena for decision support.

22. Evaluation of Severe Adverse Drug Reactions (ADR) Reported to 3 Poison Centers (PC)

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Background: PC are often consulted for help in managing difficult, complex or non-routine cases, making centers potentially valuable sentinels for detection of ADRs. However PC generally report ADRs (if any report is made) as individual case reports or small focused cases series, underutilizing the toxicolsurvellience potential of PC. *Method:* Retrospective chart review of all cases from three regional poison centers for the years 2000 – 2007 with the reason as Adverse Drug Reaction and the medical outcome as either Major outcome or Death. *Results:* There were 159 major outcome ADRs and 15 fatalities, involving 100 separate drugs. Mean age of patients was 46 years, with a very broad range of 4 months to 96 years. ADRs were evenly distributed through the age groups with approximately 10% of cases per age decade. 89 patients (51%) were female. The most common categories were cardiovascular agents (n = 26), antidepressants (n = 25), antipsychotics (n = 23), Analgesics (n = 18), antimicrobials (n = 11) and herbal/alternative medicines (n = 9). The most frequent reported effects were confusion/agitation (n = 78), tachycardia (n = 62), hypotension (n = 59), renal dysfunction (n = 42), coma (n = 39), hypertension (n = 37), seizures (n = 36), hyperkalemia (n = 24), CPK elevation (n = 23) and bradycardia (n = 20). *Discussion:* PC recorded ADRs for a wide variety of drugs, across the entire age spectrum and involving clinically significant organ injury. PC served the dual role providing timely case management advice and well as recording the further surveillance of trends. *Conclusion:* Toxicosurvellience by PC should involve organized monitoring of ADRs and may be an important source of information for regulatory authorities.

23. Lethal Blood Lead Level in a Child Treated Successfully with Succimer

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Background: The mainstay of chelation therapy for pediatric patients who are symptomatic or have blood lead levels (BLL) greater than 69ug/dl is calcium disodium ethylenediaminetetraacetic acid ($CaNa_2EDTA$) and British Anti-Lewisite (BAL). Furthermore, 2,3–Dimercaptosuccinic acid (Succimer) is approved for treatment of lead-poisoned children but recommended only for asymptomatic children with levels between 45–69ug/dl. *Case report:* A 20–month-old female was seen in clinic for pallor, vomiting and episodic fevers occurring during the previous week. She was also noted to have eaten paint chips over the last 2 weeks. Evaluation revealed a pale child with mild hypertension and a history of Glansmann's Thrombocytopenia. A hemoglobin level was 5mg/dl and a BLL was 196mcg/dl. The patient was immediately transferred to the emergency department. Vital signs were BP 140/90 HR 148, RR 32, Temperature 37.3 C. The child had no gastrointestinal or neurological symptoms. Initial laboratory values included an iron level of 205mcg/dl, normal

Laboratory values

Date	Blood Lead Level ug/dl	Hgb g/dl
6/13/08	196	
6/13/08	185	5.6
6/14/08	168	4.9
6/15/08	132	8.0
6/16/08	112	10.3
6/17/08	107	8.9
6/17/08	73	9
6/22/08	41	9.8
6/28/08	27	10.5
7/6/08	16	11.6
7/13/08	28	
7/20/08	31	
7/27/08	42	
8/03/08	11	
8/17/08	13	

basic metabolic panel and liver transaminases, WBC 18,000 RBC 4.18, Hgb 5.6gm/dl, Hct 20.4%, MCV 49, MCH 13.4, Platelets 514,000, Alk Phos 163, Albumin 4.3. An abdominal x-ray showed radiopaque material throughout the small intestines. Whole bowel irrigation (WBI) was started at 500ml/hr. After 18 hours of WBI and persistent intestinal radiopaque material, treatment with Succimer was initiated at 100mg twice a day and increased to 200mg every 8 hours on day 2. One unit of packed RBCs was given on day 2. The patient remained asymptomatic and was discharged on day 5 with a BLL of 107ug/dl for outpatient treatment with Succimer. BLLs decreased from 196ug/dl to 13ug/dl over a 2-month period. Follow-up confirmed the patient remained asymptomatic. *Conclusion:* We report a case of one of the highest BLLs reported in the literature with minimal symptoms successfully treated with Succimer. Long-term neuropsychological and cognitive effects cannot be predicted.

24. State Department of Health Utilization of Poison Control Center Hazardous Substance Data

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Background: Currently there is interest in forging cooperative efforts between poison control centers and state departments of health. The Texas Poison Center Network (TPCN) provides data to the Texas Department of State Health Services (DSHS) Hazardous Substance Emergency Events Surveillance (HSEES), which, in turn, performs surveillance of spills or releases of hazardous chemicals. *Methods:* In 2004, a system was designed allowing for the TPCN database to be replicated and sent to DSHS on a daily basis. In January 2006, HSEES began to test whether relevant cases could be identified in this replicated TPCN database. The screening criteria were human exposures with the exposure reason being unintentional environmental or occupational and the exposure site being the workplace. In March 2008, as a consequence of the Public Health Emergency Preparedness grant, a system was developed so that each time a case meeting the criteria was uploaded to the National Poison Data System, HSEES would automatically receive an email notification of the case. *Results:* During 2006–2008, 5,392 TPCN cases met HSEES screening criteria. Of these, 77 were followed up by HSEES with TPCN serving as the sole reporting source for 75 of these cases. The chemicals most frequently involved in these cases were sodium hydroxide (13), chlorine (11), hydrofluoric acid (9), ammonia (5), phosphoric acid (5), and acetic acid (4). *Discussion:* During this test, of over 5,000 TPCN cases meeting HSEES screening criteria, only 75 were followed up by HSEES. Problems encountered included 1) the criteria for identifying TPCN cases of potential interest to HSEES were very broad, 2) difficulties occurred in replicating the TPCN database to DSHS and its compatibility with the HSEES database, and 3) the TPCN did not collect certain information required for HSEES to follow-up on a case easily. *Conclusion:* Poison control centers may serve as useful sources of data for state hazardous substance surveillance programs. However, various problems need to be overcome so that hazardous substance surveillance programs can 1) efficiently identify cases and 2) be able to follow-up on such cases effectively.

25. School-Based Poison Education for Teen Parents

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Background: Many poison prevention education programs in the community target parents of young children. Teen parents in secondary school may not be exposed to community poison prevention education programs. Many public school districts have educational programs specifically for teen mothers. This is an ideal setting to deliver poison prevention education. The objective of this project was to develop poison prevention education tools specifically for teen mothers. *Methods:* A needs assessment was conducted to determine the current poison prevention curriculum and identify level of interest in new or enhanced poison prevention curriculum. A formal lesson plan was developed based on the needs assessment and literature review. A slide presentation, handouts, and interactive activities were created. The program facilitator was instructed to follow the lesson plan instructions exactly and note any deficiencies. An identical pre-test and post-test was administered by the program facilitator. A follow-up telephone interview was conducted with the program facilitator and director. *Results:* The teachers reported that the lesson plan and materials were easy to follow and administer. All activities in the intervention were noted to be "very good" and reinforced the objectives of the program. The pilot test included 11 students. Overall, eight of the ten questions showed an increase in knowledge after the intervention. An informal poll of the students was conducted by the facilitator at the end of the class. The students noted ". it had a lot of good information and it was put together well". The facilitator and program director indicated they would use this program again. *Discussion:* Young parent programs have been an overlooked and underutilized opportunity to present poison prevention information to a potential at-risk population. Based on the results of the pre/post-tests, students gained valuable knowledge during the training. This intervention engaged the audience and increased their awareness of poison prevention and strategies to reduce potential poisonings. *Conclusions:* Many schools offer programs specifically for teen parents which provides a unique opportunity for poison prevention education.

26. Hemodialysis for Acute Salicylate Poisoning – How Much Is Enough?

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Background: Salicylate poisoning remains a common problem with appreciable morbidity and mortality. Severe salicylate poisoning can be life threatening, and aggressive treatment is required to reduce absorption and distribution as well as hasten elimination. We present a case of a patient with a large, acute aspirin ingestion who expired despite treatment with hemodialysis. *Case report:* A 35-year old male arrived at the ED 7.5 hours after ingesting 400 tablets of regular-strength aspirin. He initially was afebrile, with a RR of 30 bpm, HR 120 bpm, BP 125/76 mmHg and O2 saturation of 99% on RA. His initial salicylate concentration was 89.6 mg/dL. His initial ABG showed a pH of 7.48, pCO2 21 mmHg, paO2 97 mmHg, and bicarbonate 15.8 mmol/L. His initial serum chemistry panel was normal. He was given activated charcoal and started on intravenous (IV) hydration with sodium bicarbonate. Two hours after arrival, a repeat salicylate concentration was 91.6 mg/dL. The patient became agitated and hemodialysis was initiated 12 hours after ingestion. 27 hours after his ingestion, a repeat salicylate concentration was 88.4mg/dL and his repeat creatinine was 3.9 mg/dL. A second run of hemodialysis was then begun at that time. Following completion of his second hemodialysis session, his temperature had risen to 102.3°F, BP 122/64, HR 168, RR 43, and oxygen saturation 95% (2L NC). He became progressively more confused and died early that morning, approximately 40 hour after his ingestion. *Case discussion:* Many publications have attested to the clinical efficacy of hemodialysis in the management of severe salicylate intoxication however there is no consensus as to the duration and mode of therapy. Our case illustrates that patients with massive ingestions of aspirin and severe or life-threatening symptoms may require extended periods of hemodialysis in order to correct acid-base abnormalities and remove the drug from the blood. *Conclusion:* Even in cases where salicylate poisoning is recognized promptly and dialysis is instituted in a timely manner, end organ damage can occur.

27. Bradycardia and Prolonged Sedation Following Pediatric Ingestion of Renuzit® Pearl Scents Beads

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Background: Toxic effects from emissions of volatile organic compounds from air fresheners have been demonstrated in a number of experiments, but no cases of pediatric ingestion with slow release of air freshener content resulting in prolonged symptoms has been described in the literature. We report a case of prolonged sedation and bradycardia due to ingestion of essential oil containing fragrance beads in a child. *Case report:* A 2-year-old female was brought into an emergency department following 2 days of decreased talkativeness and persistent lethargy. Upon questioning the child admitted to ingestion of some fragrance beads. She was admitted to the hospital overnight, and the poison control center (PCC) was contacted the next day due to persistent sedation and bradycardia (HR = 88bpm). The product ingested was identified as Renuzit® pearl scents air freshener beads, and up to 20 beads had been ingested. After consult with a PCC Toxicologist, an abdominal film was ordered that revealed 4 radio-opaque beads of the same size as the ingested product, 3 in the secum, and 1 in the rectal portion of the intestines. The recommendation from the PCC to administer GoLYTELY® was accepted and initiated within 6 hours of consult. No evidence of intact fragrance beads were recovered in the effluent and the patient returned to baseline within the next 24 hours. *Case discussion:* A call to the product toxicologist for the Renuzit® Company revealed that the fragrance bead liquid composition consisted of 85% water with a proprietary mix of ethyl alcohol, alcohol ethoxylate, amine oxides, and perfume oils surrounded by an acrylic polymer shell. The product was designed to resist rapid emission of the essential oil content, with slow release of volatile organic compounds into the air as an air freshener. It was suspected that the slow emission design of the fragrance beads led to slower release of the volatile organic compounds after ingestion, leading to the prolonged sedation and bradycardia. *Conclusion:* Air freshener products designed for a slow release volatile emission, ingested in large enough quantity, may lead to prolonged central nervous system and cardiovascular effects necessitating medical intervention.

28. Changes in Risk Stratification on the Modified Rumack-Matthew Nomogram Following Acute Acetaminophen Overdoses

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Background: The Rumack-Matthew nomogram is used to predict hepatotoxicity risk in acute acetaminophen (APAP) overdose based on a single plasma acetaminophen concentration (PAC) at ≥ 4 hours. The objectives were to determine how often risk stratification increases to a higher group based on subsequent PACs and whether product formulation impacted risk stratification change. *Methods:* A retrospective review of acute APAP overdoses reported to a poison center over a 3 year period was conducted. Inclusion criteria consisted of at least one plottable PAC on or above the treatment line on a modified nomogram. A subset of these patients with ≥ 2 plottable PACs was identified. Line crossers were patients with an increase in risk stratification group on the nomogram based on subsequent PAC(s). Groups were 0 (below treatment line), 1 (between 2 lower lines), 2 (≥200 mcg/mL & <300 mcg/mL at 4-hr line), and 3 (≥300 mcg/mL at 4-hr line). Product formulation (regular, extended release, combination) and administration of activated charcoal were determined. *Results:* There were 289 cases that met initial inclusion criteria, of which 88 (30%) had ≥ 2 plottable PACs. Initial stratification was 12 group 0, 105 group 1, 82 group 2 and 90 group 3. Risk stratification level increased in 26 cases. Twelve patients

changed from group 0 (non-toxic) to groups 1 (n = 8), 2 (n = 2) or 3 (n = 2). Three patients changed from group 1 to groups 2 (n = 2) or 3 (n = 1). Eleven patients changed from group 2 to group 3. Extended release or combinations were ingested by 14/26 line crossers and 29/62 non-line crossers. Activated charcoal was administered to 18/26 line crossers. Of note, 8 of 12 line crossers who were initially in group 0 ingested combination products. *Discussion:* Increases in risk stratification occurred in 9% of all cases and 30% of patients with ≥ 2 plottable PACs. Almost half of the line crossers were initially determined to have non-toxic PACs, but ultimately increased their risk stratification to groups requiring antidotal therapy. *Conclusion:* While line crossing is infrequent overall, failure to identify patients in group 0 who cross into a group requiring antidotal therapy may result in poor outcomes.

29. Accidental Administration of Adult Dose Oxytocin to a Newborn

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Background: Oxytocin is a xenobiotic that increases intracellular calcium concentrations, and is often administered to postpartum women to augment uterine contraction. There is one published case report of an accidental intramuscular administration of oxytocin to a newborn infant resulting in transient apnea, bradycardia, and hyponatremia. We present 2 cases of neonates accidentally injected intramuscularly with adult doses of oxytocin, neither of which had a negative clinical outcome. *Case Report:* In our first case a newborn infant female was given 10U intramuscular oxytocin in the first hour of life. The oxytocin was mistaken for vitamin K. The child did well, and throughout the hospital stay the electrolytes and vital signs remained within normal limits. In the second case a newborn infant female was given 5U intramuscular oxytocin, again in the first hour of life. This time the oxytocin was mistaken for the hepatitis B vaccine. This child also did well, with stable normal vital signs, and 3 normal serum sodium levels all between 137 and 139 mEq/L. *Case discussion:* To our knowledge there is one other published case of oxytocin, as a single agent, being accidentally administered to a neonate. The oxytocin was given in the place of the intended drug, vitamin K. In that case the patient developed decreased urine output, hyponatremia, along with mild episodes of apnea and bradycardia. Our cases represent the second and third examples of accidental oxytocin administration to neonates, and both had benign outcomes. There are 4 published cases of accidental administration of Syntometrine, a combination of oxytocin and ergonovine, to newborns. In these cases the children did develop adverse effects and one child expired. In each of these 4 cases the oxytocin was mistaken for vitamin K. There are also published cases of neonates developing adverse effects after pre-delivery administration of oxytocin to the mother. *Conclusion:* The published reports of accidental administration of oxytocin, as a single or combination agent, to neonates lead us to believe that adverse side effects are to be expected. Our cases, however, suggest that some neonates may tolerate an accidental injection very well.

30. Teaching Pre-School Children about Poison Prevention as Means of Educating Parents

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Background: Poison center educators strive to reach out to parents of children under age 6 years with poison prevention messages. Approaches for outreach include educating pre-school students in childcare centers and/or sending educational materials home to parents. The former method is time and resource intensive. *Methods:* Two local health departments with similar demographics participated in the study. In the study county, classroom presentations were given to pre-school children attending local childcare centers with educational materials sent home. The control county sent educational materials home without a classroom lesson. Parents were provided a survey before and after the educational program and/or educational materials were distributed. *Results:* There were 203 pre- and 96 post-surveys in the study county compared to 247 pre- and 79 post-surveys in the control county. No significant changes ($p > 0.05$) were noted concerning the reported storage of drugs, household and personal care items in either group. Respondents in both study and control counties showed an increase in knowledge of the poison center (6.0% vs 12.8%), increase in hearing about the poison center from the school (20.3% vs 39.7%) and increase in having the poison center phone number posted (10.0% vs 23.3%). *Discussion:* The study was blinded resulting in potentially different groups of parents participating in pre- and post-surveys. Significantly fewer post-surveys were collected because some of the childcare centers had closed for the year before the post-surveys could be distributed. *Conclusions:* Teaching poison prevention lessons to pre-school students in childcare centers and/or sending educational materials home to parents had little effect on poison prevention practices in the home. Teaching poison prevention lessons in pre-school classrooms does not increase awareness of poison center services or posting of the poison center telephone number more than simply sending home educational materials.

31. A Fifteen-Fold Edrophonium Overdose

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Introduction: Edrophonium chloride is a reversible acetylcholinesterase inhibitor primarily used in the diagnosis of myasthenia gravis. Toxicity from therapeutic doses of edrophonium has been reported for decades; however, no case report of human overdose exists. We report a case of an accidental fifteen-fold overdose of edrophonium. *Case report:* A 73-year-old female was scheduled for an edrophonium (Enlon®, Tensilon®) test to confirm the diagnosis of myasthenia gravis. The patient was to receive 2 mg of edrophonium chloride, followed by another 8 mg, to reach a total of 10 mg. The patient accidentally received 20 mg as an initial dose. When the patient showed no improvement in dysphagia and other symptoms, the remainder of the vial, containing 130 mg of edrophonium, was administered. The total 150 mg dose of edrophonium was delivered IV within 1 minute. Immediately after the second dose, the patient complained of difficulty breathing and suffered a respiratory arrest. Atropine 1 mg IV was given resulting in a successful resuscitation. No hypersalivation was noted. The patient awoke, followed commands, and heart rate accelerated to 150's bpm. Within minutes, apnea, bradycardia, and loss of pulse recurred, but responded to epinephrine and atropine. Because of cardiopulmonary instability, she was endotracheally intubated. Approximately 20 hours post exposure, she was extubated and remained alert and neurologically intact. Vital signs were normal except for mild hypertension with BP = 147/64 mmHg. *Discussion:* Edrophonium chloride is a reversible acetylcholinesterase inhibitor and has been reported to cause bradycardia, dyspnea, and even respiratory arrest at therapeutic doses. The patient we report experienced all symptoms listed above with a fifteen-fold overdose, but fully recovered with supportive measures. *Conclusion:* Despite well known side effects at therapeutic doses and the manufacturer's recommendations for having atropine at the bedside, surprisingly, no actual human overdose of edrophonium has been reported. This is the first reported case, to our knowledge, of an overdose of edrophonium, and the patient recovered without any sequelae.

32. Retrospective Review of Anti-Ethanol Drug Acamprosate Poison Center Exposures

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Background: Acamprosate (Campral®) was FDA approved in 2004 for treatment of alcohol dependence. Acamprosate is a synthetic taurine derivative structurally similar to gamma-amino-butyric acid. There are no human reports of acute acamprosate poisonings. *Methods:* Retrospective review of all acamprosate exposures to a poison control system from years 2004–2008. Data was extracted from an electronic database using the term acamprosate. *Results:* 41 cases were identified over the 4 year study period. 8 cases involving isolated acamprosate ingestions were evaluated. One case involved a 2y/o that was reported to only have a "taste" and was excluded. One child and 6 adults, ages 1-66y/o, were included. Amounts ingested ranged from 333mg–16.7g. A 23y/o male ingested 16.7g in suicide attempt and manifested gastrointestinal upset and diarrhea only. The other ingestions were accidental or therapeutic misadventures: 3 patients were asymptomatic, 1 nauseated, 1 vomited, 1 mild chest pain. All resolved without intervention. Additionally, there were 5 cases of intentional acamprosate and ethanol ingestions. Ages ranged from 46–53y/o. Somnolence was reported in 2, gastrointestinal effects in 2, and 1 was asymptomatic. No cardiovascular effects were reported. *Discussion:* Acamprosate's proposed mechanism of action involves reducing hyperglutamatergic states of cravings by interacting with NMDA receptors. Because of this, cardiovascular effects are uncommon and adverse effects are typically limited to nausea, vomiting, diarrhea, decreased appetite, and somnolence. In isolated acamprosate exposures, we identified predominantly minimal to no effects. *Conclusion:* Our data suggest in single acamprosate exposures, no or minimal toxicity would be expected. Larger, prospective studies are required to confirm our findings.

33. A Retrospective Poison Center Review of Varenicline-Exposed Patients

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Background: Varenicline (Chantix) was approved by the Food and Drug Administration as a prescription smoking cessation aid in May 2006. Varenicline is both a partial nicotine agonist and an antagonist. The purpose of this retrospective study was to determine clinical effects and outcomes of varenicline-exposed patients. *Methods:* We performed a search of a poison control system electronic database from August 2006-August 2008 using the term varenicline or Chantix. Cases that matched these results were reviewed. All ages were included. Cases with co-ingestants and unknown outcomes or incomplete charts were excluded. Signs, symptoms and medical outcomes were extracted from the database. *Results:* 36 cases met inclusion criteria. 15 cases were excluded. 11 cases involved adults aged ≥ 18 years old. 10 cases involved children aged < 18 years of age. Exposures were intentional in one adult (9%) and one child (10%). Among the adults, 6 (54.5%) were male, 5 (45.5%) were female. Average age was 41 years. Average dose of exposure was 7.8mg. Among the pediatric patients, 2 (20%) were male, 8 (80%) were female. Average age was 3.6 years. Average dose of exposure was 2.1mg. Nausea was reported for 3 adults (27%). Vomiting was reported for 4 children (40%). Irritability was reported in 2 adults (18%) and 2 children (20%). 5 adults (45%) and 5 children (50%) reported no adverse effects; 4 adults (44%) and 3 children (30%) reported one adverse effect; and 2 adults (18%) and 2 children (20%) reported more than one adverse effect. 8 adults (73%) and 5 children (50%)

were managed at home. Of the 3 adults (27%) and 5 children (50%) evaluated at a healthcare facility, one adult (9%) and one child (10%) were admitted. Their symptoms included ataxia, agitation and tachycardia. *Discussion:* The most common adverse events encountered in our series of varenicline exposures were vomiting, nausea and agitation. Of our 21 patients, one child and one adult were admitted to the hospital and were discharged within 24 hours. *Conclusions:* Patients exposed to varenicline develop mild symptoms. Additional study is needed to determine toxicity thresholds for this drug.

34. The Use of Modern Photographic Technology for Animal Identification

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Background: Product, substance, plant, or animal identification can be challenging for even the most seasoned specialist. We present a case where a caller used her cellular phone to photograph the offending animal (snake) and then email the picture to the specialist from her cellular phone. After a typical phone interview and initial medical management, our suspicion of the snake's identification was confirmed with the provided photographic evidence. *Case report:* A 4 year-old male child was found near a pond playing with a "medium size copper colored snake" which had bitten him once on a finger. The specialist receiving the call attempted to rule out the possibility of a Northern Copperhead envenomation which is common in our call area. Since the snake was still in the area near the child, a photograph was taken with the caller's cell phone and emailed to the specialist handling the case. Within minutes we had photographic evidence that supported our supposition that the animal in question was a non-poisonous Eastern Milk Snake. These photos were then forwarded to a herpetologist at our local zoo who confirmed our identification. *Case discussion:* Although the risk of a serious or fatal outcome in this example is remote, this does not discount the potential of using this type of common technology to aid in the telephone management of many types of poisonous exposures. In some cases, correct substance identification could significantly affect patient outcome. This concept can easily be extrapolated to other substances such as product labels, tablet identification and even large scale events such as hazardous materials operations where placards on vehicles or storage facilities need to be correctly identified. Callers could even take a picture of dermal symptoms to support verbal descriptions. *Conclusion:* One of the most challenging facets of telephone medical management is the correct understanding of exactly what substances poison information specialists are trying to identify. Using common technology such as camera phones with internet access, the poison information specialist has another tool to ensure correct substance identification and case management.

35. Naloxone in Cardiac Arrest with Suspected Opioid Overdoses

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Introduction: Naloxone's use in cardiac arrest has been of recent interest, stimulated by conflicting results in both human case reports and animal studies demonstrating antiarrhythmic and positive inotropic effects. We hypothesized that naloxone administration during cardiac arrest, in suspected opioid overdosed patients, is associated with conversion to a cardiac rhythm more likely to result in tissue perfusion *Methods:* From a database of 32,544 advanced life support (ALS) emergency medical calls, between January 2003 until December 2007, a retrospective chart review was completed of patients receiving naloxone in cardiac arrest. Forty-two patients in non-traumatic cardiac arrest were identified. Each patient received naloxone because of suspicion by a paramedic of acute opioid use. *Results:* Eleven of the 36 (31%) patients in cardiac arrest who received naloxone in the pre-hospital setting had an improvement in EKG rhythm. Of the participants who responded to naloxone, 45% of the responders (14% of all study subjects) demonstrated EKG rhythm changes immediately following the administration of naloxone. *Discussion:* We support the use of Naloxone during cardiac arrest involving any suspicion of opioid use. With current low rates of survival and low return of spontaneous circulation during cardiac arrest, any potential improvement in rhythm makes this a reasonable modality.

Characteristics of patients by rhythm changes

[table 1]	Responders (11)	Non-Responders (25)
Age (Years)	46	40
% Male	55	76
Drug Dose	2.2	2.3
Initial Rhythm		
Asystole	73	60
PEA	27	36
Vfib		4

36. Degradation and Fragment Formation of Succinylcholine in the Prehospital Environment Using Mass Spectrometry

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Objective: Pharmaceutical manufacturers recommend refrigerating Succinylcholine at a temperature range of 2-8 °C With widespread use of prehospital Succinylcholine on ambulances of varying temperatures, there is increasing importance in maintaining drug stabilityand removing it from ambulances at proper time periods which may be prior to expiration dates. We determined time period of 10% degradation, as deemed not appropriate for human injection by the FDA, using Mass Spectrometry. Various studies have stated that vials are stable for up to 30 days at room temperature without significant decomposition. Our study investigates the degradation of Succinylcholine parent compound before and after its exposure to fluctuations of temperatures while removing light exposure. *Methods:* The study used seven vials of Succinylcholine sealed with duct tape and light resistant bags. These bags were placed in built in climate controlled medication compartments in the ambulances at our University Based Level l Trauma Center. One Succinylcholine vial was used as a control and kept at the recommended temperature range of 2-8 °C. Mass spectrometry was implemented On the 1st and 14thday and every four weeks up to six months. *Results:* Using mass spectrometry, degradation products of Choline and Monocholine are present at O days indicating immediately fragments being formed when placed in the vial. Ten percent degradation with fragment formation occurs at 90 days. Temperature variation in the ambulance climate controlled compartment is 70 degrees Fahrenheit with a variation of 53 degrees Fahrenheit to 126 degrees over the six month time period. *Conclusions:* Identifiable breakdown fragments of Succinylcholine have been identified using Mass Spectrometry with fresh drug immediately shipped by the manufacturer. Tenpercent degradation was not found until 90 days indication with large temperature variations, the medication is safe for injection until this time period.

37. Isopropanol Treatment of Ethylene Glycol Poisoning; Erroneous, but Successful

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Background: Accidental and intentional ethylene glycol ingestions are common in cold and temperate climates. Early treatment includes blockade of the enzyme alcohol dehydrogenase (ADH) with ethanol or fomepizole, agents having higher affinity for the enzyme than ethylene glycol. This halts the production of toxic and acidic metabolic products. *Case description:* A 52 year-old male ingested an estimated 8 ounces of ethylene glycol antifreeze. He was described as mildly inebriated, but otherwise stable, with normal vital signs. Fomepizole was unavailable and treatment with an ethanol intravenous infusion recommended. Blood samples were sent to another hospital laboratory for measurement of an ethylene glycol level. The patient developed significantly decreased mental status, but continued to have good airway control and normal vital signs. Serial blood gas and chemistry studies demonstrated no metabolic acidosis. The initial ethylene glycol level was 52 mg/dL, but the ethanol level was < 10 mg/dL with the infusion running. An increase in the ethanol infusion rate, serial ethylene glycol levels, and serial ethanol levels were recommended. Recommendations were made to ensure the ethanol drip was infusing and to ensure it was the 10% concentration used in the provided calculations. About 12 hours into therapy, the treating physician discovered that the hospital pharmacy had been unable to obtain medicinal ethanol and had prepared the infusion with isopropanol. The isopropanol infusion was stopped and a single dose of fomepizole administered. Serial ethylene glycol levels were obtained until it became 14 mg/dL about 32 hours after the ingestion. The patient had progressive improvement in his mental status and was transferred to an inpatient psychiatric facility about 48 hours after ingestion. *Clinical implications:* Isopropanol has high affinity for ADH. We could find no other cases of its use in ethylene glycol or methanol poisoning, but it could serve as an alternative ADH blocker if ethanol and fomepizole are unavailable. Significant decreased mental status should be anticipated with its use.

Ethylene Glycol Metabolism on Isopropanol

Time Since Ingestion	Ethylene Glycol Level
1 hour	52 mg/dL
16 hours	22 mg/dL
32 hours	14 mg/dL

38. Fatal Overdose of Bupropion Controlled Gastrointestinal Delivery System; Not Tablets or Capsules Anymore!

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Background: Controlled gastrointestinal delivery systems are non-digestible pill-shaped containers using a variety of technologies; polymer coatings, semi-permeable membranes, multiple compartments, and laser-drilled holes. Continuous delivery of medication is provided as the container transits the gastrointestinal system, with significant potential impact on toxicity and overdose management. *Case description:* A 58 year-old male ingested Bupropion (Wellbutrin XL® 150 mg). He had altered mental status, tachycardia, hypotension, and seizures. After initial stabilization, he developed progressive QT prolongation, precipitous cardiac arrest, and death 36 hours after admission (46 hours after ingestion). On autopsy, 50 intact "tablets" remained in his stomach. Bupropion is proving to be a moderately toxic antidepressant in overdose. Adding to toxicity is availability in a controlled gastrointestinal delivery system (Wellbutrin XL®). *Clinical implications:* Controlled gastrointestinal delivery systems release medication with the goal of producing steady blood levels for up to 24 hours. Release may continue as long as the device remains in the gastrointestinal tract. Accumulating drug levels, delayed time to peak toxicity, and prolonged duration of toxicity can occur in overdose. Liquid activated charcoal may quickly leave the stomach, but delivery systems remain to provide a continuous reservoir of agent. Management with sequential doses of activated charcoal, whole bowel irrigation, or endoscopic removal may be justified. Various systems are

Agents in controlled gastrointestinal delivery systems

Delivery System	Agent	Specific Preparation
SmartCoatTM	Bupropion	Wellbutrin XL®
SmartCoatTM	Metformin	Glumetza®
SmartCoatTM	Tramadol	Ultram® ER
OROS®	Chlorpheniramine	Efidac 24®
OROS®	Glipizide	Glucotrol XL®
OROS®	Hydromorphone	OROS® hydromorphone
OROS®	Methylphenidate	Concerta®
OROS®	Nifedipine	Adalat® CR
OROS®	Paliperidone	Invega®

Not a comprehensive list of systems, agents, or preparations

available and being developed. Manufacturers are partnering with pharmaceutical companies to provide patent and generic agents in controlled gastrointestinal delivery systems. Consistent nomenclature needs developed.

39. PCC Public Education and Home Gastric Decontamination Trends

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Background and history: In 1965, syrup of ipecac (SI) was approved by the FDA as an OTC product for emergency poison treatment, and for many years was the mainstay of home gastric decontamination. Activated charcoal (AC) has been utilized much less in the home, reserved mainly for health care settings. In 2003, an FDA Advisory Committee discussed whether SI should retain its OTC status; the outcome was that it remained OTC. The FDA has revisited this issue, but no changes have been made. In 2003, the American Academy of Pediatrics (AAP) issued a policy statement that SI should "no longer be used routinely as a home treatment strategy." The AAPCC guideline adopted in 2005 states "the circumstances in which ipecac-induced emesis is appropriate are rare." Over the last six years, there has been significant controversy over whether to recommend either SI or AC for home use. PCC public educators used to advise all parents to keep SI on hand, less commonly AC. This study looks at trends in PCC's recommendations for home gastric decontamination in the period since the FDA, AAP and AAPCC guidelines were issued. *Method:* US and Canadian PCC public educators were surveyed in 2003 and 2009 to determine trends in PCC educators' advice after the FDA, AAP and AAPCC statements. They were asked if their PCC advised home use of SI and AC. In 2003, 41 PCCs replied; in 2009, 34 replied. *Results:* **2003:** SI: 39% advised keeping SI on hand at home; 54% did not; 7% had no firm policy. AC: 17% advised AC at home 78% did not; 5% had no firm policy. **2009:** SI: 3% advised SI; 88% did not; 9% had no firm policy. AC: 9% advised AC; 88% did not; 3% had no firm policy. *Discussion:* We found that between 2003 and 2009, PCCs decreased their recommendations for both SI (39% to 3%) and AC (17% to 9%) in the home. Survey respondents' comments were invited and many educators commented that they always advise contacting the PCC before giving either. *Conclusion:* PCCs and their public educators have transitioned from advising all parents to keep SI on hand to an individualized approach; some advise home use of SI, some advise home use of AC, and many PCCs don't expressly recommend either.

40. PCC Management: Using PI Ps and Technology To Maximize Efficiency

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Background: The limited budgets and unique nature of PCCs as telemedicine consultants present challenges to PCC managers with regards to staff scheduling and balanced workload. Call and exposure (exp) volume are not comprehensive productivity measures due to the wide range of cases. Phone calls range from short general public info calls requiring limited documentation and no f/u, to critically ill multi-substance ingestions from HCFs, which involve research, lengthy documentation and numerous f/u. Staff who manage PCC calls are either Specialists in Poison Information (SPIs) or Poison Information Providers (PIPs). All SPIs are health care professionals (RN, PharmD, MD). PIPs have a BS degree and are either pharm techs, EMTs, or have prior experience in healthcare. They are supervised by a Certified SPI at all times. *History:* Annual stats for our regional PCC: case volume 100,000, total exp volume 85,000, and HCF exp volume 24,000. Staffing: 6.5 FTE PIPs, 1 FTE SPI, and 13.25 FTE CSPI. Average PIP tenure is 9 yrs, with a range of 1 to 11 yrs. A VOIP based ACD call routing system was installed in our PCC in 9/08, and provides detailed reports on all phone activity. The phone tree directs callers to press 1 if they are from the general public (GP) and 2 if calling from a HCF. Preferentially, GP calls go directly to a PIP if available, and all HCF calls go to SPIs. *Discussion:* The table below depicts average telephone workload for a 5 month period. PIPs take more cases and exp per hour, but total minutes per hour handling poisoning calls are slightly below that of SPIs. 90% of GP exposures can be managed on-site with simple first aid instructions; 64% are closed as minimal effects possible without any further f/u. Using trained PIPs to handle these calls allows SPIs more time to manage HCF cases. SPIs handle 17,500 calls/yr originating from HCF (30% of individual SPI call volume) and f/u on all cases referred to HCF (~6,500/yr) *Conclusion:* Telephone technology and using PIPs as SPI extenders closely aligns the talents of our workforce to the appropriate skillsets and allows our PCC to run efficiently.

	Total cases/hr	Exp/hr	Incoming*	Outgoing (f/u calls)*	Total min/hr*
SPI	2.2	2	7.7	6.5	14.2
PIP	3.5	3	11.2	2	13.2

*In minutes per hr

41. Pulmonary Complications Related to Cocaine Base Paste Abuse

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Background: Cocaine base paste (CBP) is a highly addictive form of smoking cocaine. Lung injury is due to CPB compounds (cocaine, other alkaloids, adulterants) and the route of administration: inhalation of base paste from burning aluminum cans and plastic pipes. *Objective:* determine the main respiratory clinical features and pulmonary complications of CBP use. *Method:* this is a retrospective study of twenty CBP smokers who were admitted to the Drug Treatment Reference Centre during a three month period. Patients with less than one year of CBP use, known lung disease and HIV infection were excluded. Data were obtained from medical history, chest radiography, high resolution computed tomography (HRCT), respiratory function test, doppler echocardiography and complete blood count. *Results:* All patients were men, regular CPB smokers with an average age of 26 years. Tobacco and cannabis use was present in all the sample studied. The media duration of cocaine smoking was 4 years. 82% of CBP users revealed a history of cocaine hydrochloride use, and 11 % of crack abuse. Respiratory symptoms were present in all CBP users, including cough, dyspnea, wheezing, and carbonaceous sputum. Frontal chest radiograph showed bilateral areas of increased opacity in eighteen cases. HRCT scan revealed air space nodules in nine patients. In two cases interstitial damage was found. Emphysema was present in four CBP users. Respiratory function test and Doppler echocardiography were normal in all cases. Mild eosynophilia was found in five patients. Pulmonary alterations were found in all non crack users. *Discussion:* Respiratory symptoms in CBP users are common. Pulmonary complications as tracheobronchitis, eosynophilic pneumonitis, emphysema and small airway obstruction seen in this preliminary study reveals that, despite the difference between crack and CBP composition, both are smokable forms of cocaine with a similar respiratory toxicity. Role of tobacco and marijuana is discussed. Respiratory function tests are normal in mostly smoking cocaine users. Further studies in order to caractherize "CBP lung" should be performed, including determination of diffusion capacity of carbon monoxide and bronchoalveolar lavage.

42. Successful Resuscitation of a Doxepin Overdose Using Intravenous Fat Emulsion (IFE)

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Background: Experimental evidence demonstrates that intravenous fat emulsion (IFE) improves cardiovascular function following poisoning from a variety of toxins. Actual data from poisoned humans is very limited. We describe the first case of a doxepin induced cardiovascular collapse successfully resuscitated with IFE. *Case Report:* An 80 year old man was brought to the ER after an apparent doxepin overdose. He was last seen normal 4 hours prior to his arrival. His family found him with an empty bottle of doxepin and his own funeral arrangements. By history, the patient ingested about 1.5g of doxepin (19mg/kg). In the field his GCS was 3, with a BP of 56/34 and a HR of 60, and he was intubated. An ECG revealed a QRS of 113 msecs. The patient was treated with IV fluids, dopamine and 2 ampoules of NaHCO3 bolus followed by a NaHCO3 infusion. Laboratory analysis was non contributory. Dopamine was stopped and increasing titrations of norepinephrine and vasopressin were started for refractory hypotension, as well as 6 ampoules NaHCO3 for continued QRS widening. Orogastric lavage was performed and activated charcoal was given. Despite a pH of 7.73 with a Pco2 of 23, he continued to be profoundly hypotensive. At the suggestion of the on-call toxicologist IFE was started as a 225mL bolus of 20% IFE followed by an infusion, for a total of 100g over 90 min. While the infusion was running, the patient developed non sustained ventricular tachycardia. The patient received treatment with lidocaine and magnesium sulphate. At about 2.5h after the start of IFE, his BP stabilized and he was weaned off his bicarbonate and vasopressor infusions. *Conclusion:* This case highlights an extraordinary outcome in an unstable doxepin overdose treated with IFE. IFE therapy has a potential role in the treatment of other lipophilic ingestions such as beta blockers, calcium channel blockers and toxicity from local anaesthetics. Future case reports and experiences need to be collected in order to define IFE therapy's precise role in the management of overdoses.

43. Fatal Occupational Methanol Toxicity after Confined Space Entry in Two Freighter Crewmembers

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Background: Methanol toxicity is an infrequent cause of morbidity and mortality in the occupational setting. Typical non-occupational exposures involve the ingestion of products such as moonshine or automotive fluids. Methanol exposure via the inhalational or dermal route may occur in the occupational setting. We present

a case of severe methanol toxicity (one fatality and one severe disability) in two freighter crewmen exposed to methanol during a confined space entry. *Case Report:* Two sailors were working on a tanker vessel that had just offloaded a shipment of methanol. The empty tanks were being cleaned with salt water and the two crewmen were tasked to enter the confined space for a short period of time. Reports indicate that they were each wearing personal protective equipment (PPE) with a self-contained breathing apparatus (SCBA). One man complained of a headache 2.5 hours after leaving the confined space and was found dead in his cabin 24 hours later. The autopsy confirmed cause of death to be "acute toxicity due to methanol." The second man developed dizziness and vomiting about 27 hours after his exposure in the confined space. He was transferred to a hospital on shore where he continued to deteriorate necessitating intubation for altered mental status. He was acidotic with an elevated serum osmolality. When the methanol exposure history was discovered, he received fomepizole and underwent hemodialysis. His initial methanol level was 89 mg/dl. His condition improved and he was extubated, however he was noted to have significant visual loss and cognitive defects. *Case discussion:* This case underscores the dangers of confined space entries involving potentially dangerous chemicals. Potential routes of exposure in this case include dermal absorption of liquid or vapor, inhalation as a result of failure of protective measures, or ingestion. *Conclusion:* We report two cases of occupational methanol toxicity after a confined space entry. While the exact route of exposure is still under investigation, this incident highlights the significant occupational hazard associated with confined space entry in a toxic atmosphere.

44. Poison Control Center Utilization of Remote Agents during Hurricane Season

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Background: To improve the surge capacity of a poison control center (PCC), two remote telecommuting workstations were added to the PCC. These remote agent workstations are designed to be operated by regular PCC call-takers from remote locations, usually at the call-takers homes, during surge events or when a center is closed due to a natural or man-made disaster. We describe the utilization of these remote agents during two 2008 hurricane season events. *Methods:* Total call volumes were tallied for remote agents during the times of disaster impact. Tropical Storm Edouard caused the PCC to close the afternoon of August 4; the PCC reopened on the morning of August 6. Remote agents handled calls during the evening of August 4 and on August 5. Hurricane Ike caused the PCC to close on the morning of September 11. The PCC did not open again onsite until the morning of October 2. Due to evacuations and home damage, one remote agent was not deployed until September 20; the other was deployed on September 22; both were off-line September 27–28. *Results:* From July 1-August 3, the PCC handled an average of 203 calls per day. On August 5, the remote agents handled 144 calls. From August 6–31, the PCC handled an average of 208 calls per day. From September 20–26 and September 29-August 1, the remote agents handled 969 calls with a daily average of 97 calls. During October 2–31, the PCC handled a daily mean of 174 calls. *Discussion:* Remote agents were able to answer calls during two emergency events that resulted in the closing of the PCC. During Hurricane Ike, the impact of the storm was so great that it delayed the implementation of the remote agents. The number of calls handled by the remote agents was lower than that typically handled by the PCC; however, the remote agents enabled the PCC to remain operational. *Conclusion:* Remote agents allow a PCC to continue to operate during evacuation emergencies; however, during a severe event the remote agents also may be impacted by the event, thereby delaying deployment. Two remote agents were not able to handle the same volume of calls as a fully functional PCC. Remote agents can play a role in reducing the impact of disaster events on a PCC.

Change from 2002 to 2008

	ID as % of Total Call Volume	Public ID as % of Pill IDs	HCP ID as % of Pill IDs	Law Enf ID as % of Pill IDs
Policy Center	↑23%	↓36%	↓54%	↑220%
Non-Policy Centers	↑92%	↑14%	↓68%	↑4%

45. Effect of a Restrictive Pill Identification Policy – Six Years Post-Implementation

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Background: Poison centers have long recognized the controversies regarding pill identification (pill ID) services. In 2003, our poison center implemented a restrictive policy that limits the provision of pill ID to the public based on specific criteria, while continuing to provide pill ID to healthcare providers and law enforcement with little restriction. Primarily, we no longer provide pill ID to callers who have "found" a pill or who are asking for the ID of a pill belonging to another individual. *Objective:* The objective of this analysis was to determine the effect of this restrictive policy on pill ID calls at our "Policy Center" (PC) versus "Non-Policy Centers" (NPC). A secondary objective was to determine the effect on the proportion of total pill ID requests from 1) the public, 2) healthcare providers, and 3) law enforcement and to compare this data to that of NPCs. *Methods:* Standard Toxicall® (electronic charting) reports were run for the PC and five NPCs for 2002, the calendar year prior to policy implementation, and for the 2008 calendar year. NPC results were combined and reported in aggregate. *Results:* The overall change in pill ID calls is depicted in the table. Also depicted are the changes in proportion of calls from the public, healthcare providers, and law enforcement expressed as a percentage of total pill ID calls. *Conclusion:* The restrictive policy appears to have significantly slowed the growth of pill ID from the public sector. A shift in pill ID calls from law enforcement is also seen. *Discussion:* As poison center administrators face financial challenges, they should consider the impact of the provision of pill ID services. Implementation of a restrictive policy may successfully slow the growth of these calls allowing staff to focus their efforts on services consistent with their missions. As pill IDs from law enforcement officers continue, centers may want to consider implementation of a fee-for-service plan to cover necessary expenses in the provision of these services.

46. Use of a Survey To Evaluate Education Effectiveness

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Background: A question that has plagued poison center educators over the years has been: How effective is the education that takes place at health fairs? One measure of success is the number of attendees gaining awareness of poison center services. Increased knowledge also occurs at health fairs but is difficult to report. A survey method using postcards was used in an attempt to measure education outcomes. *Methods:* Senior citizens at a health fair were asked about their willingness to participate in a survey. They were given a packet of brochures, a stamped postcard and an explanation of the tabletop display. Participants were instructed to take the packet home and answer four open-ended questions on the postcard. An incentive gift (LED nightlight) was mailed upon receipt of the postcard. Question# 1 centered on customer satisfaction ("How did you like the exhibit?"). Question #2 related to increased awareness ("What did you learn?"). The last two questions asked behavioral intentions regarding poison prevention. *Results:* The postcard return rate was 30% and the participants provided an amazing variety of responses. Some had no prior knowledge about poison centers while others simply needed to know the hotline number. They learned facts about plants, pets, insects, medications and insects. Seniors described poison prevention plans such as deleting food toxins from a pet's diet, improved container labeling, checking for expired drugs, moving toxic houseplants and checking hazards room-by-room. *Discussion:* Facilitating free text responses yielded more information than a multiple choice test where seniors could simply "check the boxes." The survey provided qualitative information that recorded increased awareness at a health fair. *Conclusion:* The postcard survey was a successful method of evaluating poison prevention message and calls-to-action. Behavioral outcomes were shown in intentions to carry out poison prevention activities in the home. As a needs assessment, it identified topics of interest that will be highlighted in future displays, presentations and publications for seniors.

47. Accidental Poisoning with Monosodium Methanearsonate

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Background: Monosodium methanearsonate (MSMA) is an organo-arsenic herbicide. *Case series:* Seven healthy teenagers (15 to 18 years old) accidentally used the liquid in a 5-gallon white plastic container, thought to be cooking oil, to fry fish. Each ate three to five bites of the fish. Within 30 minutes several began vomiting. They learned the container contained MSMA (24% As by weight) and sought medical care. All of them experienced varying degrees of nausea, vomiting and diarrhea within 3 hours. They were treated with intravenous fluids and promethazine. Initial renal and hepatic tests and electrolytes were all normal. They were treated with dimercaprol 2.5 mg/kg IM every four hours for 24 hours. After 24 hours all of them were feeling well and they were discharged on succimer 10 mg/kg TID for 5 days followed by 10mg/kg BID for 14 days. Serum arsenic levels 7 hours after the ingestion were 328 to 613 µg/L (nl 0–22). Urine arsenic levels 6 hours after the ingestion and prior to dimercaprol were 64,147 to 226,328 µg As/g-creat (nl <50). Arsenic levels in 24-hour urine collected the first day during dimercaprol treatment ranged from 2,321 to 12,310 µg/L (nl <80 µg/L). Five days after the ingestion, the serum arsenic levels had returned to normal (6 to 13 µg/L). Twenty-four hour urine arsenic levels were 42 to 336 µg/L (60 to 208 µg As/g-creat). On day 24, after completion of the succimer therapy, 24-hour urine arsenic levels were all normal, 10 to 34 µg/L (25 to 52 µg As/g-creat). Five of the seven had mild elevations of the AST, peaking between 64 and 238 U/L (nl <50 U/L) on the third day, then returning to normal. They were followed for 15 months. None of them reported any academic problems in school or had symptoms of neuropathy or other problems. *Discussion:* MSMA is an organic pentavalent arsenic compound. It is felt to be less toxic than inorganic trivalent arsenic, although human toxicity information is limited. *Conclusions:* This accidental ingestion of MSMA resulted in extremely high levels of arsenic in the serum and urine. All seven individuals experienced GI symptoms and five had mild transient elevations of the AST. All were treated with dimercaprol and succimer. No persisting problems were observed.

48. Fatal Occupational Exposure to Trimethylsilyl-Diazomethane

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Background: Diazomethane (DM) is a highly explosive, toxic methylating reagent causing severe pulmonary injury. Trimethylsilyl-diazomethane (TSDM) is a less explosive analogue that may not be less toxic. We describe the first documented case of a fatality following TSDM exposure. *Case report:* A 46 year-old male pharmaceutical chemist presented to the ED with progressive dyspnea. At noon on the prior day, as part of a chemical analysis, he had mixed 2 mL of acetone with 25 mL of L-Malic acid to which was added TSDM dissolved in n-hexane. After 1 hour this mix was combined with an inert gas and a small amount of methylene chloride under a fume hood that was later reported to be nonfunctioning. Although he experienced no immediate mucous membrane irritation, 8 hours post-exposure he developed cough, pleuritic chest pain, hemoptysis, and progressive shortness of breath; by 15 hours, he presented to the ED in respiratory distress, hypoxic (PaO2 67), hypercarbic (PaCO2 46), and acidemic (pH 7.26). A chest radiograph showed an acute lung injury pattern. By 23 hours he required intubation. At 26 hours post-exposure he developed profound bradycardia, refractory hypotension, and asystole. *Case discussion:* DM inhalation is known to cause fatal pulmonary edema without an immediate irritant prodrome and with a similar time course to this case. Structural modification of DM with an added trimethylsilyl group makes TSDM less explosive, but its propensity for lung injury is unclear. The chemical admixture as described in this case may have liberated nitrogen gas, but this should not have led to pulmonary injury; nitrogen dioxide should not have evolved. The toxicity may stem from residual DM present in the reagent or a direct effect of TSDM, its metabolites or breakdown products, or potential intracellular formaldehyde formation. *Conclusion:* The temporal relationship to exposure with inadequate ventilation and clinical effects similar to the analogue toxicant DM support a causal relationship between TSDM and acute lung injury. Additional safety data for this chemical is warranted, including experimental inhalation testing in animals.

49. Severe Coagulopathy Associated with a Mild Rattlesnake Envenomation

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Background: Rattlesnake envenomation can cause tissue injury and coagulopathy. We report a case of severe coagulopathy out of proportion to local tissue injury following a rattlesnake envenomation. *Cased report:* An 8 year old child was hiking at a local mountain when he suffered an envenomation from a thirteen inch, dark snake. Initial ED examination two hours after the bite revealed a single puncture wound to the tip of the right thumb with 3mm of surrounding ecchymosis and mild edema extending to the metacarpophalangeal joint. The remainder of his right upper extremity was normal. Six hours post envenomation his exam remained unchanged and there were no clinical signs of bleeding. However, laboratory studies revealed an INR of 10, PT 96 seconds (9.7–11.7), and fibrinogen < 50 mg/dL (200–400). Repeat labs fourteen and twenty-one hours post-envenomation were INR 4.2 and 1.9; PT 39 and 19; and fibrinogen <50 and <50 respectively. The patient declined analgesics. Antivenin was not given in light of minimal tissue injury and no clinical bleeding. He was discharged on day two. Outpatient labs five days after envenomation were: INR 1.1 and Fibrinogen 104. *Case discussion:* This case demonstrates the potential for profound coagulopathy with only mild local tissue injury following rattlesnake envenomation. Despite defibrinogenation he was managed expectantly, discharged home in less than 48 hours, and had an uneventful clinical course. No confirmation of exact species was possible, but the Timber and Canebrake rattlesnakes inhabit the geographic area. *Conclusion:* While it is common to assume an association between coagulopathy and the severity of local tissue injury, either may be possible in relative isolation. Recovery at home may be reasonable when there is no clinical bleeding, despite persistent abnormal coagulation studies.

50. Ethiopian Mountain Viper Envenomation in South Texas

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Background: Bitis parviocula is a venomous snake from southwest Ethiopia, commonly known as the Ethiopian mountain viper. There are no case reports of bites by this species found in our literature search. *Case:* A 67-year-old herpetologist was bitten on his left index finger while feeding his Ethiopian mountain viper. Past history included chronic dysrhythmia and prior allergy to equine products. He presented to an emergency department within 1 hour with a discolored edematous digit displaying a 1/4-inch laceration. Within 10 minutes he developed body rash and periorbital, lingual and laryngeal edema and his oxygen saturation dropped from 98% down to 71%. The patient received rapid sequence endotracheal intubation, IV fluids, epinephrine, methyprednisolone, and H1 and H2 antihistamines. He was then transferred to our tertiary care center for further stabilization and treatment from where our regional poison center (PC) was consulted. Antivenom was recommended and the PC assisted in locating it. SAIMR polyvalent AV (equine) was sent from a regional zoo. The patient received 2/3 of one vial of AV and developed hypotension within minutes. The treating physicians were not comfortable giving additional AV thereafter. Lab values were significant for a WBC peaking at 20,800, and normal coagulation profile. The patient was discharged in stable condition 4 days after admission. *Discussion:* This case demonstrates the numerous challenges that may present in the evaluation and management of exotic snake envenomations. Our patient's presentation was consistent with severe envenomation with respiratory and hemodynamic compromise. AV treatment was associated with immediate hypersensitivity likely related to the patient's prior history of reaction to equine products. Treatment was complicated by differing degrees of experience among treatment team personnel, lack of adequate information regarding the particular snake species, and lack of non-reactive specific AV availability. *Conclusions:* This is a unique case report of envenomation by *Bitis parviocula* treated with AV. Exotic snakebites are uncommon and pose significant treatment challenges requiring careful coordination among treatment personnel and consultants. AV availability and adverse reactions are serious treatment complications.

51. Influence of Age on Salvia Divinorum Abuse: Results of an Internet Survey

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Background: Salvia divinorum is a psychoactive herb abused for its hallucinogenic properties. Due to its abuse potential, 13 states have instituted legal restrictions on its use. We wished to examine differences based on the age at which salvia abuse was initiated to identify important correlates surrounding such use. *Methods:* Over a 10 week period (Nov 20, 2008 – Jan 31, 2009), we recruited subjects via the Internet for a self-completed survey on salvia use. We targeted "social networking sites" (n = 26, e.g. Facebook, LiveJournal) and posted notices to selected groups (n = 69) indicating interest or experience in recreational salvia use. Key data points collected included: respondent demographics, circumstances of use (frequency, method, age [present and at first salvia use]), acquisition, and use experiences (behavioral, physical changes). *Results:* We analyzed data from 219 respondents. Salvia users who were young adults (≤21yrs) at first use favored using salvia for fun (OR = 1.94, CI = 1.08–3.49, p = 0.03) or to relieve boredom (OR = 2.06 CI = 1.09–3.91, p = 0.02), while salvia users who were adults (≥22yrs) at first use favored salvia for spiritual effects (OR = 2.63 CI = 1.02–6.75, p = 0.04). Being an adult at first use was associated with higher odds of concurrently using marijuana (OR = 2.68 CI = 1.50–4.78, p = 0.0007) or tobacco with salvia (OR = 1.94, CI = 1.05–3.60, p = 0.03). Young adults at first use were more likely to purchase salvia at a retail store vs. older adults (p = 0.04). Over half of all respondents reported a reduction or cessation of salvia use in the last 12 months (114 of 219, 52%), most commonly citing dislike of the high (33%) or loss of interest in salvia (29%). *Discussion:* Reports of cessation suggest recreational salvia use may be more attributed to curiosity than continual abuse. Young adults at first use are more likely to use salvia for fun or to relieve boredom vs older adults who cite spiritual reasons. *Conclusion:* Utilizing an innovative survey strategy, these findings identify differences surrounding salvia use based on age when first initiated.

52. Iron Blister Packing: Another Turn of the Ferrous Wheel

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Background: In 1997, the FDA mandated that supplements containing greater than 30mg of elemental iron be unit-dose packaged. In October 2003, this mandate was removed. The purpose of this study is to describe the trends in pediatric iron pill exposure before and after the mandate was removed. *Methods:* The AAPCC database was queried for cases from 2000–2007 involving children ≤5 years old who were exposed to iron tablets, capsules and caplets. Excluded were other iron formulations and iron-fortified multivitamins. Patient outcomes were stratified into: no effect, minor effect, moderate effect and major effect. Major and moderate outcomes and deaths are reported. Outcomes and use of deferoxamine were also stratified by year. The National Center for Injury Prevention and Control (NCIPC) was queried for unintentional deaths resulting from poisonings in ages <1 – 5 years of age during 2000–2005. ICD-10 code x44 (accidental poisoning and exposure to other/unspecified drugs) was used. *Results:* 10,296 AAPCC iron cases involved tablets, capsules, caplets. Breakdown by year: 2000:8.5%, 2001:7.8%,

Results by year

Year	AAPCC cases	Major + Moderate Outcome	Deferoxamine use	NCIPC deaths
2000	878	3	6	7
2001	805	2	6	14
2002	1383	14	8	16
2003	1288	7	7	22
2004	1384	6	3	10
2005	1388	14	11	18
2006	1579	17	0	*
2007	1591	11	7	*

*data not available

2002:13.4%, 2003:12.5%, 2004:13.4%, 2005:13.5%, 2006:15.3%, 2007:15.5%. Yearly AAPCC cases, combined major and moderate outcomes, deferoxamine use, and NCIPC deaths are reported in the table. No AAPCC deaths were reported. *Discussion:* Small increases in pediatric iron pill exposures have occurred after 2003. The majority of these exposures did not result in moderate or major effects. Among this population, clinically significant increases in deferoxamine use did not occur. Clinically significant increases in deaths reported by the NCIPC did not occur. *Conclusion:* No clinically significant change in outcome following iron pill exposure among children aged ≤5 years of age has occurred since removal of the unit-dosing mandate in 2003. Future monitoring is needed.

53. Efficacy of Intravenous N-Acetylcysteine for Early Non-Staggered Acetaminophen Overdose

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Introduction: UK guidelines for management of non-staggered acetaminophen (APAP) overdose use plasma APAP concentration plotted on a Rumack-Matthew derived nomogram to assess the need for IV N-acetylcysteine (NAC, 20.25hour course). Early studies suggested IV NAC provided protection against APAP related acute liver injury (ALI) if commenced within 8hours of non-staggered ingestion. Therefore UK guidelines recommend IV NAC is not commenced empirically provided plasma APAP concentration is available within 8hours of ingestion. Recent case reports suggest ALI can occur in non-staggered APAP poisoning even if IV NAC is started with in 8hours of ingestion. The study aim was to assess whether this is common phenomenon. *Methods:* Data on all patients presenting to our inner-city teaching hospital is prospectively collected on our purpose-designed, approved, clincal toxicology database. We retrospectively extracted data for the 36month period Mar 2005-Feb 2009 for adults (>15years) presenting with non-staggered APAP overdose, a reliable history of ingestion time, requiring IV NAC based on plasma APAP concentration, and who commenced IV NAC within 8hours of reported ingestion. Data was collected on the post-NAC ALT and INR and requirement for further NAC. *Results:* There were 1223 APAP related presentations; 123 met study inclusion criteria. 60 (48%) patients were classified as high-risk for APAP related toxicity (48 chronic ethanol abuse, 11 malnourished, 1 CYP enzyme induction). Mean plasma APAP concentration 195µg/ml (46–687). Post IV NAC results: mean ALT 43 (5–561 IU/L, NR 4–45 IU/L), mean INR 1.08 (0.82–1.29, NR 0.9–1.1). No patient required >20.25hours IV NAC treatment. *Conclusions:* All patients at risk of APAP related ALI based on their plasma paracetamol concentration who received 20.25 hour IV NAC infusion within 8 hours of overdose recovered and none developed ALI (ALT > 1000 IU/L). This suggests that current guidelines, recommending that IV NAC is not commenced empirically provided plasma APAP concentration is available within 8hours of ingestion are safe - however, larger studies are required to confirm these findings.

54. A Case of Mistaken Identity: A Fatal Paraquat Ingestion in a Child

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Background: Paraquat ingestion has become more uncommon in the United States due to increased preventative efforts. Despite these measures, exposures may occur. An accurate history is key to managing this intoxication. We report a fatal pediatric ingestion of paraquat where a correct history was obscured by similar herbicide trade names. *Case report:* An 8 year-old male presented 2 hours after accidentally ingesting an unknown amount of a weed killer stored in a soda bottle. His parents identified this chemical as Amoxone® (2,4-dichlorophenoxyacetic acid or 2,4-D). His physical exam was unremarkable. Two doses of activated charcoal were given and he was admitted for overnight observation. His admission basic metabolic panel was unremarkable. The child had nausea and vomiting that reportedly resolved by the next morning. The patient was discharged home. He proceeded to develop sore throat, chest and abdominal pain, poor oral intake, decreased urinary output, and continued emesis that became bloody. Returning 9 days after admission, the patient's physical exam revealed pharyngeal erythema and dry mucosal membranes. Repeat lab studies were consistent with renal failure. His family repeated Amoxone as his only ingestion. Upon readmission he was tachypneic and hypoxic. A chest radiograph revealed right-sided pneumothorax, pneumomediastinum, and subcutaneous emphysema. Given his history of ingestion, acute renal failure, and pulmonary symptoms, paraquat was a concern. The patient was placed on mechanical ventilation, but his respiratory status continued to steadily decline. He died 7 days after readmission. A positive urine paraquat level of 0.74 μg/mL (<0.03 μg/mL) was later reported. It was noted that Gramoxone® is a trade name for paraquat. *Case discussion:* Paraquat toxicity often carries a poor prognosis. An accurate history is key to a quick diagnosis and appropriate management. The similarity of the trade names Amoxone® (2,4-D) and Gramoxone® (paraquat) appeared to contribute to a diagnostic delay in this case. *Conclusion:* When obtaining a history, clinicians should be aware of this trade name similarity between brands of 2,4-D and paraquat.

55. Fatal Intentional Sodium Azide Poisoning

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Background: Sodium azide is a rare human poisoning that can result in fatal outcomes. Its lethality appears to be related to its effects on cellular respiration. However, the exact mechanism is controversial. *Case report:* We present a case of a 59 y.o. male who presented about 1 hour after intentional sodium azide ingestion with emesis, incontinence, hypotension, respiratory failure, profound lactic acidosis, and coma. Significant laboratory values on presentation were: plasma lactate 8.5 mmol/L (N: 0.55–2.2); blood ethanol 394 mg/dL; blood cyanide 0.5 µg/mL (N: < 0.2 µg/mL). Arterial blood gas analysis indicated a metabolic acidosis, with a pH of 7.2 (N: 7.35–7.45) and a bicarbonate of 15 mmol/L (N: 22–26). Additionally, mixed venous oxygen saturation levels of 90–97% (arterialization) were observed. Management included intubation and ventilation, rapid cyanide antidote kit administration, volume resuscitation, vasopressor support, and after ICU admission, exchange transfusion, veno-arterial extracorporeal membrane oxygenation (ECMO), continuous renal replacement therapy and induced hypothermia. Treatment was withdrawn approximately 24 hours after ingestion when brain death was confirmed. Our patient's sodium azide levels were later determined to be 5.6 µg/mL on admission to the ED (about 1.5 hrs post ingestion), 13.7 mg/ml at 5 hrs, 6.8 mg/ml at 12 hrs and 0 µg/mL 19 hrs post ingestion. *Discussion:* This case demonstrates the significant toxicity experienced after a sodium azide ingestion. The patient had evidence of venous arterialization providing in vivo support to previously published in vitro studies that sodium azide inhibits cellular respiration. To the best of our knowledge this is the first report of mixed venous oxygen saturation levels and the use of ECMO during sodium azide toxicity. This case also demonstrated the ineffectiveness of the cyanide antidote kit and of ECMO. *Conclusion:* Sodium azide is an extremely toxic agent. Similar to cyanide, toxicity is probably related to its effect on cellular respiration. Treatment with the cyanide antidote kit and ECMO were ineffective in our patient.

56. Two for the Price of One: Occult Salicylate Overdose Masked by Sodium Cyanide Ingestion

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Background: We report a case of survival after intentional ingestion of both sodium cyanide (NaCN) and acetylsalicylic acid (ASA). *Case report:* A 43 y/o male was found unresponsive in his home by family. He was transported to the ED via EMS. On arrival, he was unresponsive with the following vital signs: afebrile, BP 101/62, P 103, R 30s, and SaO2 96%. After emergent intubation, a profound metabolic acidosis with hyperlactatemia was noted (6.97/55/126/12, lactate 14.2mmol/L). Both the local police and hospital hazmat coordinator contacted our poison center for information on NaCN disposal. Given the clinical presentation, along with other evidence (NaCN container from an online chemical store and a sports drink bottle with powder residue), hydroxocobalamin (Vit B12a) treatment for likely CN toxicity was recommended. The pharmacy did not stock Vit B12a, so sodium nitrite and sodium thiosulfate were used. CN antidote kit (CNAK) administration yielded a MetHgb of 6.5% and reduction in acidosis (7.1/52/177/16). On routine screening, the serum ASA level was 45mg/dL and alkalinization therapy was begun. A repeat ASA level 4 hours later increased to a peak of 91mg/dL, and he was dialyzed once with improvement in both ASA burden and acidosis. The patient was extubated on day 2 post-ingestion and admitted to 1 week of CN sniffing. When this failed to cause death, he drank a mixture of NaCN and Gatorade®. His initial serum CN level was 1.22mcg/dL. *Case discussion:* This case is unique in that the patient presented with classic findings of CN poisoning complicated by a concomitant ASA overdose. Had the latter toxicity gone undetected, it may have resulted in serious morbidity or death. Secondly, it reveals the importance of communication with police and EMS when patients are found unresponsive for unclear reasons. This also highlights the risks of having highly lethal chemicals readily available by internet for sale to individuals. *Conclusion:* We report survival with favorable outcome after ingestion of a mixture of NaCN and ASA. To our knowledge, this is the 1st reported case of a mixed ingestion of CN and ASA that required both the CNAK and dialysis.

57. Crazy for Cacti: A Retrospective Review of Peyote Exposures

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Introduction: Peyote is a cactus containing the hallucinogen 3,4,5-trimethoxyphenethylamine, found primarily in the southwestern United States and northern Mexico. Although it is used ceremonially by various native American Indian tribes, illicit use has also been well-described. However, there are currently no published case series of illicit exposure to peyote. We sought to identify characteristics of patients with reported exposure to peyote. *Methods:* We performed a retrospective review of a poison center database for all cases of single-substance human exposure to peyote using the terms "peyote" and "mescaline" for the time period 1997–2008. Data collected included age, gender, route of exposure, whether exposure was intentional, clinical effects, duration of effects, treatment, and medical outcome. *Results:* There were a total of 31 patients, 26 (84%) of which were male. Patient ages ranged from 14–59 years with a mean of 23 years. Twenty-six (84%) patients were age 25 years or less. Thirty (97%) exposures were intentional. Reported effects included hallucinations (n = 18), tachycardia

(n = 16), agitation (n = 11), mydriasis (n = 9), hypertension (n = 3), nausea (n = 2), paranoia (n = 2), psychosis (n = 2), vomiting (n = 1), and generalized seizure (n = 1). Five patients (16%) were managed at home. The remainder were managed in an emergency department (n = 19), ICU (n = 3), or inpatient ward (n = 4). Therapies administered included benzodiazepines (n = 7), intravenous fluids (n = 7), activated charcoal (n = 4), droperidol (n = 1), and endotracheal intubation (n = 1). Among all exposures, effects were classified as none (n = 1), minor (n = 9), moderate (n = 20), and major (n = 1). No deaths occurred. *Conclusion:* In this case series, most cases of peyote exposure were associated with moderate clinical effects, with tachycardia and CNS effects most commonly seen. Clinically significant effects requiring treatment occurred in a substantial number of patients. The majority of exposures occurred in adolescents and young adults. Vomiting (which has been commonly associated with peyote intoxication) was not described in the majority of patients in this series.

58. Blood Mercury Concentrations in the U.S. Population, 1999–2006

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Background: Mercury (Hg) measured in whole blood is primarily organic Hg (e.g., methylmercury). We describe the distribution and demographic characteristics of total blood Hg (TBHg) levels in the U.S. general population among participants in the 2003–2006 National Health and Nutrition Examination Survey (NHANES). TBHg trends are described for children ages 1–5 and females ages 16–49 during 1999-2006. *Methods:* A descriptive analysis used NHANES demographic and TBHg results for persons ages 1 year and older (n = 16,780) during 2003-2006; children ages 1-5 (n = 3770) and females ages 16–49 (n = 7245) during 1999–2006. *Results:* In the 2003–2006 survey periods, TBHg estimated geometric means were similar for non-Hispanic blacks (NHB) and non-Hispanic whites (NHW), 0.853 and 0.833 µg/L, respectively) and lower in Mexican Americans (MA), 0.580 µg/L. Regression of log TBHg with age, race/ethnicity and gender showed interactions between gender and age ($p = 0.0013$) and race/ethnicity and age ($p < 0.0001$), but not between gender and age ($p = 0.0975$). Model-adjusted geometric mean TBHg levels in the population exhibited a quadratic increase with age ($p < 0.0001$), peaking at ages 50–59 in NHB and NHW, at ages 40–49 in MA, and then declining at older ages. For TBHg in children during 1999–2006 there was an interaction between survey period and race/ethnicity ($p = 0.0002$). Adjusted geometric mean TBHg levels increased slightly for NHW children and decreased slightly for NHB and MA children. Female children had slightly higher TBHg levels than males (0.356 vs. 0.313 µg/L, $p = 0.0050$). *Conclusions:* In the general U.S. population, TBHg increased with age until the fifth or sixth decade, and then declined. Overall, geometric mean TBHg levels were higher in NHB and NHW and lower in MA. Declining levels of TBHg were evident in NHB and MA children over the period 1999–2006. No statistically significant trend from 1999–2006 was noted in the THBg results for females ages 16–49.

59. Intoxication Associated with "Suicide by Cop"

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Introduction: "Suicide by Cop" (SBC) is a colloquialism for a form of victim-precipitated homicide in which a suicidal individual (subject) engages in calculated, life-threatening and criminal behavior in order to compel police to use deadly force. Little data has been published pertaining to SBC. We hypothesized that the majority of the subjects were intoxicated at the time of the SBC event. *Methods:* A retrospective review was performed of all SBC cases entered into Federal Bureau of Investigation's Law Enforcement Online Hostage Barricade Database System. Demographic data pertaining to the subject, specific information pertaining to the event, previous substance abuse history by the subject, and use of inebriating substances by the subject during the event were collected. *Results:* From 1983 to 2009, a total of 54 SBC cases were documented. Of those cases: 1 (1.9%) age under 18, 8 (14.8%) ages 18–29, 28 (51.9%) ages 30–45, 12 (22.2%) ages 46–65, 1 (1.9%) age over 65, and 4 (7.4%) the age was not documented; 49 (90.7%) were male and 5 (9.3%) female. The incident durations were: 18 (33.3%) lasting 0–2 hrs, 16 (29.6%) 2–4 hrs, 7 (13%) 4–6 hrs, 7 (13%) 6–9 hrs, and 6 (11.2%) greater than 9 hrs. A total of 46 subjects (85.2%) were killed, 7 (13%) injured, and 1 (1.9%) no injury. There were no deaths of law enforcement or bystanders. The subject's previous substance abuse history was: ethanol 25 (39.1%), Schedule I Controlled Substance 19 (29.7%), prescription 3 (4.7%), and unknown 17 (26.6%). Substances inebriating the subject during the event included: ethanol 21 (37.5%), Schedule I Controlled Substance 11 (19.6%), prescription 2 (3.6%), none 5 (8.9%), and unknown 17 (30.4%). *Conclusion:* Of the SBC subjects, only 13.5% (5 of 37 where results were available) were not intoxicated, whereas the remaining cases were intoxicated with mind–altering substances. The majority of SBC cases (85.2%) were killed. Law enforcement agents should be aware that when managing SBC cases, the majority of subjects are intoxicated, further complicating negotiations. Through disinhibition, intoxication can increase the potential for violent threats or behavior leading ultimately to tactical resolution and loss of life.

60. The Kiss of Death: Case Report of a Western Gaboon Viper (*Bitis gabonica*) Bite to the Face

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Background: Envenomation with exotic snakes is uncommon in North America. Management may be challenging due to unfamiliarity with specific venom toxicity as well as difficulty in obtaining antivenin. *Bitis gabonica* envenomation is described as having a high mortality rate, large amount of venom and systemic hematologic effects. We report the case of a snake enthusiast who was bitten on the lower lip by a *Bitis gabonica* viper. *Case report:* This patient presented to hospital within 20 minutes of a bite to the lower lip with rapidly increasing swelling at the site. The patient was intubated electively for impending airway obstruction. Antivenin was located in the neighboring province approximately 3 hours after the bite occurred but administration was delayed for 7 hours due to the need to charter a jet for transport. In the interim, management of the patient was supportive and serial testing for coagulopathy was performed, all of which were negative. After administration of anti-venin, the patient's swelling decreased significantly and within 8 hours the patient was extubated. The patient remained stable and was discharged home 24 hours later. Serial blood tests and follow up 48 hours after discharge showed no evidence of systemic symptoms or coagulopathy. *Discussion: Bitis gabonica* envenomation may result in significant mortality due to the large amounts of venom deposited into its victims as well as the systemic hematologic effects. In retrospect, our patient likely suffered a "dry" bite due to the absence of hematologic effects. This case highlights the logistic problems associated with management of exotic snake bites. *Conclusion:* We report a case of *Bitis gabonica* envenomation to the face that presented with local swelling that was managed with supportive care and antivenin administration. Treating a venomous bite to the face without quick access to antivenin added complexity to the management.

61. Central Nervous Toxicity after Ingestion of Tea Tree Oil

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Background: Melaleuca oil, also known as Tea Tree Oil (TTO), is a complex mixture of compounds produced by distillation of leaves and twigs of the Australian tea tree, *Melaleuca alternifolia*. Its antimicrobial activity led to a rich history in folk medicine, and it is considered important in treating skin ailments in modern homeopathy and natural healing. This *essential oil* is pale yellow in color and is comprised of 50–60% terpenes. The Standards Association of Australia standard for TTO requires that in marketed products, the cineole must be kept below 15%, and terpinen-4-ol kept over 30%. The type and range of human toxicity of essential oils is poorly characterized. Previous reports describe minimal ingestions that resulted in confusion, ataxia, malaise, nausea, vomiting, diarrhea, abdominal pain, and rash. Significant mental status depression is rarely reported. This report documents a case of adult human poisoning manifested as vomiting and coma after TTO ingestion. *Case Presentation:* A twenty-four-year-old otherwise healthy, autistic female was witnessed to ingest one ounce of TTO. The product had been obtained and left out by the patient's sisters, who intended to use it as a disinfectant for their facial piercings. The patient rapidly became unresponsive and was transported to an ED where, on arrival, she was comatose and vomiting. Blood pressure was 92/53 mmHg, heart rate 120 beats per minute, and respirations 12 per minute. Breath sounds were clear. She was intubated for airway protection and sedated with propofol. Overnight, she remained tachycardic, but with normal blood pressure. All laboratory studies, chest x-ray, and electrocardiogram were normal. There was no clinical evidence of pulmonary aspiration. By the next morning, her mental status normalized, she was extubated and discharged. *Discussion:* Ingestion of TTO was undoubtedly responsible for rapid onset of vomiting and coma. While the composition of TTO is similar to turpentine, the latter substance has often been associated with pulmonary aspiration. Significant aspiration did not occur with this ingestion. Poison centers should be aware of the potential for respiratory depression, even after a small volume ingestion.

62. Successful Use of the CIWA-Ar Scale for Gamma-Butyrolactone Withdrawal

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Background: Gamma-butyrolactone (GBL) is a prodrug for Gamma-hydroxybutyrate (GHB) and is available as an industrial solvent. GHB and its prodrugs are abused for their sedative and euphoric effects and by body builders for claimed anabolic effects. Regular users of GHB can develop tolerance and dependence, developing a continuous pattern of dosing every 1-2 hours. Chronic heavy GHB abusers can experience severe withdrawal, while many GHB users may experience some symptoms upon discontinuation. GHB withdrawal is rapid occurring within 1–6 hours after the last dose and can last up to 2 weeks. Treatment is usually with benzodiazepines. Large doses may be required and symptoms can be difficult to control. *Case report:* A 22 year old male was admitted after an overdose including 30ml of GBL. He was a regular user of GBL ingesting up to 50ml a day for 2 years (3–5mL every 2 hours). Symptoms of agitation, clammy skin, excessive thirst, vomiting, and tachycardia were present around 12 hours post overdose. Diazepam 20mg was started every 4 hours to control withdrawal symptoms. The patient became increasingly anxious with tremor and hallucinations uncontrolled by diazepam therapy. It was decided to start him on the CIWA-Ar (Clinical Institute Withdrawal Assessment of Alcohol) scale as for alcohol withdrawal. The patient scored moderate to high on CIWA-Ar because of anxiety and hallucinations so diazepam was administered accordingly every ninety

minutes. Four days post ingestion the patient ceased scoring on CIWA-Ar and diazepam was decreased to 2–5mg for mild agitation. After an uneventful recovery the patient was discharged 6 days post ingestion. *Conclusion:* GHB withdrawal can be very difficult to manage and there are frequent reports of patients resistant to high-dose benzodiazepines, requiring other sedatives such as quetiapine or phenobarbital. This case shows increasing the frequency of dosing based on symptoms as in the CIWA-Ar scale may be of benefit in severe GHB withdrawal appearing resistant to benzodiazepines. This is the first report in our knowledge of someone successfully treated with CIWA-Ar scale for GHB withdrawal. This or a modified version could prove an effective management protocol for these patients.

63. Visualization of Poison Center Call Data

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Background: Poison Control Centers (PCC) often need to understand internal and external factors that impact call volume. A method for dynamically visualizing PCC call data utilizing available and open source application programming interfaces (APIs) is provided. *Methods:* Custom code was used in tandem with the Google™ chart API, to produce an interactive tool displaying a time-series chart of PCC cases in a web browser. A custom web interface was written using HTML syntax. The web interface calls both the Google™ chart API and queries the PCC medical record database. The custom database query includes language to construct the relevant data series, in this example the number of incoming cases per half our period. *Results:* Resulting data were presented in the form of a dynamic time series chart that was published on the internet. In addition, the custom database query produced moving average confidence intervals and short run prediction intervals for yet to be observed time periods. This tool provided a graphical method for the PCC to identify trends and outliers. Slider buttons along the y axis of the chart allowed users to increase/decrease the chart scale and time period *Discussion:* Visualization tools are helpful in trend analysis and in explaining a dataset to those unfamiliar with the data. The API and database queries introduced here allow PCCs to quickly see the relationship between data outliers and the larger data set. It's an easy method to demonstrate to business partners the impact on call volume by such things as stories in the media, public health events or even newly released consumer products of toxicologic concern. This tool is also highly portable: 1- it is freely available and can be easily implemented in any PCC and 2- it is easily published to the World Wide Web to share information concerning a particular PCC. *Conclusion:* Google™ chart API is a potential tool to display PCC call data in a unique way to monitor trends over time.

64. High-Definition Simulators in AHLS: Bringing to 'Life' Toxicology Scenarios

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Introduction: The use of life-size, high-definition patient simulators has transformed medical education. These programmable devices allow for complex and medically appropriate physiologic responses in real time. The Advanced Hazmat Life Support (AHLS) Course is designed with 4-desktop scenarios. These scenarios are pre-written and are always the same. We report the first experience using High-Definition Simulation in an AHLS Course. *Methods:* HAZMAT Case Studies 1 and 4 were developed into high-definition simulations and Case Studies 2 and 3 were continued as desktop. The simulation cases took place on Day 1 and the desktop cases took place on Day 2. Participants completed a four item Likert-based satisfaction survey (5 = Strongly Agree to 1 = Strongly Disagree) after each day. *Results:* Because of a small sample size (n = 30) and skewed response set, Welch-tests were employed. Participants were well satisfied with the experience (mean rating 4.36 of 5.0) and did not find the simulations to be intimidating compared to the desktop activities. Though statistically not significant, participant mean scores reflect more satisfaction with attaining a comprehensive overview of AHLS toxicity, and ability to manage acutely poisoned patients after using the simulators [Welch t(d) = -0.36, p = 0.72] and [Welch t(d) = 0.293, p = 0.77] respectively. *Discussion:* High-definition simulation offers a unique advantage to the AHLS Course. It offers the participants the ability to treat 'live' patients with 'live' vital signs in a 'live' environment. It allows for a dynamic patient care environment with real time response. There are additional fees associated with high-definition simulation specifically for the cost of use and the appropriate personnel. However, based on the participants' survey results, these costs may be overshadowed by the benefit. In the future, we intend to conduct all 4 HAZMAT Case Studies as simulations and identify any skill/knowledge differences between simulations and desktop experiences.

65. Chronic Difluoroethane Abuse Associated Peripheral Neuropathy Treated Successfully with Gabapentin

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Introduction: Chronic halogenated hydrocarbon abuse has not been associated with peripheral neuronal toxicity nor withdrawal syndromes. We report a case of chronic fluorinated hydrocarbon abuse associated with pruritis of arms and legs which improved with re-exposure to difluorethane (DF) or gabapentin therapy. *Case report:* A 53 year-old man reported to an inpatient illicit drug program for help in the cessation of DF abuse. Once a chronic cocaine and marijuana user, to maintain his employment the patient agreed to abstain from illicit drug use and consented to random drug testing. Due to his craving for substance induced euphoria he discovered an alternative source that would not be detected on random urine drug screens, a keyboard cleaning spray containing DF. The patient started to inhale this product 8 times daily for 7 years. During the 2nd year of constant use he reported severe pruritis developing in his hands and feet which progressed to both arms and legs, which would resolve upon re-exposure to the DF containing product. The patient was tried on diphenhydramine and hydroxyzine on separate occasions, without relief. He has no past or family medical history or medications. He worked as a custodial engineer and had no exotic hobbies. He smoked ½ pack a day and did not drink alcohol. His vital signs and skin were normal. He had decreased sensation in a glove-and-stocking distribution but an otherwise normal neurological examination. The patient had a chest radiograph that revealed skeletal fluorosis and laboratory analysis that revealed normal blood counts and a normal complete metabolic panel. A neurological consultation suggested that his pruritis may be a representation of a peripheral neuropathy and attempted to a trial of gabapentin at 300 mg 3 times daily. After 1 day of therapy, the patient reported complete relief of his symptoms. *Conclusion:* Neither fluorosis nor hydrocarbon abuse has been associated with either peripheral neuropathy or withdrawal symptoms. It appears that gabapentin at standard adult dosing has relieved this patient's symptoms. The etiology of his pruritis is most likely either a form of peripheral neuropathy associated with prolonged DF abuse or a withdrawal syndrome that is not well characterized.

66. Clinical Effects Following Aripiprazole (Abilify®) Ingestion by Young Children

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Background: Aripiprazole (Abilify®) is an atypical antipsychotic agent first approved by the FDA in late 2002. It is now approved for the treatment for the treatment of schizophrenia and bipolar disorder, and it is approved as an adjunct for the treatment of depression in adults and older children. However, there have been no published reports on its effect on young children. *Objective:* The purpose of this study was to determine the clinical effects of aripiprazole ingestion by young children. *Methods:* Retrospective, observational study of the telephone calls to one state's poison centers for single agent exposures to aripiprazole from 2003 through 2008 for children under 6 years followed to a known outcome. *Results:* There were 116 children (56.9% male) who met the inclusion criteria. The amount ingested ranged from less than 2 mg to 280 mg. Only 44 (37.9%; 95%CI: 29.6% – 47.0%) children were asymptomatic. The most common symptoms were drowsiness/lethargy (55.2%; 95%CI: 46.1% – 63.9%), irritability/agitation (9.5%; 95%CI: 5.4% – 16.2%), and vomiting (9.5%; 95%CI: 5.4% – 16.2%). Less common symptoms include tremor, ataxia, abdominal pain, dizziness, and tachycardia. Two patients had major clinical effects. One ingested 80 mg (5.7 mg/kg) and had a seizure, and the other ingested 150 mg (11.5 mg/kg) had QT prolongation on ECG. None of the 101 children who ingested less than 60 mg had a major effect (0%; 95%CI: 0% – 3.7%). Although most children (62.1%) children were managed in an Emergency Department, only 34 (29.3%) were treated with activated charcoal. Twenty–two (19.0%) were admitted overnight. There were no deaths (0%; 95%CI: 0% – 3.1%). *Conclusions:* This is the first study of aripiprazole clinical effects in young children, but it is limited by its reliance on caller information. Most (98.3%) young children who ingest aripiprazole develop no or only mild clincal effects. This study suggests that children under the age of 6 years who ingest less than 60 mg of aripiprazole may be safely observed at home.

67. Sodium Phosphate and Munchausen Syndrome by Proxy

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Background: Child abuse is a significant contributor to pediatric morbidity and mortality, with nearly 3 million cases reported each year. Here we present a case of suspected child abuse involving $NaPO_4$ poisoning complicated by confirmed ipecac exposure. *Case report:* An 8month old developed hypernatremic hypokalemic dehydration while hospitalized for C. difficile enteritis on metronidazole. She spent 5 days in the ICU on total parenteral nutrition for emesis (50 episodes/day). Symptoms resolved and she was discharged on day 14. She returned 10 days later with lethargy and diarrhea (10 stools/day). She was hypothermic (93.2°F centrally), required an isolette, received ceftriaxone and intravenous fluids, and was admitted. She developed carpopedal spasms on day 3 and was transferred to the ICU. She had hypocalcemia (nadir 6.3mg/dL), hyperphosphatemia (peak 14.8mg/dL), hypernatremia (peak 156mmol/L), and an elevated BUN (28mg/dL). PTH was 294.8 pg/mL (normal 10–70). Urine Ca was low and PO_4 high. Renal ultrasound was normal. She received $CaCO_2$ and $Al(OH)_3$ and was transferred to a tertiary center on day 5. She was hypocalcemic and hyperphosphatemic on admission to the tertiary center (Ca 6mg/dL, PO_4 10mg/dL). A skeletal survey, CT scans of her head, abdomen, and chest, upper endoscopy, sigmoidoscopy with biopsies, and stool studies were normal. A low phosphorus diet was started, and symptoms resolved. The negative evaluation left concern for a malicious cause. While there is no laboratory test to prove exogenous $NaPO_4$ use, emetine and cephaeline (both >200ng/mL) were detected in the urine. *Case discussion:* We present a case of Munchausen Syndrome by Proxy (MSP) involving exogenous $NaPO_4$ and ipecac administration. The patient's symptoms of vomiting and diarrhea are consistent with the confirmed ipecac exposure. While not frequently described, the documented hypothermia may have also been related to this exposure. $NaPO_4$ administration is supported by the findings of elevated serum Na and PO_4, low Ca, vomiting and diarrhea, and an otherwise

negative workup. We are unaware of other MSP cases involving $NaPO_4$. *Conclusion:* Child abuse continues to affect pediatric morbidity and mortality. This case serves to remind practitioners of the potential use of NaPO4 in cases of MSP.

68. Not Such a Headache after All: A Retrospective Review of Intentional Excedrin® Overdoses

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Background: There is little literature specifically addressing the typical course of intentional overdoses (ODs) of aspirin (ASA), acetaminophen (APAP), and caffeine (CAF) combination headache remedies (e.g., Excedrin®). These ODs could potentially pose a management challenge due to need for multimodal treatment with both antidotal therapy and one or more enhanced elimination techniques. Interferences between usually employed decontamination, antidotal, and extracorporeal elimination techniques may theoretically occur. *Case series:* We reviewed all intentional ASA 250mg/APAP 250mg/CAF 65mg combination product ingestions in patients ≥ 13 y reported to our poison control center (PCC) over a 12 mo period. Only cases with recorded levels of both ASA and APAP were included. Cases were reviewed for reported coingestants, vomiting, charcoal administration, and coded interventions. A total of 124 cases were obtained. Mean patient age was 23 y (range 10–53 y). The mean number of pills reportedly ingested was 21 (range 1–150), resulting in peak ASA and APAP levels of 17 mg/dL (high 42 mg/dL) and 41 mg/L (high 253 mg/L), respectively. Coingestants were involved in 46% of cases and vomiting was reported in 34%. With regard to coded interventions, 49% received charcoal, *N*–acetylcysteine (NAC) was given in 18%, and only 5% underwent urinary alkalinization with $NaHCO_3$. There were no patients who died, required liver transplantation, or received dialysis. *Case discussion:* ASA/APAP/CAF combination product ODs reported to our PCC resulted, on average, in modest peak ASA and APAP levels. The low rates of NAC and $NaHCO_3$ therapy are striking, especially when coupled with the absence of deaths, liver transplants, or dialysis use. While a paucity of significant exposures may account for these findings, somewhat frequent spontaneous decontamination via vomiting may be contributory. *Conclusion:* Despite a theoretical potential for serious toxicity requiring multimodal management, ASA/APAP/CAF combination product intentional ingestions reported to our PCC did not result in serious toxicity. Our series provides insight into a rarely discussed form of commonly encountered agents.

69. Organophosphate Incidents Reported to the National Pesticide Center: Role of Regulation

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Background: Significant regulatory changes were implemented for residential uses of diazinon and chlorpyrifos between 2000 and 2002 based on inadequate protection of human health from revised risk assessments. Prior to these regulatory changes, diazinon and chlorpyrifos were commonly used organophosphates (OPs), along with malathion, which was not targeted by regulatory action. The purpose of this study was to analyze data collected by the National Pesticide Information Center between 1995 and 2007 to determine if longitudinal trends in reported incidents among targeted OPs can be detected. *Methods:* Data were grouped from 1995–2000 and 2001–2007, and categorized as pre- and post-regulation, respectively. Residential reports of total OP-related incidents, as well as chlorpyrifos, diazinon and malathion, were compared using an independent means test between pre and post-regulatory periods. *Results:* NPIC received 3,385 OP-related incident reports that met the criteria for this study. Total OP-related incidents significantly decreased between the pre- and post-regulatory periods ($p < 0.001$). Incident reports for both chlorpyrifos and diazinon were significantly less in the post-regulatory period ($P < 0.001$). The average annual number of chlorpyrifos incidents declined from 214 from 1995–2000, to 39 incidents per year post regulation. No statistical difference was noted for the average number of malathion incidents reported between these two periods ($p = 0.4$). *Conclusions:* Consistent with other findings, the number of chlorpyrifos and diazinon exposure incidents reported to NPIC significantly decreased following targeted regulatory action.

70. Media Awareness Campaign Increases Calls to Poison Centers

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Background: One of the vital functions of regional poison centers is to participate in surveillance of public health threats. A Real-Time Disease Detection grant was used to enhance the public's awareness of poison center services. By prompting people to call the poison center for magnets, this action followed Behavior Modeling Theory by serving as a guide for future action after a poisoning. *Methods:* Two poison centers planned a media awareness campaign, after hiring an ad agency experienced with non-profit health organizations. Ads were created for English- and Spanish-speakers in urban and rural counties. Grant funds purchased air time for cable television, radio and ads for newspapers and billboards. Messages were created to promote the poison hotline number, explain the primary poison center service and have an immediate call-to-action phrase. Different calls-to-action were planned for different counties to help assess effectiveness. *Analysis:* Funds paid for 2265 cable television spots, 794 radio spots, 10 billboards and 138 newspaper ads in English and Spanish. Additional spots were donated by media. *Results:* Projections of numbers reached included: 12% of the statewide population via television; 68% of target cities' population via radio; 60,000 people via billboards; and 300,000 via newspaper. There was an increase in requests for interviews and poison center magnets. Poison center information calls increased by 31% during the three months of the campaign. *Conclusions:* Media outreach facilitated a method of low-literacy region-wide outreach. It is difficult to gauge awareness because individuals may have been privy to the campaign, but not in need of the centers' services at the time and, therefore, did not respond to the call-to-action. However, there was a documented increase in material requests, information calls and media requests during the campaign.

71. Systems Issues in the Management of Carburetor-Cleaner Huffing-Related Methanol Exposures at a Regional Poison Center

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Background: The medical error rates and other challenges involved in the recognition, diagnosis, and clinical management of inhalational carburetor fluid exposures has not been characterized. *Methods:* All human inhalational exposures to a carburetor cleaning fluid at a single poison center between 2000 and 2009 were reviewed. Cases were scored regarding recognition on the part of the poison center and/or caregiver of the potential for methanol exposure, appropriateness and timeliness of diagnostic recommendations and procedures, appropriateness of case management, and outcomes. *Results:* 24 cases were identified. The average age was 30 years and 63% were males. The poison center failed to recognize/document the potential for methanol exposure in 6 (25%) cases. Anion gap metabolic acidosis was present on presentation in 9 (38%) cases, including one case where methanol exposure risk was not appreciated. Appropriate poison center recommendation for methanol laboratory testing was absent in 13 (54%) cases. Hospitals failed to appropriately obtain, or obtain in a timely manner, methanol levels in 6 (25%) cases. Poison center management recommendations were inappropriate in 6 (25%) cases and hospital management of patients was inappropriate in 4 (17%) cases. Eight of nine (89%) cases with a metabolic acidosis received specific treatment (ethanol or fomepizole). No adverse outcomes as a result in inappropriate diagnosis or treatment were seen, but relevant outcomes were unknown in 50% of cases. There was no difference in the rate of inappropriately managed cases between major population centers and rural areas. *Discussion:* The potential for methanol exposure in the huffing of carburetor cleaning fluids, and the process of diagnosis and management of methanol toxicity, have been known for decades. The high rate of failure to recognize, diagnose and/or treat these cases in our setting thus represents a variety of individual and systems failures. *Conclusions:* Improvements in multiple aspects of poison center and hospital healthcare delivery are required for improved recognition, diagnosis, and management of these cases.

72. Acute Disseminated Encephalomyelitis and Transverse Myelitis after Intranasal Insufflation of Heroin

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Background: Heroin use has been associated with the CNS complications of transverse myelitis, stroke, spongiform leukoencephalopathy, and acute myelopathy. We present a unique case of acute disseminated encephalomyelitis as well as transverse myelitis after intranasal insufflation of heroin. *Case report:* A 29 year old former intravenous drug user presented to the Emergency Department with new onset paraplegia. She last remembered being out the night before at a party and getting into her car to go home. The next morning, she was found by EMS in her car with the inability to move her arms and legs in addition to hypothermia and decreased responsiveness. She endorsed intranasal insufflation of heroin and denied any other route of ingestion or use of other substances. Her daily medications included suboxone and alprazolam and she denied taking more than the prescribed doses. She had no other past medical history of infections, immune disorders, or prior neurologic deficits. On physical examination, she was alert and oriented and had severe neck and upper back pain, 0/5 strength in all four extremities, no sensation and normal respiratory exam. Of note, normal labs included blood glucose of 98 mg/dL, potassium 3.6 mEq/L, calcium 8.5 mEq/L and magnesium 1.6 mEq/L. Pertinent negative laboratory values were HIV, ANA and ESR negative or normal range. A urine drug screen was positive for opiates and benzodiazepines. Her MRI showed acute disseminated encephalomyelitis and transverse myelitis from C2 to T1. After weeks of treatment, the patient left against medical advice and was lost to follow-up. *Discussion:* Heroin myelopathy after intravenous use is well established. There is one similar case report of acute myelopathy after intranasal insufflation. This case is unique in comparison because of the added complication of encephalomyelitis. Potential mechanisms for heroin myelopathy include direct toxic effect, decreased perfusion and vasculitis. *Conclusion:* This case expands the range of neurologic complications of intranasal insufflation of heroin to include encephalomyelitis.

73. Acute Nicotine Poisoning in a Toddler Resulting in Hyponatremia

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Background: Hyponatremia has been previously reported with nicotine patch therapy but to our knowledge not

after the acute ingestion of tobacco. Nicotine has been documented to stimulate the release of antidiuretic hormone (ADH). We present a case of a 20 month-old male who developed altered mental status, bradycardia, and electrolyte abnormalities after ingesting an unknown quantity of tobacco. *Case report:* A 20 month-old male was noted by his parents to have a decreased activity level and one loose stool during the day but no vomiting. By evening he seemed confused and was lethargic. The parents denied any ingestion by the child although both parents rolled their own cigarettes and had witnessed the child putting them into his mouth several months prior to this presentation. In the ED the child was minimally responsive and vital signs were: rectal temperature 35.7°C, HR 64 beats/min, BP 114/56 mmHg, RR 14 breaths/min, and pulse oximetry 100%. Physical exam was remarkable for cool and mottled skin, intermittent posturing and eye deviation to the right. His initial laboratory studies included Na^+ 119 mEq/L, bicarbonate 14 mEq/L, glucose 59 mg/dL, phosphorous 2.3 mg/dL, total protein 5.3 g/dL, serum osmolality 263 mOsm/kg H_20, and anion gap of 11. A comprehensive urine drug screen was positive for nicotine and cotinine in a 2:1 ratio. The patient was treated with 10 mL of D25 and a 5 mL/kg bolus of 3% saline intravenously. The patient became more responsive, opening his eyes and moving all four extremities after these interventions. He was treated with intravenous normal saline overnight and his mental status and electrolyte abnormalities returned to normal within 24 hours of presentation. *Conclusion:* The metabolic effects of acute nicotine ingestion are quite variable and in this case resulted in hyponatremia, hypophosphatemia, and a non-anion gap metabolic acidosis. We theorize that the acute ingestion of nicotine in this child stimulated the release of ADH resulting in hyponatremia.

74. Drug-Induced Stevens-Johnson Syndrome and Toxic Epidermal Necrolysis in Children: Clinical Manifestations and Outcome

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Introduction: Stevens–Johnsons syndrome (SJS) and Toxic Epidermal Necrolysis (TEN) are life-threatening complications of drug therapy. *Methods:* We analyzed all SJS/ TEN cases treated in two tertiary-care pediatric hospitals in North America between 2000 and 2007. Cases were identified using ICD-10 discharge codes; data was manually extracted from patients' charts. *Results:* We identified 54 cases, (37 males) who were admitted for STS (n = 42), TEN (n = 7) and SJS-TEN overlap (n = 5). The mean age at presentation was 9.6±4.7 years (range 1–18). Fifteen patients had a skin biopsy performed to confirm the diagnosis. Length of hospital stay for SJS/TEN ranged between 2 to 54 days. The most common identified etiologies were drugs (26 [48%], primarily antiepileptics [15] and sulfonamide antibiotics [6]) and mycoplasma infection (16); the inducing drug was undetermined in 9 patients. Treatment included systemic corticosteroids (27 (50%)) and topical steroids (9 (17%)), systemic antibiotics (30 (56%)) or antiviral drugs (17 (31%)). Intravenous immunoglobulin (IVIG) was administered to 22 children (41%); both IVIG and systemic steroid treatments were used in 8 (15%). There was one death, the presumed result of graft-vs.-host disease. 12 patients (22%) had recurrent SJS/TEN episodes, often following different drug exposures; 5 of these had multiple recurrences. Twenty-six (48%) children had long-term sequelae, involving the skin (24) and eyes (14, including corneal opacities, keratitis); phimosis (2), venous thrombosis (1) and bronchiolitis obliterans (1) also occurred. *Discussion:* The prognosis of SJS/ TEN in children appears more favourable compared to adults, but about half of the affected children suffer long-term sequelae, and up to 20% may develop recurrent SJS/TEN after exposure to drugs from different classes. Further study into the pharmacogenetic mechanisms of recurrent SJS/TEN is warranted to identify susceptible hosts.

75. Hyperinsulinemic Euglycemic Therapy for Symptomatic Amiodarone Ingestion

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There are few published reports describing treatment for type III antiarrythmic intoxication. We report the case of a severe amiodarone ingestion, presenting with hypotension and bradycardia, treated with hyperinsulinemic-euglycemic therapy (HIE).

82 y/o female presented after a suicidal ingestion of 28 tablets of 200 mg amiodarone with a heart rate of 30 beats per minute and systolic blood pressure of 110 mmHg. The patient then developed a wide complex rhythm, with a QRS of 120 msec and a blood pressure of 70/30 mmHg. A glucagon bolus of 8 mg was given, followed by a continuous infusion at 8 mg/h, dopamine infusion at 15 mcg/kg/min and serum alkalinization with sodium bicarbonate were started. Heart rate improved with a transvenous pacemaker without improvement in blood pressure. HIE was initiated at 0.1 units/kg/hr with regular insulin and increased to 3 units/ kg/hour. Blood pressure improved to 135/58 mmHg and heart rate was junctional at 53 beats per minute. This regimen was maintained until hospital day 4. 12 hours following cessation of treatment, the patient became hypotensive at 82/37 mmHg. HIE was restarted at 1 unit/kg/hour. Blood pressure and heart rate stabilized at 147/45 mmHg and 61 bpm, paced and remained for 5 more days. She remained unresponsive and per the family's request, was extubated and terminally weaned on hospital day #9.

HIE is used to treat symptomatic calcium and betablocker overdose via an unknown mechanism. Amiodarone is type III antidysrhythmic with multiple mechanisms of action including sodium channel, potassium channel, calcium channel and beta blockade. There are no previous reports using HIE to treat amiodarone intoxication. The presentation was similar tobetablocker intoxication although there is not a known coingestion. The cardiovascular benefit of HIE in this overdose may be through treating the beta and calcium blocker effects of amiodarone or from another, unknown benefit. This is the first report detailing treatment of the cardiovascular effects of amiodarone with HIE. Patients with evidence of Na channel blockade, from amiodarone, may also benefit from alkalinization.

76. Secular Trends in Information Calls from The National Poison Data System: 2000 – 2008

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Background: NPDS features allow poison centers to examine national aggregate data for exposures and information calls by AAPCC generic categories (in these data, 926 minor grouped into 161 major categories). *Methods:* We ran NPDS enterprise reports for years 2000–2008 and examined information call change over time as the absolute (linear call regression/year) and relative change (doubling time from linear regression of log-calls/year) for each major category and total. *Results:* Of the 162 regressions, 102 (63%) of the linear and 100 (62%) of the log regressions were statistically significant ($p < 0.05$, 2000–2008, N = 9). The table shows the top 20 major categories ($p < 0.05$), 2008 call totals, and the mean rate of increase (doubling time in years). *Discussion:* Descending ranking shows the categories most responsible for the information call increase. The doubling times (mean growth rate over this time period) were ~3-fold faster and changes weremore strongly related to time compared to exposure calls. *Conclusion:* These quantitative trends, remarkably consistent over time, may portend exposures or abuse. Addition of ranking algorithms to NPDS may help focus interventions, predict future poison center workload, and enhance the value of NPDS as a real-time data system.

Increase in number of information calls

Rank	Increase Calls/Y	2008 Calls	Doubling Time (Y)	Major Category
1	25372	253,815	3.34	Acetaminophen Combinations
2	19886	166,857	2.25	Opioids
3	16266	167,806	3.74	Misc Sedative/ Hypnotics/ Antipsychotics
4	8340	82,601	3.66	Misc Muscle Relaxants
5	8046	77,530	3.45	Misc Unknown Drug
6	6328	73,928	5.01	Nonsteroidal Antiinflammatory Drugs
7	6156	65,969	4.07	Misc Cardiovascular Drugs
8	5708	58,470	4.09	Misc Antidepressants
9	4728	55,706	4.70	Misc Antihistamines
10	3798	47,491	5.77	Antibiotics
11	2878	32,949	5.00	Acetaminophen Alone
12	2849	26,722	3.16	Misc Anticonvulsants
13	1758	29,490	8.14	Misc Stimulants and Street Drugs
14	1554	17,144	4.65	Misc Diuretics
15	1341	19,287	6.86	Misc Hormones and Hormone Antagonists
16	1319	14,370	4.79	Other Miscellaneous Drugs
17	1266	11,437	3.34	Oral Hypoglycemic
18	936	13,771	7.58	Cyclic Antidepressants
19	753	9,659	5.86	Misc Gastrointestinal Preparations
20	711	9,107	4.55	Antacids

77. "Go Lytely" Dissolves More Quickly

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Introduction: Polyethylene glycol electrolyte solution (PEG-ELS) is a water soluble hydrocarbon solution routinely used following acute poisonings for whole bowel irrigation (WBI). This is thought to be most beneficial in large sustained release acute poisonings but is also used in acute iron poisoning and "body packers." Some have suggested using WBI for large nonsustained poisonings. In addition, PEG-ELS is often given in "body stuffers" in which poorly wrapped illicit drugs are ingested. We theorize PEG-ELS could increase solubility of nonsustained release drugs. *Methods:* An artificial stomach model, polypropylene with volume 1.89L was used. This was filled with 500mL of simulated gastric fluid in each group. 10 acetaminophen (APAP) 500mg tablets were uniformly placed in the stomach model. In one group, 500mL sterile normal saline was added. In the other group, 500mL PEG-ELS was added. APAP concentrations were obtained at baseline, 15, 30, 60, and 90 minutes using a "thief" to standardized

depth. In addition, area under the concentration-time curve (AUC) was calculated using the trapezoidal method. *Results:* In the normal saline group APAP concentrations were: 0, 0, 0, 5, and 11 mg/L at 0, 15, 30, 60, and 90 minutes, respectively. The APAP concentrations were: 0, 16, 29, 101, and 154 mg/L at 0, 15, 30, 60, and 90 minutes, respectively in the PEG-ELS group. The AUC_{0-90} was 315 mg-min/L in the normal saline group compared to AUC_{0-90} 6233 mg-min/L in the PEG-ELS group. *Conclusion:* In this artificial stomach model we identified higher APAP concentrations and AUC following the addition of PEG-ELS to simulated gastric fluid containing 5 grams of APAP compared to normal saline in simulated gastric fluid containing 5 grams of APAP as control. Further study is needed to elucidate the clinical relevance of this finding.

78. Increasing Poison Center Case Reports of Male Enhancement Supplements in Texas

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Background: There has been an increase in use of over-the-counter products in the US marketed as male enhancement supplements (MES) since the 1998 introduction of FDA-approved prescription medications for erectile dysfunction. These products are sought for lower cost and discrete accessibility. In 2006, the FDA analyzed 17 MES and found potentially harmful and undeclared phosphodiesterase-5 (PDE5) inhibitor analogues of sildenafil. This study evaluates exposure data related to these supplements. *Methods:* Exposure case data from 2002–2008 was collected retrospectively from our network of six regional poison centers (PCs). These cases were analyzed for their exposure characteristics and outcomes. *Results:* A total of 97 exposures were identified. Cases increased from 3 to 31 exposures annually with percentage changes of +33, +125, +89, –12, +20 and +73% respectively. Children <6–years-old accounted for 26%, 6–19-year-olds 7%, and adults >19-years-old 65%. Females accounted for 24%, 15 were <6-years-old, and 8 females >19-years-old. Reasons for exposure included 43% unintentional general, 28% adverse reactions, 22% misuse or abuse, 6% suspected suicide, and 2% intentional unknown. Of these, 55% were managed on site, 35% at a health care facility (HCF), and 10% were referred to a HCFs. Of those treated at HCFs, the most common clinical effects were tachycardia 33%, vomiting 24%, nausea 15%, agitation 15%, hypertension 9%, and chest pain 9%. Treatments included oral dilution 28%, IV hydration 12%, food 10%, activated charcoal 7%, and benzodiazepines 5%. Of the 74 patients with documented symptoms, 10 had moderate effects, one had major effects, and there were no deaths. Of all the MES reported exposures, Stamina Rx® contributed to 60%. *Discussion:* Adult males comprised the majority of cases, but females and children unexpectedly accounted for a substantial number of exposures. Over 70% of cases were either unintentional exposures or adverse reactions. Most cases were handled at home. The FDA has issued several voluntary recalls of PDE5-containing MES. *Conclusions:* There should be careful monitoring and regulation of MES, because of the increase in reported cases and potential health risks from undeclared ingredients.

79. Do Snakebite Patients of Varying Severity and Achievement of Initial Control Benefit from Antivenom?

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Background: Fab antivenom (FabAV) is used to stop progression of symptoms from North American crotalid envenomation. Loading doses are given until initial control (IC) is reached although this is not achieved in all patients. We describe changes in specific venom effects (VE) in a cohort of patients of varying severity and achievement of IC. *Methods:* Data were collected during a multi-center retrospective cohort study of patients treated with FabAV between 2002 and 2004. Nine specific VEs were assessed at 3 time points by severity and achievement of IC. Severity was determined using a 7-point severity score. IC was defined using standard criteria. *Results:* 209 cases were included: 87% cases were mild/moderate envenomations and 13% were severe. IC was achieved in 83% of cases. Percentage of cases with VEs decreased from start FabAV to IC/last loading dose and final clinical assessment (Table). At final assessment, 25% of severe cases had thrombocytopenia, 14% coagulopathy and all other venom effects were present in <4% of cases. In addition, 4% of mild/moderate cases had thrombocytopenia, 6% coagulopathy and ≤1% had any other venom effect at final assessment. At start FabAV, 46% of cases not achieving IC had thrombocytopenia, 29% coagulopathy, 100% pain, and 94% swelling. By final assessment, 20% had thrombocytopenia, 17% coagulopathy, 6% pain and none with swelling. *Discussion:* Regardless of severity or if IC was achieved, VEs improved at IC/last loading dose and final assessment. Pain, swelling, neurological, gastrointestinal, cardiovascular, bleeding and respiratory effects resolved in nearly all cases by final assessment, while coagulopathy and thrombocytopenia improved in some cases but persisted in others. *Conclusions:* Snakebite patients treated with FabAV showed improvement of VEs regardless of severity and achievement of IC.

Table. % cases with VEs

Venom Effect	Start FabAV	IC/Last Loading Dose	Final Assessment
Pain	98.1	9.6	1.4
Swelling	96.2	10.1	0.0
Neurological	29.7	6.2	0.5
Gastrointestinal	28.7	3.4	0.5
Coagulopathy	23.9	21.1	7.2
Thrombocytopenia	22.5	6.2	6.7
Cardiovascular	17.2	2.4	0.5
Respiratory	16.3	3.4	0.5
Bleeding	1.4	1.0	0.5

80. Utilization of Poison Education and Prevention Services: Results from a Web-Based Survey

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Background: Educating the public about poison prevention is a main objective of poison control centers in the United States. The purpose of this study was to describe the demographic profile of the residents of New Jersey who access NJPIES services via the Internet and to evaluate their previous, current and future intent to utilize poison center services. *Methods:* New Jersey residents can request either educational materials or posion prevention programs from NJPIES through its website. The process requires individuals to complete a survey before requesting either educational materials or a poison prevention program. The data, collected via the NJPIES website, provides the ability to categorize which services are being utilized by NJ residents and identifies which counties are accessing those services. Individuals were also asked to identify which services they have used in the past and which services they plan to use in the future. *Results:* A total of 1,204 completed surveys were obtained during 2008. Nearly one-half of the responders were between the ages of 41 and 55 years old; race/ethnicity consisted of 75% whites; 8% blacks, and 7% Hispanics; approximately 85% were females and more than 95% of the responders reported English as their primary language. Approximately two-thirds of responders were aware of the services provided by NJPIES; less than one-half of them ever used these services and more than 80% of the responders suggested they will utilize poison center services in the future. *Discussion:* Females, whites, and those between 41 and 55 years old were more likely to contact the poison center than all other groups. Although the results indicated the majority of responders were aware of NJPIES' services, only a small percentage actually utilized poison center services/education programs in the past. *Conclusion:* This survey provides NJPIES with valuable information about the utilization of its services. The knowledge gained will allow NJPIES to determine where additional outreach efforts are needed throughout the state.

81. Medication Identification Using IVR Technology: A Profile of Caller Demographics

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Background: Medication identification requests (MIR) constitute a significant portion of the calls received by most poison information centers. To minimize the impact of MIR on poison center staffing, interactive voice recognition (IVR) technology was implemented to automate the identification of medications. Callers are prompted to provide their gender, age, postal zip code and the name of the medication which they wish to have identified. The voice recognition translational software then converts the caller's responses into data fields. The goal of this project was to profile caller demographics and MIR through the use of an IVR. *Methods:* Gender and age data were reviewed to conduct a comparison of male and female callers and to determine the mean age of the callers. Zip code data were analyzed to identify rural versus urban callers based on a standardized definition and to determine whether there were differences in their MIR. The MIR data were exported into Excel for analysis. Descriptive statistics were used. *Results:* Data from 15,190 MIR were analyzed. Males accounted for 49.8% and females 49.6% of inquiries. The mean age of the callers was 31.54 years (SD ± 13.01). Rural callers constituted 35% of the MIR, compared to 65% from urban callers. MIR for APAP with hydrocodone, oxycodone, clonazepam and APAP with oxycodone were the top four identification requests from both the urban and rural callers. There were minor differences in the order of the remainder of the top 10 MIR. With the exception of acetaminophen, all of the top 10 MIR involved prescription pharmaceuticals with substance abuse potential. *Conclusions:* The IVR managed MIR successfully and reduced poison center workload through automation. There were no gender differences among callers and substances with abuse potential accounted for the majority of the MIR. Call volume from urban and rural areas paralleled the service area demographics.

82. New Insights into Root Causes of Accidental Unsupervised Ingestions (AUIs) of Over-the-Counter (OTC) Medications

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AUIs often result in calls to US poison centers & manufacturers of OTC medicines. *Objective:* Determine AUIs root causes & relationship to normal med storage. *Methods:* US reports in children <12yo with OTC med & MedDRA terms [accidental drug intake by child, accidental exposure, accidental overdose & failure of child resistant (CR) mechanism] over ~1/3 yr (Q3 2008-Q1 2009) were identified. Healthcare professionals (HCPs) called reporters to obtain info about AUIs & normal med storage. *Results:* 220 reports identified; unable to re-contact 175 caregivers; 45 (20%) caregivers completed survey. All AUIs occurred in children <7yo; 78% in children 1 to <4yo; 56% male; 80% unobserved by caregiver. *Root causes:* Site: 89% at 1° residence Room: 36% bedroom; 33% kitchen; 13% living room; 13% bathroom Caregiver location at time of AUI: 71%

in different room Formulation: 71% pediatric Intended recipient of ingested med: 56% child who had AUI (If intended for someone else: 40% parent, 30% sibling, 15% grandparent) Location of med at time of AUI: 60% not normal storage location Elapsed time: last therapeutic dose & AUI: 9% < 1min, 13% < 15min, 27% < 1day, 9% < 1wk, 16% > 1wk, 26% unknown Climbed on device to access med: 50% Reportedly gained access with secure CR closure: 27% *Normal storage of OTC Meds*: 76% in high out of sight location; 71% in unlocked location; 71% in multiple rooms; 33% store OTC meds in location different from Rx meds; 33% store adult meds in location different from pediatric meds. *Conclusion:* Most AUIs with OTC meds occur at home, in bedroom or kitchen & are unobserved when the caregiver is in a different room. Pediatric formulations intended for use by child who had AUI are commonly involved. Although most caregivers store meds in a high area out of sight, AUIs often occur within 24hrs of the last therapeutic dose when the OTC med is not in its normal storage location. Meds are commonly stored within multiple rooms & not in a locked location. Caregivers store OTC/adult meds differently than Rx/pediatric meds. New insights may help guide targeted interventions & educational efforts.

83. Two Cases of Atropine Poisoning Suspected from Bottled Water

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Objective: Detailed case reports of atropine poisoning are rare. We report two cases of confirmed atropine poisoning purportedly from a bottle of water purchased from a street vender at a tourist venue. *Case report:* Two women, 84 and 35 yo, presented to the ED with acute anticholinergic toxidrome after drinking from a bottle of water. The 84 yo arrived with altered mental status. Vitals were: BP, 157/79 mmHg; HR, 109/min; RR, 18/min; T, 35.4°C; and glucose, 112 mg/dL. Exam was remarkable for dilated pupils, dry mucous membranes, hypoactive bowel sounds, and urinary retention. Neurological exam noted unintelligible speech unstable gait, hallucinations. She had a normal brain CT and ECG She received a total of 4 mg of IV physostigmine with complete resolution of her findings. She stated that the symptoms began minutes after drinking the water. A serum atropine concentration drawn 16 hours after presentation, was 0.83 ng/mL. The 35 yo woman drank from the same bottle of water with acute onset of similar symptoms and presented to the ED with syncope. Initial vital signs were: BP, 98/65 mmHg; HR, 130/min; RR, 18/min; O2 99%; T, 36.5°C; and glucose, 100mg/dL. ECG demonstrated sinus tachycardia only. Physical exam was identical to the older woman except that she was oriented and had clear speechSymptoms resolved completely with 2 mg of IV physostigmine and she was discharged within 24 hours. Blood atropine concentration drawn upon arrival was 9.4 ng/mL. Although the remaining water from the bottle tested negative, the sample was limited due to an insufficient quantity of fluid. The source of exposure is still unclear. *Discussion:* Atropine has been used historically as an incapacitant and for murder. The circumstances in this case are suspicious for an attempted drug facilitated crime. Atropine poisoning was confirmed with blood analysis and response to physostigmine. *Conclusion:* Anticholinergic poisoning was suspected clinically and atropine toxicity was confirmed. Although the source of atropine remains undetermined the circumstances are suspicious for criminal intent.

84. Prolonged Serum Half-Life after Therapeutic Acetaminophen Dosing

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Background: Acetaminophen (APAP) pharmacokinetics in therapeutic dosing have been well characterized.

Table 1.

Hours Post Admission	APAP (mcg/mL)	ALT (IU/L)	ALT (IU/L)
0.0	3	37	–
21.9	–	–	1000
27.9	–	–	1000
44.7	–	–	500
55	–	–	1000
55.6	27.1	435	–
60.2	33.4	–	–
63.6	36.8	555	–
68.1	35.1	502	–
71.6	31.2	439	–
79.6	24.7	302	–
83.6	24.8	–	–
98.8	16.4	–	–
115.6	11	144	–
122.2	11.4	118	–
128.4	11.2	107	–
134.8	9.6	120	–
163.5	Undetectable	–	–
175	Undetectable	–	–

The reported half-life ranges from 1 to 3 hours, though it may be longer in neonates and the elderly. While there are reports of prolonged half-life following overdose, we describe a case with prolonged half-life after documented therapeutic dosing. *Case report:* A 39-year-old female with a history of pancreatitis, hepatitis C and anorexia (BMI 14.5) presented to the ED for abdominal pain. She denied taking any APAP products prior to arrival, although her serum APAP concentration was 3.0 mcg/mL on admission. Her initial serum ALT was 37 IU/L. In the first 3 days of her hospital stay, she received a total of 3.5g APAP in the form of Vicodin (5/500) as a prn order. At 56 hours post-admission the patient's ALT acutely rose to 435 IU/L and serum APAP levels were noted to be supratherapeutic. She was started on IV NAC treatment and transferred to the ICU with a sitter. Serum APAP concentrations and ALT are shown in Table 1. Her post absorption half-life was 32 hours (95% CI 29 to 36 hours). The patient developed multi-system organ failure and died. *Discussion:* This patient had abnormal pharmacokinetics following therapeutic doses of APAP. In addition to a prolonged APAP half-life, her volume of distribution, calculated using her total dose and terminal clearance, was high at 1.9 L/kg (normal Vd 0.6 L/kg). As she was hospitalized, her doses were known and occult ingestion was unlikely. Possible explanations include malnutrition, liver dysfunction or congenitally abnormal acetaminophen metabolism.

85. Medication Safety: Who Ya Gonna Call? The Poison Center!

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Background: The majority of older adults do not see the poison center (PC) as a resource for their medication-related poisonings. Therefore, many older adults may not get adequate, cost-effective treatment for their medication-related poisonings. *Methods:* An advisory committee assisted the PC in developing materials to educate older adults. The materials objectives were to educate older adults about their risk for medication-related poisoning and increase their use of medication safety tools and the PC. The materials were promoted to senior-serving agencies and advocates for distribution in targeted communities. To measure the education program's effectiveness, the recipients were encouraged to complete and return an evaluation survey and the volume of exposure calls from those 60 years of age and older was tracked and compared over time. The penetrance of older adult calls from targeted communities 12 months prior to the distribution of the materials was compared to 12 months after. *Results:* There was an increase of 16% in older adult call penetrance for the targeted communities. Of the 53 completed material evaluations, 92% stated they were likely to keep the materials as a resource and 74% will recommend it to others. Four of the medication safety tools (medication list, pill reminder box, PC magnet and medication wallet card) were utilized by more than half. Prior to receiving the materials, only 15% had called the PC for a medication-related question and 11% for a medication-related emergency. However, 51% stated they were likely to call the PC in the future for a medication-related question and 72% for a medication-related emergency. *Conclusion:* The distribution of these materials increased the target population's utilization of the PC. Survey results indicate an increase in the use of medication safety tools and PC services. *Discussion:* Older adults continue to underutilize the PC for medication-related poisonings. PC education programs need to prioritize older adults as a target audience. Continued targeted distribution of these educational materials will help prevent medication-related poisonings and improve the likelihood of older adults accessing adequate, cost-effective treatment via poison centers.

86. Girl Scouts and The Poison Center: A Partnership To Maximize Poison Prevention Education

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Background: The Poison Center (PC) has formed a partnership with two Girl Scout councils within the state to establish the PC patch program. Through the PC patch program, over 24,000 girls have the opportunity to learn about poison safety and perform service projects related to teaching poison prevention to younger age groups. The Girl Scout program has focused on developing girls of courage, confidence, and character for over 96 years, and the PC patch program allows for the development of these characteristics in the girls who participate. *Case report:* The Girl Scout councils were contacted with our patch program proposal to aid in increasing outreach efforts within the state. All Girl Scouts from all age levels ranging from age 5 to 18 were eligible. The program directors were provided with a program guide that is divided by grade levels. To earn a poison prevention patch, participants must distribute materials in addition to completing learning projects such as poison-proofing a home, creating puppet shows, or hosting in home poison prevention training for parents of small children. *Discussion:* To date, sixty Girl Scouts have completed the program, reaching at least 1,000 citizens. Along with distribution of materials these girls have poison proofed homes, toured grocery stores and found potentially hazardous look a like products, researched poisonous substances, performed puppet shows, made collages of poisonous substances, set up displays for the community, and conducted prevention training in the homes of young children. *Conclusion:* Girl Scout participants not only learn aspects of poison prevention, but also become a partner with the PC for conducting programs throughout the state. This partnership will allow outreach efforts within our state to expand with minimal costs. This program has the ability to expand within the Girl Scout system and other service focused organizations.

87. The Incidence of Respiratory Depression during Emergency Department Chemical Restraint of Agitated Patients

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Introduction: Patients with undifferentiated agitated delirium present frequently to the emergency department (ED) and often require chemical restraint. While serious adverse events are rare, the incidence of hypoxia and respiratory depression are unknown. *Objective:* To determine the incidence of

respiratory depression in patients who are chemically restrained for psychomotor agitation in the emergency department. *Methods:* Prospective, observational study. Any patient chemically restrained secondary to undifferentiated psychomotor agitation was eligible. Drugs used for chemical restraint were left to the discretion of the treating physician. ED protocol mandated that all patients receiving chemical sedation undergo electronic monitoring of HR, BP, RR, SpO_2, and End Tidal CO_2 ($ETCO_2$). We used the Capnostream 20 to measure $ETCO_2$ and SpO_2, data was recorded every 5 seconds. Data files began when the treating physician deemed the patient adequately sedated and lasted for 90 minutes. Hypoxia was defined as SpO2 ≤93%, respiratory depression (RD) was defined as $ETCO_2$ level ≥50mmHg, an absolute change from $ETCO_2$ baseline of 10%, or loss of waveform. All patient files were downloaded into Excel then graphed and analyzed. Final interpretation of hypoxia or RD occurred during the data evaluation. Hypoxia and RD were only considered present if they were part of an overall "trend" of SpO_2 ≤93%, a rise/fall of $ETCO_2$ of ≥10% or loss of $ETCO_2$ waveform for ≥15 seconds. *Results:* 20/25 patients had enough data for full analysis. 5/20 (25%) patients developed hypoxia. 10/20 (50%) patients developed RD by $ETCO_2$. 5/5 patients who developed hypoxia had an $ETCO_2$ change preceding the onset of hypoxia. The average Ramsey Sedation score was 4.35 (SD 0.57). 5/20 patients had an airway intervention, 3 were physically stimulated, and 2 were verbally stimulated. Medications included: lorazepam, diazepam, haloperidol, and medazolam *Conclusion:* This interim analysis shows that a significant proportion of patients have respiratory depression who are chemically restrained. Further evaluation of the clinical relevance of $ETCO_2$ changes without hypoxia in this patient population is warranted.

88. Thyroid Storm from a Liothyronine Compounding Error

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Background: Liothyronine (Triiodothyronine, (T_3)) is used to treat hypothyroidism, goiter-euthyroid and myxedema in patients who are allergic to desiccated thyroid or thyroid extract derived from pork or beef. A paucity of information exists on T_3 in acute overdose. We present 2 cases of life threatening T_3 toxicity from a confirmed source. *Case series:* Case 1: A 49 y/o woman with hypothyroidism presented to the emergency department (ED) with confusion, N/V, headache, and palpitations. Ten days prior she was prescribed Liothyronine by her naturopathic doctor. Initial VS were a BP-158/65, P-130, RR-18, oral temp-37.4 C, and O_2 saturation of 98%. She was treated with IV fluids and propranolol and admitted to the floor. She became increasingly tachycardia (160 bpm) and was transferred to the ICU where she became obtunded and was intubated for hypoxia. Her initial T_4 5.7 ug/dL (4.5–12.5 ug/dL), TSH 0.01 mU/L (0.40-5.20 mU/L), and total T_3 8523 ng/dL (72–170 ng/dL). Case 2: A 66 y/o woman with hypothyroidism presented to the ED with sweating, shortness of breath, palpitations and short term memory loss. Five days prior she had her prescription for Liothyronine refilled. Initial vital signs were BP-178/83, P-133, RR-20, oral Temp 37.3 C, and an O_2 saturation of 95%. She was initially treated with propranolol, but ultimately required an esmolol drip for increasing tachycardia and was intubated due to increased confusion and respiratory failure. Her initial T_4 was 2.4 ug/dL, TSH 0.09 mU/L, and total T_3 8249 ng/dL. Both patients had their Liothyronine prescriptions filled at the same compounding pharmacy. After a Food and Drug Administration's investigation, it was found that Case 1's 7.5 mcg tablets contained 6264 mcgs per tablet of T_3 and Case 2's contained 7234 mcgs per tablet. *Conclusion:* This case series demonstrates that although uncommon, toxicity from T_3 may be acutely life threatening. And it highlights the potentially catastrophic outcomes that can result when compounding errors occur.

89. The Innocent Victims of Increased Opioid Availability

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Background: Our goal is to describe the call volume impact and clinical impact of increased societal availability of opioids. *Methods:* We searched the AAPCC NPDS database for exposures of children < 6 yrs to hydrocodone, oxycodone, codeine, methadone, morphine, fentanyl, hydromorphone and the non-narcotic tramadol during the years 2000–2007. Extracted data was entered into a SQL Server database with a multidimensional analytic architecture for analysis. *Results:* 70,650 unique patients (not exposures) were less than 6 years old. For most the reason for exposure was unintentional general (67%) or therapeutic error (30%). Unintentional general calls increased 49% over the period (least squares best line fit $p < 0.0001$). Therapeutic error cases rose by 52% from 2000 to 2003 then fell back to 17% above 2000. Of the therapeutic error cases 95% were exposed at home. 99.6% involved only one opioid (89% just one substance). In 97% it was codeine or hydrocodone. Reason for error: 24% not own medication, 10% took medication twice, 16% wrong medication, 27% wrong dose. This group did well with only 14% visiting a health care facility and only 1% admitted. In contrast, of the unintentional general cases 99%, were exposed at home. Eighty three percent involved hydrocodone, codeine and oxycodone. Fifty-one percent of children poisoned were evaluated at a health care facility (5.4% admitted--2.5% to an ICU). Twenty-four children in this subgroup died, including 10 from methadone, although methadone was only 1% of these unintentional general opioid cases. *Conclusion:* The rise and fall in therapeutic errors may reflect a better understanding of toxicity and decreased use for cough in small children. In contrast, US DEA ARCOS data suggests prescription opioids have increased 100% in this 8 year period. As prescription opioids are more available in society and in homes, unintentional exposures to children have increased with significant consequences. Methadone is a particular problem.

90. Massive Hymenoptera Envenomation by Native US Yellowjackets

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Introduction: Envenomation by a large number of Hymenopteran can cause significant morbidity and mortality due to venom load. All cases of mass hymenoptera envenomation in the US have involved Africanized "killer" honey bees." We present the first case of massive Hymenoptera envenomation by native US Hymenoptera. *Case report:* A 3 year-old previously healthy male and his family were hiking in Oregon, and were attacked by yellow jackets. The child's father fell down a ravine. The child stood on the trail until his father was able to return, grab the child, and elude the bees. On ED arrival, the child was tearful, uncomfortable, and vomiting. Vital signs were nl, as was his physical exam except for > 90 punctate lesions on the head and neck, and 30 below the neck w/o edema or urticaria. Medical toxicologists identified yellowjackets in his clothes. Initial labs were nl except for a WBC of 37.5 K/cumm and mild hypokalemia, including a nl CK at 298 U/L (nl <317U/L). IV fluids, ondansatron, midazolam and morphine were given for symptom control. 6.5 hrs after arrival, his AST rose to 389 U/L (24–47 U/L), ALT to 160 U/L (13–48 U/L), CK to 1045 U/L and PTT to 53.1 sec (26 – 36 sec). UA normal. Generalized edema developed at 12 hrs and was treated with IV decadron and diphenhydramine. At 24 hrs, he remained unwell, his CK rose to 1881 U/L, with all other labs normalizing. His CK peaked at 2085 U/L after 32 hrs. 48 hrs after the incident, the child began to take po fluids with labs returning to nl levels. He had no further sequelae from this event. *Discussion:* "Delayed toxic effects" of mass envenomation are due to direct end organ toxic effects from the large venom load received from as few as 20 stings. It has resulted in pediatric deaths when overlooked on initial evaluation. Guidelines recommend admitting all pediatric patients sustaining >50 stings for 24 hrs for laboratory evaluations. The 50 sting threshold appears reasonable for treating envenomations by native US species of wasp. *Conclusions:* Delayed toxic reaction may be caused by native US species of Hymenoptera. Physicians should be aware that endemic US species can cause this reaction and should have a low threshold to admit pediatric patients with >50 stings for 24 hrs.

91. Prolonged Neuromuscular Weakness and Death after Ingestion of 2,4 Dichlorophenoxyacetic Acid (2,4 D) Despite Early Hemodialysis

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For patients with ingestion of chlorophenoxy compounds, previous literature suggests a high morbidity and mortality. Although no definitive antidotal therapy currently exists, some suggest that urinary alkalinization and hemodialysis (HD) may be useful to enhance elimination of these xenobiotics. We describe a case that questions the utility of HD for 2,4 D ingestions. An 84-year-old man presented to the ED after an intentional ingestion of a 2,4 D containing herbicide called Spectracide Weed Stop. On arrival airway erythema was noted with excessive oral secretions and respiratory distress. The patient was immediately intubated. Initial vital signs were BP-104/61 mm Hg, pulse-75 bpm, O2sat-100%. Physical examination was otherwise unremarkable. Initial arterial blood gas showed pH 7.37, PaCO2 41 mmHg, PaO2 413 mmHg. Serum bicarbonate was 25 with an anion gap of 19. BUN and creatinine were measured at 26 and 1.1 mg/dL. Serum creatinine phosphokinase (CPK) was 196 IU/L. Alkalinization therapy was initiated with sodium bicarbonate 132 mEq/L at 200 mL/hr and nephrology was consulted for HD. Serum CPK levels peaked on day 5 at 19,754 IU/L. Serum creatinine peaked on day 3 at 6.6 mg/dL. The patient was noted to have minimal urine output over the next few weeks of about 0-10 mL/hr. The patient also developed thrombocytopenia, with platelets of 46,000, and hypocalcemia of 4.9 mg/dL. Two days after arrival and after 2 HD treatments, the serum 2,4 D level was measured at 320 mcg/mL. The patient was extubated on hospital day #10, and had profound neuromuscular weakness as well as encephalopathy. The patient's mental status improved over a few weeks although his neuromuscular weakness persisted. He died after a month of hospitalization due to fungemia. Despite the medical literature suggesting that 2,4 D is amenable to HD, this case suggests that hemodialysis was not effective at lowering serum levels. A level of 320 mcg/mL suggests that a minimal amount of xenobiotic was removed.

92. Survey of Caregiver Preference, Dosage Familiarity and Toxicity Knowledge of Common OTC Analgesics

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Objective: Describe parental preference for acetaminophen (APAP) or ibuprofen (IBU) to treat ill children, describe rationale for preference, and evaluate caregiver knowledge about the risks and potential toxicities of analgesics. *Methods:* Participants were

primary caregivers of children less than 6 y/o presenting to Albert Einstein Medical Center ED. Eligible subjects were asked to complete a survey conducted by a research associate. Information collected included child's age, presenting complaint, antipyretic used, reason for analgesic preference, analgesic dose and reason for chosen dose. Caregivers were asked if they knew the analgesic active ingredient, recognition of trade vs generic name and perception safety of APAP versus IBU. *Results:* 122 surveys completed; 3 declined after initiation of interview; 3 surveys excluded for incompletion (N = 116). Children's mean age was 19 mos (range 33 days –60 mos); most common complaint was fever without any other symptom (62%, 95%CI 53–70). 92/116 caregivers (79%, 95%CI 72–86) provided OTC medication to the child. 68/92 (73.9%) patients received APAP versus 24/92 (26.1%) IBU (effect size 48% 95%CI 38–58). Of the APAP patients 32/68 (47% 95%CI 35–59) received it based on health care provider advice, yet only 18/68 (27%, 95%CI 16–38) received correct dosage instruction from health care provider. 59.8% of caregivers gave incorrect doses of APAP or IBU. APAP patients had 56% incorrect dosing (26.5% underdose, 29.4% overdose) and IBU patients had 73.3% incorrect dosing (40% underdose, 33% overdose). 79% (95%CI 72–86) of caregivers did not know Tylenol and APAP were the same medication. 72% (95%CI 64–80) of caregivers did not recognize Advil and Motrin are both IBU. 48% (95%CI 40–57) of caregivers distinguished APAP and IBU were different medications. APAP was selected as safer than IBU by 56% (95%CI 47–65) of the caregivers, 65 % (95%CI 56–74) based that perception on physician's instruction. *Conclusion:* A majority of caregivers do not know APAP and Tylenol or Advil and Motrin are the same medication. Caregivers of children frequently provide incorrect dosages of APAP and IBU. APAP was the preferred analgesic by caregivers of children and potential toxicity was underestimated.

93. Strychnine Insufflation in an Adolescent

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Introduction: Strychnine poisoning is infrequently seen in the US. We present a classic case of strychnine poisoning with an unusual method of exposure that was initially misdiagnosed. *Case report:* A 14yo healthy male found a white powder in a tin in the attic of a rental house. He insufflated the powder assuming it was cocaine. 15 min after insufflation, his muscles became stiff, he developed an unsteady gait and fell down a set of stairs, lacerating his chin. Spasms worsened when he was touched by others. His mother, an RN, and stated he had a "tonic clonic seizure" but was awake during the event. He initially denied a history of snorting the powder and was treated with benzodiazepines for muscle spasms. Lab evaluation showed a WBC of 25.3 and hypokalemia to 3.2 mmol/L (NL 3.5–5.1 mmol/L), CK elevated at 340 U/L (NL 0–170 U/L), and myoglobin elevated at 1013 (NL 25–72 ng/mL) but was otherwise WNL. UA was positive for blood, UDS neg for cocaine and amphetamines. Salicylate and APAP were neg. He was treated with low dose lorazepam therapy and discharged after mild symptom improvement. After discharge, confessed about the powder to his mother, she returned home and found the tin of white powder was labeled "strychnine." The patients had persistent nausea and spasms after discharge and returned to the hospital. Laboratories at this time showed an increasing CK to 2124, myoglobin was decreasing to 724 ng/mL. The patient was admitted to the hospital and given aggressive IV fluids. The CK peaked at 2228 IU/L and had declined to 2077 IU/L by 24 hours after ingestion. At this time the patient felt less jumpy and myoclonus had resolved. *Discussion/conclusions:* Strychnine is uncommon ingestion, with 40 cases reported in the US for 2007 that was obscured by a common complaint of "muscle spasms." The hallmark of these ingestions is muscular irritability and "awake seizures" with severe muscle contractions. Complications include hyperthermia and rhabdomyolysis. Though this case did respond to benzodiazepines, typically these do need significantly more care than typical cases of muscle spasm. This case also serves as a reminder that ingestion histories should be obtained for all patients, but particularly teenagers. This is an uncommon overdose for which clinicians should be vigilant.

94. A Retrospective Review of Maternal – Fetal Exposures in a Poison Control System

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Background: Surveillance of toxic exposures and patient management utilizing poison control center data offer unique opportunities for evaluating developmental toxicity in human pregnancy. *Methods:* A retrospective review of 931 pregnancy-related cases in a large poison control system from the year 2007 was performed, as part of an ongoing study. Exposure groups were divided into ≤19 years and ≥ 20 years of age, in those cases where age was reported. *Results:* Of the 931 cases where age was known, 88 (9.5%) were in the ≤19 years group, and 718 (77%) were ≥ 20 years of age; 114 calls were for information only. In the ≤19 years group, 52.2% were treated in a health care facility, in contrast to the 27.3% in the ≥ 20 years age group. No obstetrical evaluation was charted in 38% of the ≤19 years group, or in 26% of the ≥ 20 years group. Conditions of pregnancy, birth outcome, and follow up with a teratogen registry were not available in poison control center records. Exposures reviewed that were potentially harmful to the fetus included: salicylates, acetaminophen, iron, rattlesnake venom, antiseizure medications, drugs of abuse, carbon monoxide, lead, and mercury. *Conclusions:* Maternal-fetal exposures were found in a large number of patients accessing the poison control system, with more than half requiring hospitalizations in teenage pregnancies. Poison control centers offer a unique opportunity for community partnerships with health care facilities and teratogen registries for follow up for birth outcomes and improvement of risk assessment for exposures in pregnancy.

95. Methadone Overdose in a Breast-Feeding Toddler

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Intro: Methadone's use in breast-feeding mothers is generally considered safe. We present a child who became symptomatic after inception of maternal self-medication with methadone. *Case report:* A 13 mo healthy, primarily breast-fed, male was treated for narcotic OD. The child's mother ran out of her prescribed hydrocodone/APAP for carpal tunnel syndrome, and substituted 2 doses of methadone 40mg at (times 0 and 4 hrs). The child nursed at 6 hrs and at 10 hrs (for 45 minutes each) and fell asleep beside his mother for 45 minutes. No pills were available to the child. At 11.5 hrs, his mother awoke, noted decreased responsiveness and summoned EMS. EMS confirmed cyanosis, miosis, and bradypnea and BVM respiration was initiated. CBG was elevated. On ED arrival, the child was unarousable with normal vital signs. Naloxone 0.2mg IV was given with awakening. Lab evaluation was NL except for a UDS that was positive for opiates, with confirmation of methadone metabolites. At 18 hours, the child remained intermittently somnolent with O2 sats dropping as low as 91%RA, initiating treatment with his 4th dose of naloxone IV. He subsequently returned to his normal state of health. Child Protective Services evaluation found no danger, and the child was discharged. *Discussion:* Literature on methadone in lactation is minimal. Methadone is present in breast milk with expected infant dose between 3.5-4.4% of the maternal dose in early lactation, which is generally considered a safe level. Most studies, however, are done on newborns with ongoing exposure to methadone, which is not the case with our child. Hydrocodone does cross into breast milk, but is a much less potent opioid at typically doses his mother used. It is unknown what contribution the age of the child, the increased fat content or volume of breast milk in later lactation may have had to the methadone dose he received. Another possible etiology is ingestion of a methadone tab. *Conclusions:* We report methadone toxicity in a breast feeding child. Risk factors for toxicity in this case may have included self-initiation of methadone therapy, the older age of the child, or a higher subsequent volume and fat content of breast milk at this later stage of lactation.

96. The Utilization of a Social Networking Website To Increase Awareness of Poison Center Services

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Background: Awareness of Poison Center (PC) services is a major component of PC public education programs. Poison prevention programs and materials have included information concerning poison-proofing homes, what to do in a poison emergency, and services PCs can provide in a poison emergency. The traditional approach allows programs and materials to be available to schools, businesses, health-fairs, and other community gatherings via face to face contact with PC staff. With increased internet usage, websites have improved the visibility of PCs and eased citizens' access to information that has been previously provided through phone consultation and outreach programs. *Case report:* The PC wanted the ability to directly contact citizens in its designated service region. Facebook, a social networking website, allows organizations to design an informational group page free of charge. This PC uploaded its logo, general information concerning services, and its contact information to the group page. PC staff that were already members of Facebook contacted their friends and family to join. The PC, affiliated with a College of Pharmacy, sent a request to faculty, staff and students to become a member. Also, the PC's website also provided information to join. Once an individual becomes a member of the group, messages and updates from the group page administrator are sent directly to the individual members e-mail inbox. Members are also able to post questions or statements to the organizational page for all members to view. *Discussion:* According to Facebook, there are over 175 million active users. Of those, over half are outside of college. The fastest growing demographic are persons ≥ 30 years old. This PC's Facebook page has been posted <2 months and 216 members have joined. The PC has been able to update the page with activities it has conducted, including links to television interviews. *Conclusion:* As technology has simplified the ability to communicate and provide information to large numbers of individuals at one time, PCs should take advantage of these opportunities. Social networking websites such as Facebook will allow PCs to increase awareness relating to their community activities and services they provide.

97. Sudden Sensorineural Hearing Loss Following Nasal Insufflation of Heroin

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Background: Sudden sensorineural hearing loss (SSNHL) involving relapse use of IV heroin after abstinence has been very sporadically reported. Documentation of serial audiogram (AG) data is extremely rare. *Case report:* A 47 yo female with reported history of heroin abuse presented to the emergency department (ED) via EMS after being found unresponsive by family. She was last seen ~9h earlier. Naloxone 0.8 mg was given with arousal noted. On ED arrival, vital signs were: T 36.3° C, P 121, R 10, BP 87/61, SaO2 88%.

The patient was stuporous, bradypneic, atraumatic, with no needle track marks. After 0.4 mg of naloxone, the patient was alert with normal respirations and reported difficulty hearing, with the right ear being worse. She admitted to snorting heroin after prolonged abstinence and denied any IV drug use. ED labs included: ABG 7.203/50.0/71.6, HCO_3^- 17 mEq/L, CK 551 U/L. Salicylates were undetectable and the urine drug screen was positive for opiates. Although the patient reported spontaneous improvement in her hearing, an AG on hospital day 3 demonstrated normal hearing at 250 Hz sloping to moderate SNHL at 1000 Hz, rising to mild SNHL at 4000 Hz, and falling again to moderate SNHL at 8000 Hz. There was slight asymmetry of ≤10 dB in the lower frequencies, with the right ear poorer. Brain MRI was normal. Peak CK and creatinine were 8920 U/L and 2.2 mg/dL, respectively. On hospital day 4, the patient was discharged on prednisone for SSNHL. At 1 wk follow up, the patient reported her hearing loss had largely resolved. However, a repeat AG 3 mo later indicated essentially normal hearing on the left, but the right ear showed mild hearing loss in the range of 250–500 Hz, normal hearing at 1000–4000 Hz, and mild hearing loss at 4000–8000 Hz. *Case discussion:* The pathophysiology of heroin associated SSNHL and the role of adulterants, if any, remains unclear. Hydrocodone and prophoxyphene have been implicated as causes of hearing loss after chronic abuse, but the mechanism of ototoxicity may be dissimilar to that of heroin associated SSNHL. Steroid therapy may be of value. *Conclusion:* This is a case of heroin associated SSNHL with persistent deficits on follow up AG at 3 mo. To our knowledge, this is the 1st case following nasal insufflation of heroin.

98. Chronic Carbon Monoxide (CO) Poisoning: Myth or Reality – A Systematic Review

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Background: Chronic CO poisoning is an elusive diagnosis and poorly defined in published literature. The aim of this review is to ascertain the existence of chronic CO poisoning, define it, and describe the clinical presentation. *Methods:* A structured literature search (1950 to 2009) was conducted using PubMed, EMBASE, Cochrane Library, bibliography reviews of articles and major toxicology textbooks, and contact with content experts. Search terms included "Carbon Monoxide" OR "Carbon Monoxide Poisoning" AND "Chronic" OR "Subacute" OR "Occult." We included articles published in all languages, human studies with reported health effects, and evidence of CO exposure. Two independent reviewers scanned all abstracts, did a structured evaluation on included articles using design-appropriate published criteria, and constructed evidence tables for consensus development. Adjudication of differences was performed by both reviewers and a research consultant. Observational and experimental studies were evaluated separately to control for heterogeneity. *Results:* A total of 584 literature citations were screened. 28 articles met inclusion criteria. Of these, 20 articles met our quality requirements: 14 reported duration of exposure, 13 duration and either ambient CO or COHb concentrations, and 3 duration and both ambient CO and COHb concentrations. Intermittent exposure was described in 18 articles. Median exposure duration was 18 months (range 8 hours to 50 years). The lowest COHb and ambient CO concentrations associated with health effect were 2.5% and 10 ppm, respectively. Most common reported symptoms were headache, nausea, vomiting and dizziness. *Conclusions:* The majority of evidence supporting the existence of chronic CO poisoning were of fair quality. The best available data indicates that a COHb of 2.5% and/or intermittent exposure to as low as 10 ppm ambient CO for a period ranging from 8 hours to 50 years can result in a spectrum of symptoms, mainly headache, nausea, vomiting and dizziness.

99. Kinetics and Metabolism of Diethylene Glycol in Rats

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Diethylene glycol (DEG) overdoses, mostly through use of adulterated pharmaceuticals in unregulated countries, have been linked with kidney failure, hepatotoxicity, and peripheral neurological disease. Recent studies using fomepizole (FOM) to block DEG metabolism confirmed that a metabolite of DEG, not DEG, is responsible for the acidosis and the kidney and liver toxicity. The purpose of this study was to relate the kinetics of DEG and its metabolites with the development of toxicity to determine the responsible toxic agent. Wistar rats were treated in four groups: water (control), low dose DEG (2 g/kg), high dose DEG (10 g/kg), or high dose DEG + FOM. DEG plasma Cmax values were 42 and 37 mmol/L for 10 g/kg DEG and DEG + FOM, respectively. FOM did not alter the rate of DEG elimination from plasma ($t½ = 12.4 \pm 1.9$ h vs. DEG alone, $t½ = 15.3 \pm 2.6$ h). Analysis of high dose DEG urine by IC-MS showed that hydroxyethoxyacetate (HEAA) was the only acidic metabolite detected in urine (no glycolate, oxalate, or oxybisacetate). Urinary 2-HEAA peaked at 24 h with 114 mmol/L for the 10 g/kg group, but at 8 h with 86 mmol/L for the 2 g/kg group. Total urinary HEAA was 194 mg and 792 mg for low and high dose DEG, respectively, which represented 20% of the dose. Rats treated with FOM + DEG had no 2-HEAA in urine, confirming that FOM inhibited DEG metabolism completely. Urinary HEAA levels correlated in a time- and dose-dependent manner with metabolic acidosis. Kidney and liver toxicity was observed at 10 g/kg DEG and was prevented by FOM treatment. These results demonstrate that HEAA is the only acidic metabolite in urine after toxic doses of DEG and suggest that HEAA is responsible for the target organ toxicity of DEG. Fomepizole blocks formation of HEAA from DEG and HEAA elimination in the urine, but does not alter DEG elimination from the plasma, suggesting that the latter is controlled by the rate of excretion of unchanged DEG in the urine. This project is supported by the American Chemistry Council.

100. Treatment with Polyvalent Antivenom in an Intoxicated Patient Bitten by Egyptian Cobra (Naja Annulifera)

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Background: There has been a recent increase in the private collection of exotic venomous snakes in the USA. Specific antivenom is of paramount importance in reversing signs and symptoms of envenomation. Many hospitals in the USA are equipped with Polyvalent Crotalidae Immune Fab antivenom made specifically for snakes native to the USA. Obtaining specific antivenom for non-native snakes in the USA, usually requires help from zoos or the military. In this case report, we present an intoxicated male bitten by a cobra snake. *Case report:* A 28 year old male presented to the emergency department 4 hours after being bitten on the right hand by a cobra (*Naja Annulifera*). He decided to drink alcohol in order to ameliorate the pain, which led to confusion regarding his degree of envenomation. On arrival patient was lethargic, tachycardic, had slurred speech and nystagmus. He had 2 puncture wounds on dorsum aspect of his right hand. Two vials of specific $F(ab')_2$ antivenom were administered. Ethanol level was 420mg/dL. The patient was discharged 24 hours later, his swelling and erythema did not progress any further. *Discussion:* Cobra snake bites primarily produce neurologic effects, and death is usually due to paralysis of respiratory muscles. Discriminating between envenomation and alcohol intoxication can be a medical challenge. Attributing the symptoms and signs to alcohol and withholding specific antivenom treatment may lead to a fatal outcome. Once the species is identified as being non-native to the area, focus at obtaining specific antivenom is crucial, this usually involves activating expert personal in the field and local zoos. The earliest antivenoms consisted of pure equine serum, more recently cleavage of the IgG molecule with pepsin or papain to produce $F(ab')_2$ or Fab fragments respectively has reduced the incidence of anaphylaxis and serum sickness. *Conclusion:* Great caution should be taken not to delay specific antivenom treatment in the intoxicated patient if envenomation is suspected. Further research and funding is needed in developing less expensive, less antigenic antivenom with longer shelf life to make these products easily available.

101. Increased Intracranial Pressure and Cranial Nerve Palsies Associated with Ethylene Glycol Toxicity

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Ethylene glycol (EG) ingestion may lead to metabolic acidosis and renal failure due to its metabolites. In addition to the renal tubules, precipitates of calcium oxylate crystals have been found in the brain on postmortem autopsies and may account for cranial nerve abnormalities and neurologic complications. We present the case of a young male who ingested EG who subsequently developed bilateral optic disc edema, increased intracranial pressure, and left cranial nerve VI and VII palsies. There is minimal medical literature demonstrating these combined findings.

An 18-year-old male presented to the emergency department after ingesting antifreeze. Initial vital signs were BP-158/118 mmHg, HR-106, RR-24, O_2 sat-98%, afebrile. He was agitated and combative upon arrival, prompting sedation and intubation. ABG post intubation was 7.05/35/272/9.5/98%. ECG showed a sinus tachycardia with normal intervals. Na^+ 141, K^+ 5.2, Cl^- 104, CO_2 6 (mmol/L); BUN-11, creatinine-1.5, Ca^{2+}-10.6, and glucose-145 (mg/dl). Ethylene glycol concentration was 79 mg/dl, methanol and ethanol were negative. After consultation with the regional poison center, the patient was started on fomepizole 15mg/kg as an intravenous bolus along with IV pyridoxine and thiamine. Nephrology was consulted and hemodialysis (HD) was performed for 4 hours. The following morning in the ICU, labs revealed serum bicarbonate of 23 and a creatinine of 3.4 mg/dl. Repeat ABG was 7.38/41/150/23/100% while intubated. He received another four hours of HD and was subsequently extubated and fomepizole was discontinued on hospital day #2. On hospital day #6 his creatinine rose to a peak of 15 mg/dl and required HD every other day. Two weeks after admission, he developed left cranial nerve VI and VII palsies and headaches. MRI/MRA of the brain was unremarkable. Fundoscopic examination showed bilateral grade III papilledema and a lumbar puncture revealed an elevated opening pressure of 35mmHg.

This case should aware clinicians of the potential debilitating neurologic consequences of EG toxicity

102. Parents, Grandparents, or Pet Owners?

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Background: In an effort to identify where Poison Center (PC) callers find the phone number, call center staff asked exposure callers where they obtained the number. The PC conducted a similar study in 2008. *Method:* For the month of February 2009, PC callers with exposures were asked where they obtained the PC phone number. Answers were grouped into pre-determined categories. Data for February 2008 and 2009 were analyzed for significant differences and combined. Exposure cases (excluding intentional exposures and those of unknown intent and missing source data) were analyzed using the SAS® software. *Results:* Data were analyzed for

4201 human exposure and 246 pet-related cases. PC phone number sources differed by caller relationship, caller site and exposure site. When babysitters (n = 23) and mothers (n = 1503) called they most often used a magnet/sticker (52% and 40%, respectively). A phonebook was used by 24% of the mothers. Fathers (n = 298) equally used a magnet/sticker and a phonebook (33%). Grandparents (n = 80) frequently used a phonebook (40%) followed by a magnet/sticker (19%). Pet-related callers (n = 246) most frequently used a phonebook (22%). Caller location data showed callers from their own residence (n = 2693) used a magnet/sticker most frequently (32%), followed by a phonebook (29%). Calls from the workplace (n = 41) or another residence (n = 59) most often used a phonebook (27% and 24%, respectively). Exposure site data showed that a magnet/sticker (26%) was used most often by those exposed in their own home (n = 3377), followed by a phonebook (23%). Health care providers (25%) and phonebook (12%) were the sources of the number for those exposed at the workplace (n = 73). *Discussion:* Although the data collection categories were well defined, coding by multiple data collectors (reliability) may be a limitation. These data identify target populations for magnet/sticker distribution. *Conclusion:* Many households have a magnet/sticker available demonstrating that educational efforts have been effective. However, it is clear the phone book still plays a significant role in obtaining the PC number for certain populations. Education efforts targeting these populations and settings may increase the percent of callers utilizing a magnet/sticker.

103. Mortality after Suicidal Ingestion of Aluminum Phosphide

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Aluminum phosphide (AP) is pesticide commonly used in Southeast Asia and is the second leading agent involved in suicides in India. When AP comes into contact with water or hydrochloric acid, phosphine gas is generated. Phosphine is a powerful oxidant and an inhibitor of cytochrome c oxidase in the electron transport chain. This leads to diffuse cellular toxicity, severe metabolic acidosis, adult respiratory distress syndrome and frequently death. Currently there is no known antidote for aluminum phosphide toxicity.

A 50 year-old Indian man presented to the emergency department (ED) one hour after intentionally ingesting 3 unknown pellets. Initial symptoms included nonbilious vomiting and abdominal pain. He had no past medical history and denied use of illicit drugs, ethanol, or tobacco. Vitals upon arrival were BP-130/90 mm/Hg, HR-110, RR-18, O2 sat 97%, and afebrile. Physical examination was only remarkable for epigastric tenderness. ECG revealed sinus tachycardia with normal QRS and QTc intervals and no evidence of Na+ channel blockade. 30 minutes after arrival to the ED, he became confused, hypotensive, bradycardic, and tachypneic. Repeat vitals were BP-80/40 mm/Hg, HR-40 bpm, RR-28, O2 sat of 82%. ABG was 7.1/26/80/12/90%. He was intubated, given atropine and started on dopamine and norepinephrine infusions. His complete blood count was within normal limits. Na^+ 140 K^+ 3.5 Cl^- 100 CO_2 14 (mmol/L) BUN 20 creatinine 1.3 and glucose 100 (mg/dl) with an anion gap of 26. Serum lactate was 10 mmol/L. Chest x-ray revealed bilateral pulmonary edema. 20 minutes after intubation, he went into cardiopulmonary arrest and was pronounced dead 2 hours after ingestion. The family brought in the offending agent which was identified as an aluminum phosphide pesticide which the patient had brought back from India.

Even though AP ingestion is a common cause of suicidal death in Southeast Asia, it is rarely encountered in North America. Clinicians need to be aware of its rapid and fatal toxicity. Management is primarily supportive as well as a focus on the protection of the health care staff due to possible off-gassing of phosphine.

104. Sotalol Induced Torsade de Pointes and Enhanced Elimination with Hemodilaysis

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Sotalol is a nonselective β-blocker and a Class III antidysrhythmic with the potential to cause torsade de pointes (TdP). TdP is most common in patients taking sotalol who have renal failure or are taking other drugs that prolong the QTc interval. Sotalol exhibits minimal protein binding and has a volume of distribution of 1.5L/kg. It is nearly entirely renally eliminated and its half life can be prolonged to over 100hrs in people with renal insufficiency. We present a case of a patient with end stage renal disease started on sotalol who developed refractory TdP and was treated successfully with hemodialysis.

A 78 year old male with a PMHx of hypertension, coronary artery disease, end-stage renal disease on hemodialysis was admitted to the hospital for colitis. During his hospital stay, the patient developed atrial fibrillation with rapid ventricular response which responded to diltiazem. Cardiology consultation was requested and recommended addition of sotalol 80mg orally twice daily. After five days of sotalol initiation the patient had an episode of pulseless ventricular tachycardia and TdP. Pt. was intubated, given 2 grams of magnesium sulfate and defibrillated with restoration of a perfusing rhythm. Electrocardiogram revealed a sinus bradycardia with a QTc interval of 618msec and laboratory analysis revealed a serum K^+ 5.1 Mg^{2+} 2.4 (mmol/L), and creatinine of 3.7 (mg/dl). Shortly afterwards, he had several further episodes of TdP that was refractory to defibrillation, transvenous pacing, lidocaine 100mg bolus, and further Mg^{2+} supplementation. Nephrology was consulted and hemodialysis (HD) was initiated that same day for 4 hrs. After completion of HD, patient had no further episodes of TdP and was hemodynamically stable. Predialysis sotalol serum level was >2000ng/ml (laboratory was unable to dilute due to highly elevated concentration) and the level post dialysis was 2475ng/ml (therapeutic 1000–2000ng/ml).

This case demonstrates that sotalol dosing must be carefully monitored in patients with renal impairment and elimination can be enhanced with hemodialysis.

105. Validation of Self-Reported Drug Use by MSM

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Background: Drug use in high-risk venues is associated with increased risk of HIV transmission in men who have sex with men ("MSM"). The ultimate goal of our research was to explore the relationship between the twin epidemics of substance use and HIV transmission risk. We examined the range of recreational drugs, pharmacologically-active substances that adulterate them, and coingestants—those substances used to modify the effects of recreational drugs used by a sample of MSM. Because contaminants of drug formulations cannot be identified by survey methodology yet are often pharmacologically active, we were particularly interested in the degree of agreement between self-reported drug use and qualitative drug analysis. *Methods:* Venue-based sampling field study; GC-MS analysis of urine capable of detecting 1043 different club drugs, adulterants, and coingestants. *Results:* We screened 19,795 MSM over a two-summer period; 11,571 refused to be screened (59%). Of the 8224 men who agreed to screening, 6499 (81%) were ineligible. The 1725 (18%) who met inclusion criteria included 665 who agreed to participate in the interview and to provide a urine specimen. We detected 65 discreet substances in the urine of participants. The most common illicit substances abused by MSM in our study population were marijuana, MDMA/MDA, methamphetamine, and cocaine. We identified substantial rates of agreement (kappa 0.57-0.63) between GCMS analysis results and self-reported drug use. *Conclusions:* The validity of self-reported club drug use has never been determined. We report that MSM in our study sample accurately described their drug use. This research is important because virtually all drug policy in the US—and community specific interventions—have been based upon self-reported drug use. In light of these results, the reliance upon self-reported drug use appears appropriate. This investigation wassupported by NIH grant R01 DA-18572.

106. Multiple Pulmonary Emboli and Hyperfibrinogenolysis following Mojave Rattlesnake Envenomation

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Introduction: Rare thrombotic events following snakebite envenomation have been reported with a number of tropical pit viper species. We report what we believe to be the first thrombotic event following envenomation by a Mojave Rattlesnake (Crotalus Scutulatus) complicated by delayed hyperfibrinogenolysis and coagulopathy. *Case:* A 59 year old male was bitten on the left hand while feeding a Mojave rattlesnake at a wildlife sanctuary. He was intubated for angioedema and transferred to our facility. He denied prior snakebite, but had handled snakes for many years, No evidence of coagulopathy, hemotoxicity, or neurotoxicity was evident on initial presentation. He was extubated the following day and received a total of 20 vials of Crotalidae polyvalent immune Fab(Crofab) over the first 2 hospital days. On the 5th hospital day he experienced hypofibrinogenemia, elevation of prothrombin time, shortness of breath, marked d-dimer elevation, and worsening chest radiograph infiltrates. CT angiography of the chest revealed multiple bilateral pulmonary emboli. No other evidence of disseminated intravascular coagulation(DIC) or bleeding diathesis was present. Treatment was initiated with multiple infusions of cryoprecipitate which resulted in transient elevations of fibrinogen followed by rapid decreases to levels below 50 mg/dl and a marked increase in D-dimer measurements to greater than 55 mg/L consistent with a diagnosis of hyperfibrinogenolysis. Factor II and X activity levels were both greater than 100% of normal confirming that DIC was not present. Infusions of Crotalidae immune Fab and unfractionated heparin resulted in interruption of fibrinogenolytic activity with reduction in D-dimer levels and increase of fibrinogen to normal plasma levels. The patient was discharged in good condition on warfarin therapy. *Discussion:* We present the first case of thrombosis following Mojave rattlesnake envenomation with evidence of hyperfibrinogenolysis and absence of DIC that responded to antivenin administration. The patient also exhibited an anaphylactic type reaction to envenomation with no prior history of snakebite.

107. Alarming US Poisoning Mortality Trends from 1981 to 2005

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Introduction: The goal of Healthy People 2010 is a poisoning mortality rate (/100,000) of 1.8. Poisoning mortality has been neglected by most injury and poison prevention programs. *Purpose:* Determine poisoning trends in US injury mortality from 1981 to 2005. *Methods:* A retrospective US population study using Wonder.CDC.Gov leading and underlying cause of death data, which is coded from 1981 to 1998 with ICD9 and from 1999 to 2005 with ICD10. *Results:* In US for all study years combined there were 3,839,851 injury deaths with the 5 leading causes: motor vehicle (MV) traffic (29%), firearms (22%), poisoning (11%), falls (8%), and suffocation (7%). While the overall deaths trends for suffocation remained stable over these years, they fell for firearms and MV traffic and increased for poisonings and falls. The poisoning % of all injury deaths increased > 2.6x from 1981 to 2005. The overall poisoning death rate for males (8.8) was 2x females (4.3). The ages with the highest overall poisoning death

rates were 25–34 Yrs (9.2), 35–44 Yrs (10.5) and 45–54 Yrs (12.9); with these 3 groups totaling 73%. Blacks (6) had a similar overall rate as Whites (5.8), which were 2.6x Other (2.3) race group. All 3 race group rates dropped in late 90's but rose dramatically to 2005. Overall unintentional poisoning deaths (57%) were more prevalent than suicide (31%) and undetermined (11%). The rate of unintentional poisoning deaths increased 3.5x from 1991 (2.3) to 2005 (8). There were 2,378,720 unintentional injury deaths with the 5 leading causes: MV traffic (46%), falls (12%), poisoning (10%), drowning (5%) and suffocation (5%). While the unintentional deaths trends for drowning and suffocation remained flat, they fell for MV traffic and increased for poisonings and falls. The rate of unintentional poisoning deaths increased 3.5x from 1991 (2.3) to 2005 (8) and the % increased from 49 to 72%. *Conclusions:* Poisoning deaths have increased dramatically in US since 1990 with unintentional poisonings responsible for most of the increase. Poisoning has become the second most prevalent cause of injury deaths in the US since 2003 and should be a major focus of injury and poison prevention programs.

108. Titration of Hyperinsulinemia Euglycemia Therapy for the Treatment of Acute Diltiazem Toxicity

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Background: Hyperinsulinemia euglycemia (HIE) therapy has been advocated to treat the toxicity of calcium channel blockers (CCB) by clinical toxicologists for over a decade. In practice, the dosing regimen is variable but usually is in the range of 0.5–1.0 unit of regular insulin/hr. This case demonstrates successful titration of HIE as a vasopressor/ionotrope to maintain a mean arterial pressure (MAP) of > 70 mm Hg. *Case report:* A 49 yo male with a history of atrial fibrillation, HTN, dilated cardiomyopathy, EF 55–60%, hyperlipidemia, CAD, ingested 27 diltiazem SR 240 along with less toxic antihypertensives, a statin and warfarin, 20 hours prior to arrival. The initial blood pressure was 90/30 mm Hg, heart rate (HR) 83 bpm, and SaO_2 94%. He was intubated because of shock, and despite 2 grams of calcium gluconate and 4mg of glucagon, a glucagon infusion, intravenous fluids, and norepinephrine, dopamine, vasopressin infusions, his MAP remained 40–50 mm Hg. A bolus of 80 units (1.0 units/kg) of regular insulin (R) along with 25 grams of dextrose followed by 80 units of R/hr and a D10 infusion at 100 mL/hr, was then ordered to titrate upward 0.5 units of R/kg every 30 minutes until a MAP of 70 mm Hg was obtained. Seven hours later the R was at a rate of 280 units/hr and the MAP was 45 mm Hg and HR 90 bpm. Fourteen hours from start the R was at a rate of 360 units/hr and the MAP was 85 mm Hg and HR 100 bpm. The patient maintained a MAP of > 70 mm Hg and HR 70–100 bpm for 21 hours on 360 units of R/hr. The other pressor were weaned during this time except for 4μg/kg/min of dopamine. The lowest glucose and potassium reported were 83 mg/dL and 3.3 mEq/L respectively. An ampule of 25 grams of dextrose was given with every increment of HIE and potassium was supplemented as indicated. Attempts to wean HIE combined with treatment with amiodarone and digoxin for atrial fibrillation, resulted in refractory hypotension and medical care was withdrawn. *Discussion:* Titrating HIE to a goal MAP was effective and safe in this patient. Results may vary depending on each clinical situation and type of CCB. *Conclusion:* HIE can be titrated similar to traditional vasopressors/ionotropes.

109. Severe Neurologic Injury after Benzonatate Induced Cardiac Arrest

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Introduction: Benzonatate is a local anesthetic used as an antitussive agent. Published case reports of overdose are few, toxicity is rapid and severe, and treatment options remain only supportive to date. *Case report:* A 20 year-old depressed man had a tonic-clonic seizure 10 minutes after ingesting a "handful" of benzonatate perles in a suicide attempt. After regaining consciousness, he ambulated briefly with assistance before collapsing to the floor. Upon EMS arrival, he was cyanotic with agonal respirations and a weak pulse. Pupils were dilated and unreactive and he was incontinent of urine. En route to the emergency department (ED), the patient went into a pulseless ventricular fibrillation arrest and was shocked twice (360J), given 1mg epinephrine intravenously, and intubated. He subsequently converted into sinus tachycardia. In the ED, BP: 101/70 P: 123 bpm. Fifty grams of activated charcoal were given. EKG: sinus at 123 bpm, QRS 84 ms, QT 298 ms. ABG: 7.21 pCO2 48.1 HCO3 18.8 pO_2 86 O_2 sat 94.2% (70% FiO2) Labs: Na 132, K 4.1, Cl 96, HCO3 20, Glu 321, Cr 1.9. Toxicology screens were negative. The head CT was negative. An EEG demonstrated severe bihemispheric dysfunction consistent with anoxic injury. While in the intensive care unit (ICU), the patient remained hemodynamically stable and experienced no further cardiovascular compromise. On hospital day 14, a tracheostomy tube was placed and long-term care was planned. He never regained consciousness nor exhibited any purposeful movement. A urine benzonatate level of 13 mcg/mL was obtained (min. detection level:0.5 mcg/ml, high performance liquid chromatography). *Discussion:* Chemically similar to tetracaine, benzonatate can cause seizures, dysrhythmias, and cardiac arrest. Absorption is rapid following ingestion. Six total cases have been reported, all of whom suffered cardiac arrest, with 1 successfully resuscitated. The four deaths included 2 toddlers and 2 adults. In one case, an adult injected the contents of 2-3 perles, ultimately resulting in brain death. *Conclusion:* We report a rare case of benzonatate toxicity with cardiac arrest resulting in severe anoxic injury.

110. Board Certification and Recertification in Medical Toxicology: The First 12 Years

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Background: Beginning in 1994, physician board certification (BC) in Medical Toxicology (MT) has been available through the American Board of Medical Specialties (ABMS). Since the BC certificate is time limited to 10 years, a recertification examination in MT was first offered in 2004. We report rates of BC and re-BC in medical toxicology from 1994 through the 2006 biennial exam cycle. *Methods:* Data was obtained from the Official ABMS board directory database. This electronic database was queried about certification status of diplomates with BC in MT. As of March 2009, data was only available on BC through the 2006 exam cycle. *Results:* Between 1994 and 2006, 328 physicians had become board certified in MT by ABMS including 71 who had become recertified. 77% also had board certification in Emergency Medicine, 13% in Internal Medicine, 12% in Pediatrics, and 11% in Occupational Medicine. Since 2002 when fellowship training (FT) was required to sit for the MT exam, 37, 37 and 42 physicians first achieved MT BC in 2002, 2004, and 2006 respectively. Of the original 64 who achieved BC in 1994, 41 (68%) were recertified in 2004 and another 7 (12%) were recertified in 2006. Of the 49 who achieved BC in 1996, 30 (65%) were recertified in 2006. *Conclusions:* Since FT training was required to take the MT exam, about 40 physicians first become BC in MT during each biennial exam cycle. Of the MT BC physicians who initially certified in the mid 1990s (including many who were already at mid-career), 2 of 3 recertified after 10 years. More than 3 of 4 MT diplomates have BC in EM.

111. Ingestion of Ricin Seeds from a Castor Bean Plant

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Background: Castor Bean (CB) plants have become more widely available as attractive ornamentals. We report a patient who chewed several CB seeds which were inadvertently mistaken for peanuts and developed mild gastrointestinal effects. There is an increased need for education concerning the toxicity of this plant. *Case:* A 47 yr-old male mistakenly chewed 2 CB seeds that were placed in a dish waiting to be strung into a necklace. The patient had received the CB plant as a gift purchased over the Internet. He developed diarrhea approximately 6 hrs post-ingestion and had an episode of vomiting on day 2. The duration of the diarrhea lasted for 3 days and oral maintenance fluids was the mainstay of his treatment for the 3 days. *Discussion:* Although severe toxicity and death has been reported from the ingestion of 1 chewed seed in a child, this case is similar to other case reports in adults who have survived ingestion of a few seeds of castor beans without developing any major toxicity. *Conclusion:* Since the castor bean plant is readily available from many sources including the Internet, education concerning the potential toxicity of this plant needs to be increased. Adults can survive ingestions of a few castor beans without developing major toxicity.

112. Mechanism of Toxicity of Cleistanthus Collinus: Vacuolar H^+ ATPases Are a Putative Target

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Background: Ingestion of Cleistanthus collinus, a shrub native to India,either accidentally or intentionally, is a major cause of death in Southern India. Intake of a boiled decoction of leaves is highly toxic and medical management is mainly supportive due to lack of information on molecular mechanisms of toxin action. Since distal renal tubular acidosis is one of the symptoms of poisoning, and ATP requiring proton pumps are important for acid secretion in kidney, we hypothesized that these may be putative targets for *C. collinus* action. *Methods:* Renal brush border membrane (BBM) isolated from wistar rats as well as cultured liver and kidney cells were exposed to aqueous extract of C.*collinus*. V–H^+ATPase & proton pumping activity were then evaluated using spectrophotometry. Acidification of intracellular organelles and protein levels of V–H^+ATPase in cells were examined by acridine orange staining and western blotting respectively. *Results:* In vitro exposure to C.*collinus* results in significant inhibition of V–H^+ ATPase activity in renal BBM as well as block of proton pumping in renal BBM vesicles. *C.collinus* extract was also found to inhibit acidification of intracellular organelles in cells in culture, accompanied by a decrease in V- H^+ ATPase activity but increase in protein levels. The effects of C.*collinus* extract were comparable to those seen when cells were exposed to bafilomycin or concanamycin; specific inhibitors of the V- H^+ ATPase. *Discussion & Conclusion:* These results demonstrate that the vacuolar H^+ ATPase in renal cells is a putative target for the toxins in *C.collinus* and the inhibition of this important proton pump probably plays a role in development of the distal renal tubular acidosis and subsequent renal failure seen in poisoned patients. By-passing this block and examining approaches to sustain proton pumping in the kidney would be a rational approach for management of patients with *C.collinus* poisoning.

113. Butanediol (BD) Conversion to Gamma-Hydroxybutyrate, (GHB), Is Markedly Reduced by Fomepizole (4-MP), an Alcohol Dehydrogenase Blocker

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Background: GHB, marketed as Xyrem for narcolepsy treatment, is otherwise an illegal drug of abuse. 1,4-butanediol (BD), a readily available industrial chemical is thought to be metabolized to GHB by alcohol

dehydrogenase (ADH) and produces similar effects to GHB when ingested. We hypothesized that 4-MP, an ADH blocker used to treat toxic alcohol ingestions, would block the conversion of BD to GHB and might alter the nature of the intoxication. *Methods:* Consented, healthy volunteers with minimal past GHB exposure (3 males, 3 females) participated in this blinded, randomized 2 arm crossover study of BD preceded by 4-MP (one arm) or placebo (other arm). Vital signs, subjective effects, and plasma were collected at baseline and 15, 30, 45, 90, 120, 180, 240, 300, 360, and 720 min. post dosing. Plasma was analyzed by GC-MS for BD and GHB (LOQ 1 and 5 mcg/ml, respectively). Statistics included WinNonLin and paired t Tests. *Results:* BD was rapidly metabolized to GHB in the placebo arm, with 3 subjects having no detectable BD at any time post dosing. Among those with detectable BD, the mean peak was 6.6 mcg/ml at 30 min. In the 4MP arm, BD was detectable in all subjects with a mean peak of 27 mcg/ml at 30 min. Conversely, GHB levels were lower in the 4-MP arm than in the placebo arm, with peaks at 30 min. of 11.3 mcg/mL and 45.4 mcg/mL, respectively. In the 4-MP arm, BD was detectable in all subjects for up to 360 min. while GHB was not detectable above 5 mcg/mL in either arm after 180 min. There were no significant differences in vital signs, O_2 saturation or subjective effects between the 2 arms. *Conclusions:* These data clearly demonstrate that ADH is a major pathway for the conversion of BD to GHB. It is unknown if 4-MP incompletely blocks metabolism of BD to GHB via ADH, or if there are alternative pathways for the conversion of BD to GHB. The effects of BD and GHB ingestions were similar even when BD conversion to GHB is substantially inhibited. Further investigation of the utility of 4-MP in prevention of GHB toxicity from BD may be warranted. NIH Supported: DA 014935, GM007546

114. Dichlorvos- and Methomyl-Induced Respiratory Toxicity Results from Central Muscarinic Effects

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Objective: The mechanisms of anticholinesterasic insecticide-induced respiratory toxicity are still unclear. We previously showed atropine (A) but not methylatropine (MeA) induced the correction of paraoxon-induced respiratory toxicity. The aim of this study was to assess the peripheral or central origin of respiratory toxicity induced by another organophosphate, dichlorvos (D), and a carbamate, methomyl (M). *Methods:* male Sprague-Dawley rats were poisoned using D (5.76 mg.Kg-1; i.e. 45% of the sc MLD) or M (2.3 mg.Kg-1; i.e. 50% of the ip MLD). Poisoned rats were treated with A (base: 10 mg.Kg-1) or equimolar MeA (base: 5.42 mg.Kg-1) by intramuscular injection at the time of maximal respiratory effects, 5 min post injection of D or M. Respiratory function was assessed using whole body plethysmography and central temperature using infrared telemetry. Results are expressed as mean +/- SEM. Statistical analysis used parametric tests with $p < 0.05$. *Results:* In rats with intraperitoneal telemetry, greater dose of D or M than about 50% of the MLD resulted in death. M but not D induced a significant decrease in core temperature. D and M induced a decrease in respiratory rate resulting from an increase in expiratory time. M but not D increased the tidal volume. The onset of respiratory toxicity occurred 5 min after injection for both D and M. The decrease in respiratory rate induced by M and D lasted 20 and 30 min, respectively. A (10 mg.Kg-1) completely reversed the D- and M-induced respiratory toxicity while an equimolar dose of MeA (5.42 mg.Kg-1) was without significant effects. *Discussion:* A crosses the blood-brain barrier and induces peripheral and central muscarinic effects. In contrast, MeA does not cross the blood-brain barrier only resulting in peripheral effects. In addition to paraoxon, our study showed that A resulted in the complete correction of D- and M-induced respiratory toxicity. In contrast, MeA did not induce any significant effect. We conclude the respiratory toxicity induced by anticholinesterasic insecticides including paraoxon, dichlorvos, and methomyl at dose about half the MLD results from effects mediated by central muscarinic receptors.

115. Early Elevation of Interleukin-6 Concentration in the Cerebrospinal Fluid Is a Predictive Marker of Delayed Encephalopathy from Carbon Monoxide Poisoning

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Background: Delayed encephalopathy (DE) may occur after carbon monoxide (CO) poisoning, but a patient's initial presentation dose not predicts later outcomes with certainly. *Purpose:* We investigate whether early increase in Interleukin-6 (IL-6) in the cerebrospinal fluid (CSF) can be a predictive marker of DE. *Methods:* Nineteen patients who were admitted to our hospital from Nov 2006 to Sep 2008 with consciousness loss from CO poisoning or CO-Hb > 25%, and who became alert without any neurologic symptoms after hyperbaric oxygen (HBO) therapy were included in this study. The CSF and serum were simultaneously sampled within 24 hours after final exposure to CO and then every week, and they were immediately frozen at -80°C for analysis. IL-6, neuron specific enolase (NSE), and lactic acid (LA) in both CSF and serum, and MBP in CSF were determined. All patients were observed at least 3 months, and classified into two groups according to whether they developed DE (group DE) or not (group non-DE). The study was approved by the ethics committee of our hospital. *Results:* Three patients developed DE being in group DE. Their initial IL-6 concentrations in CSF significantly were higher than those of group non-DE ($P = 0.015$). No significant differences were found between two groups in the initial NSE and LA concentrations in both serum and CSF and in the initial MBP concentrations in CSF. *Discussion:* We previously reported that myelin basic protein (MBP) level in the CSF was markedly elevated preceding the clinical manifestation of DE. However, MBP concentration was not yet elevated in the initial phase of CSF. Therefore MBP concentration cannot predict the development of DE in the early phase of CO poisoning. Early elevation of IL-6 concentration in CSF may relate with the degree of cerebral injury and with the development of DE, although the mechanism remains unknown. *Conclusion:* Early elevation of IL-6 concentration in the CSF may be a predictive marker of DE from CO poisoning.

116. Estimation of Melamine Intake by Chinese Infants

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Background: High doses of melamine may lead to kidney stones and renal failure. Recent infant formula contamination affected thousands of Chinese infants, and 6 deaths were reported. Infants consuming infant formula are at risk since their entire intake is from one source. *Methods:* We calculated the amount of melamine an infant might ingest based on the available reported amounts in infant formula from China, Canada, and the United States. Formula doses were based on mean kcal requirements for infants of 1, 3, and 6 months of age. The weight of formula needed to meet those requirements is 22.8g/day, 18.6 g/day, and 17.8 g/day, respectively. The highest reported concentration of melamine found in infant formula was 6197 ppm from China, 0.346 ppm from Canada, and 0.140 ppm from the U.S (only 1 of 89 U.S. products had measureable levels). *Results:* The highest concentrations of melamine in infant formulas tested and predicted intakes are shown in the table.

Age (mo)	kcal/kg/day (mean)	Formula Melamine Concentration (ppm)	Melamine intake mg/kg-bw/day
1	117	6197	141
		0.346	0.00789
		0.140	0.00319
3	95.2	6197	115
		0.346	0.00642
		0.140	0.00260
6	91.4	6197	110
		0.346	0.00617
		0.140	0.00250

Discussion: For infants, the US FDA set tolerable daily intake (TDI) levels for melamine at 1 ppm in food sources or 0.063 mg/kg-bw/day. The possible amount of melamine intake by infants ingesting Chinese formula exceeds 17,000 times that of the highest measureable levels in the U.S. and Canada. The amount ingested from Chinese formula helps to explain some of the clinical symptoms that have been reported. The long term health effects from exposure to these levels are unknown. The actual weight of each scoop had to be estimated and leaves limitations on the data. *Conclusion:* The estimated amount of melamine ingested by infants from Chinese formula was massive compared to background amounts in U.S. and Canadian formula. This helps to explain many of the health effects these children experienced.

117. Poison Control Center Calls Relating to Salmonella Serotype Saintpaul Outbreak in April-August 2008

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Background: On June 3, 2008, the Food and Drug Administration (FDA) and media reported a food poisoning outbreak involving Salmonella serotype Saintpaul. The outbreak occurred during April–August 2008. The outbreak was initially associated with tomatoes; however, around July 6, 2008, an association with jalapeno peppers was reported. This study describes the calls 6 poison control centers received as a consequence of this outbreak. *Methods:* Data were obtained from 6 poison control centers. The mean daily number of reported food poisoning exposures was determined for each month during March–July 2008. In addition, all calls received during March 1–September 1, 2008, were reviewed to identify those calls specifically pertaining to the outbreak and evaluated with respect to the date of the call and food mentioned. *Results:* The mean daily number of reported food poisoning exposures was 3.9 for March, 3.5 for April, 3.4 for May, 5.1 for June, and 3.9 for July. A total of 133 calls (57 potential exposures, 76 information requests) specifically pertaining to the outbreak were identified. The first calls were received on June 3 (n = 8). The highest daily number of calls was received on June 11 (n = 14). Calls continued to be received through August 3. Tomatoes were the food mentioned in all calls received prior to July 6. Tomatoes continued to be associated with calls received for a few more days. Peppers began to be associated with the outbreak calls on July 7, and after a few days became the only food mentioned in the outbreak calls. *Discussion:* The food poisoning outbreak did not appear to result in calls to poison control centers until after the FDA and media reported the outbreak. Calls immediately began to be received by the poison control centers, with calls continuing to be received for several months. The food associated with the calls depended on what was reported in the media. *Conclusion:* Poison control center data may currently be of limited value as a surveillance source for detecting food poisoning outbreaks because the poison control centers might receive calls only after the outbreak is announced.

118. A Gargantuan Acetaminophen Level in a Patient Treated Solely with N-Acetylcysteine

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Complications from enormous acetaminophen (APAP) ingestions treated with various therapeutic modalities are well known. We believe that the following patient presented with the largest single ingestion of APAP. She was treated solely with IV N-acetlcysteine (NAC) with a successful outcome.

A 59 yo female with a history of depression was found in a pool of blood with a suicide note. In the ED she was obtunded with agonal respirations and immediately intubated. Vital signs were HR 81 bpm, BP 93/53 mmHg, T < 88°F rectal, RR 12 on ventilator.

The patient had self-inflicted slash marks on her neck and forearm. EKG showed a sinus rhythm with nonspecific ST/T wave changes and a slightly prolonged QTc. Activated charcoal was given via NG tube.

ABGs were pH 6.9, pO_2 547, pCO_2 13, base excess < -30, lactate 22. IV $NaHCO_3$ was started. The BMP was significant for bicarbonate of <5, BUN 15, and creatinine 1.3. LFTs showed total bilirubin 0.9, AST 103, ALT 74 and alkaline phosphatase 67. Her INR was 1.3.

Fomepazole was administered for possible toxic alcohol ingestion until levels were negative. There was no response to naloxone. There were no apparent coingestants. IV NAC was given for a potential APAP ingestion. An initial serum APAP level was 1141 mg/L and peaked at 1193 mg/L. The next day her AST was 3150, ALT 2780. There was no elevation in bilirubin or INR. IV NAC was continued for 32 hours using the Prescott protocol until hepatic enzymes decreased. Her serum pH increased to 7.45 and bicarbonate was discontinued. LFTs decreased on day 3, and normalized by day 4 when she was transferred to a psychiatry unit.

Early coma and metabolic acidosis are associated with enormously elevated APAP levels. A significant correlation has been found between the degree of early hyperlactatemia and increasing APAP levels in the absence of hepatic failure. This patient is unique in that she had the highest reported APAP level treated solely with an established IV NAC protocol resulting in a succesful outcome with no sequelae.

119. Hydroxycobalamin: An Effective but Challenging New Antidote

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Introduction: Hydroxycobalamin is an FDA approved antidote for cyanide poisoning. Our report demonstrates the successful treatment of cyanide poisoning, but also describes some challenges we encountered with hydroxycobalamin. *Case report:* A 34-year-old woman was brought in to the ED after a syncopal event and seizures. Systolic blood pressure was 75 mm Hg, her QRS complex widened and pulses were lost. She was intubated and given sodium bicarbonate and fluids. CPR began and pulses returned following epinephrine, atropine, and vasopressors. A venous blood gas demonstrated a pH of 6.36 and pulse oximetry was 99%. Simultaneous internal jugular venous and radial artery blood gases were obtained. After bicarbonate the venous gas demonstrated a pH of 6.80 with a PO_2 of 222 mm Hg, an O_2 saturation of 99%, and bicarcarbonate of 9 mEq/L. The arterial blood gas showed a pH of 6.82, a PO_2 518 mm Hg, an O_2 saturation of 100%, and a bicarbonate of 9 mEq/L. A carboxyhemoglobin level was 0.4%. 40 minutes after hydroxycobalamin administration, vasopressors were discontinued. Arterial blood gas now demonstrated a pH of 7.32 and a bicarbonate of 23 mEq/L. Initial laboratories showed an elevated lactic acid level of 32.4 mEq/L. Nephrology attempted dialysis; however, the dialysis machine repeatedly alarmed and shut down due to a "blood leak". Fortunately, the acidosis corrected and hemodialysis was not required. The patient was extubated neurologically intact. Whole blood cyanide level, drawn after the antidote was completed, was elevated at 22 mcg/dL (Ref lab normal 0-22 mcg/dL) and urinary thiocyante level could not be analyzed due to an "interfering substance". *Case discussion:* The clinical scenario and initial laboratories suggested cyanide poisoning with limited oxygen extraction and a profound metabolic acidosis. Hemodialysis for acidosis was unsuccessful because colorimetric alarms triggered a "blood leak" similar to known colorimetric interferences with certain laboratories. *Conclusion:* Hydroxycobalamin is an effective antidote that offers many advantages. However, clinicians must be aware of its effects on hemodialysis machines which could delay the initiation of this treatment modality in the severely acidotic patient.

120. Neonatal Hemolysis Associated with Nursing Mother Ingestion of Arnica Tea

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A 9 d/o term male, from an uncomplicated delivery, presented with 1 day of lethargy, decreased intake and jaundice. No fevers, vomiting, diarrhea, or URI symptoms were reported. The child was breast-fed and not on any medications. Initial total bilirubin was 41mg/dL with 5mg/dL direct. The hemoglobin was 5g/L. The mother had started drinking a tea made from Arniva flowers 48 hrs prior to the onset of symptoms. She was assymptomatic. The mother's diet was evaluated and unremarkable and that she was not on any medications other than ibuprofen(which has not been associated with neonatal hemolytic anemia). There was no maternal-fetal blood incompatibility. The baby's screening G6PD level was normal. Work up for other common causes of neonatal jaundice including infection was negative.

The child was exchange transfused twice which lowered the bili to 9.9 and corrected the child's anemia. The bili lowered to normal after phototherapy. The mother stopped drinking the implicated tea and the child resumed breast feeding without any further hemolysis or other problems.

There are reports of neonates with G6PD developing hemolysis after their mothers have taken sulfisoxazol and Fava beans. A Pubmed search for herbal medications causing hemolysis in non-G6PD children did not reveal any results.

Arnica Montana Extract is an extract of dried flower heads of the plant. It is most often applied topically to soothe muscle aches, reduce inflammation, and diminish bruising. Arnica in herbal form is primarily restricted to topical use because its safety when taken orally is unknown. Most oral Arnica preparations sold today are homeopathic, thus extremely dilute.

The composition of extracts can include fatty acids, essential oil, triterpenic alcohols, sesquiterpene lactones, sugars, phytosterols, phenol acids, tannins, choline, inulin, phulin, arnicin, flavonoids, carotenoids, coumarins, and heavy metals. No reproductive/developmental toxicity data are available. Ingestion of A. montana-containing products has induced severe gastroenteritis, nervousness, accelerated heart rate, muscular weakness, and death.

121. Vision Loss in a Patient with Metformin-Associated Lactic Acidosis

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The use of metformin is contraindicated in patients with renal insufficiency, as determined by creatinine concentration or creatinine clearance. Metformin-associated lactic acidosis (MALA) can occur when renal function is impaired and metformin accumulates in the body. Symptoms of MALA are varied and have rarely included vision loss. *Case report:* A 67 year-old female presented to an urban emergency department with a complaint of acute vision loss. She had recently been started on metformin for treatment of diabetes mellitus type 2. In the emergency department, the patient had a temperature of 90.1°F, a heart rate of 55 beats per minute, a blood pressure of 117/94mmHg, and respiratory rate of 34 breaths per minute with a pulse oximeter reading of 98% on room air. On neurological exam she was awake and alert and was answering questions. Her pupils were midsized and reactive, and she was could only see "black" despite lying under bright lights. She followed simple commands. She had no detectable reflexes. Laboratory evaluation revealed a severe lactic acidosis (pH 6.65, lactate 19.9 mmol/L). Creatinine concentration was 7.0mg/dL (baseline creatinine 1.3mg/dL). Her metformin concentration was 28mcg/ml. Methanol, formic acid, ethylene glycol, propylene glycol and salicylate concentrations were negative. Her head CT was unremarkable. She underwent hemodialysis and had resolution of her lactic acidosis and vision loss. *Conclusion:* Patients with MALA can present with a variety of clinical findings, rarely including vision loss. A thorough evaluation of a patient's renal function, beyond serum creatinine concentration, is essential prior to initiation of metformin therapy.

122. Opioid Drug Death in Washington State; Missed Opportunity?

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Background: Deaths due to unintentional overdose with opioids have become the #1 cause of unintentional trauma death in Washington State and several other states, surpassing motor vehicle crashes in 2006. *Methods:* We reviewed data collected 2003-2007 by the Washington State Department of Health from death certificates related to unintentional prescription opioid overdose and compared data from the Washington Poison Center on opioid drug deaths for the same time period. We also reviewed poison prevention efforts by the Poison Center 2003–2007 for interventions directed toward unintentional prescription opioid overdose. *Results:* During the period 2003–2007, death certificate data demonstrated a progressive increase in deaths related to unintentional prescription opioid overdose. Most (63%) of these victims were using methadone, and most used it in conjunction with multiple other medications, illicit drugs and alcohol. The mean age of victims was 40. Poison Center data from the same time period captured at most only 0.2% (3/1872) of the deaths. The Poison Center engaged in no interventions directed toward unintentional prescription opioid overdose during this time period. *Conclusions:* The epidemic of prescription opioid drug deaths has not been captured by Poison Center data and has escaped intervention efforts by the Washington Poison Center. *Clinical implications:* Methods to capture death data by the Poison Center need to be developed. This data should guide intervention efforts. No interventions have yet been validated for this epidemic, but suggested interventions have included: 1) Education for patients, family, and providers. 2) Changing usage patterns in patients. 3) Changing prescribing patterns of providers. 4) Reducing the available supply of prescription opioids, especially methadone. 5) Increasing the availability of

Prescription opioid drug deaths in Washington state

Year	Poison Center Deaths	Death Certificate Data
2007	*1	447
2006	*1	452
2005		390
2004	1	342
2003		241

*It could not be determined if these deaths were unintentional

antidotes, like naloxone. 6) Decreasing the use of prescription opioids with interacting agents. 7) Developing prescription monitoring programs.

123. Snake Bite: Our Experience at a Tertiary Care Centre in North Western India

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Background: Snake bite is a common problem in North West India. However the nature of snake remains speculative in the absence of a venom detection method. *Aims and objectives:* Aim was to know the pattern of envenomation based on the clinical symptoms. An attempt was made to identify the dead snakes brought in by the victims. *Patients and Methods:* All consecutive patients with snake bite admitted to the Emergency from July 2007 to December 2008 were included. The victims were encouraged to bring in the dead snakes for identification and were examined by a specialist. Patients were confirmed to have been bitten by a particular species; by identifying the dead snake, by morphological description of snake and clinical symptoms. All patients received treatment governed by the standard guidelines. All the patients were observed till discharge or death. *Results:* During the period, 89 patients were admitted of which 73 were neuroparalytic, 15 haemotoxic and one non poisonous. Their mean age was 30.2 + 9.3 (15–60) years in males and 29.4 + 9.0(range 16–65) years (M:F = 2:1). The mean time interval between bite and arrival to hospital was 4.5 hours (range 0.5 –10) hours. Out of the 73 patients with neuroparalysis, 72 were suspected bitten by common krait (9 confirmed)and one by cobra. 15 patients with vasculotoxic envenomation were suspected to be bitten by Russel's viper(only 1 confirmed). All the patients with neuroparalytic bite required assisted ventilation from a period varying between 8–96 hours (mean duration 39.5 hrs). A single patient with suspected cobra bite also required ventilation and survived. All except 2 with neuroparalysis survived and both were due to common krait. Out of the 15 patients with vasculotoxic envenomation 7 developed renal failure warrenting renal replacement therapy and one died. Eight patients developed bleeding manifestations (six hematuria and 2 bleeding gums) *Conclusion:* The most common envenomation in our centre is due to common krait. Identification of a dead snake by an expert was possible in only 10% cases in our study. In absence of definitive identification, institution of treatment based on symptoms, following standard guidelines help in reducing mortality.

124. Hyperbaric Oxygen (HBO) for Portal-Venous Embolism Associated with Concentrated Hydrogen Peroxide (H2O2) Ingestion

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Background: Ingestion of H2O2 has been associated with venous and arterial embolic events. Cerebral embolism and fatalities have been reported. Most serious cases involve exposure to solutions >30%, though portal venous emboli have been reported with ingestion of H2O2 at concentrations of 3%. *Methods:* We searched computerized data from a single poison center (PC) over the last 9 years where a protocol for recommending a non-contrast hepatic CT was in place for patients with ingestion of H2O2 concentrations greater than 30 %. Cases were screened for signs and symptoms, amount, route and reason for exposure, presence of portal venous gas on CT scan, time to hyperbaric treatment, resolution of embolic burden after HBO, and disposition after treatment. *Results:* Nine cases were identified where portal vein gas embolism was seen on hepatic CT. Five patients were male and most patients were older than 55. All but one ingestion was accidental. The presenting symptoms were nausea, vomiting and abdominal pain. Three HBO centers were utilized. Average time from contact with the PC to HBO treatment was 4.9 hours. Seven patients had complete resolution of gas embolism and two patients had only minor residual portal air on CT after a single treatment. Five patients were discharged home within 25 hours of initial contact with PC, and the other four were discharge home within 72 hours. Two patients required myringotomy to help tolerate compression; one patient had a self-terminating seizure at the end of a dive. *Discussion:* Ingestion of hydrogen peroxide liberates oxygen gas via the enzyme catalase. Gas dissipates through gastric mucosa into the portal venous system. Once the concentration of oxygen gas exceeds its solubility in blood, bubbles are formed. These bubbles may occlude vascular flow in the liver, or embolize systemically causing various sequelae. HBO increases the solubility of these bubbles and allows for redistribution and elimination of the emboli. *Conclusion:* HBO should be considered in patients demonstrating portal venous air on CT scan or clinical symptoms suggesting embolic events after ingestion of concentrated H2O2, as it will reduce the gas embolic burden.

125. A Case Report of Inhalational Abuse of *Agua Celeste*

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Objective: To report a case of acute renal failure following intentional inhalant abuse of an unknown paint stripper which was originally used for its intended purpose then collected and resold for abuse. *Case summary:* A 35 year-old female presented to a hospital in Ciudad Juarez where she was initially seen for symptoms of vomiting and generalized weakness. The patient was transferred to our emergency department with signs of altered mental status, acute renal failure, non-anion gap metabolic acidosis, and pneumonia. Labs on arrival included: Na+ 163mmol/L, K+ 2.3mmol/L, Cl- 146mmol/L, CO_2 8.0mmol/l, BUN 75mg/dl, SCr 7mg/dl, Ca 9.5mg/dl, Mg 3.6mg/dl, Phos 2.0mg/dl, arterial pH 7.242, pCO_2 13.7mmHg, pO_2 78.8mmHg, HCO_3 5.7mEq/L, BE -20.5mEq/L. The family reported that the patient had been taking *agua celeste*, originally reported to be a tea. The treating physicians suspected copper poisoning due to limited information found on the Internet and contacted the poison center for a toxicology consult. The patient received dialysis to correct the electrolyte abnormalities and metabolic acidosis. The patient's mental status improved over the following 2 days of hospitalization. Serum copper was sent out to a reference lab and reported as normal. Prior to discharge, the patient admitted to abusing *agua celeste* as an inhalant. *Discussion:* Inhalant abuse is common in many parts of the world and is facilitated by the widespread availability of volatile solvents that have legitimate commercial and household uses. The patient reported that *agua celeste* is a paint stripper that is collected onto rags after it is used and resold inexpensively for abuse. She purchased it in the basement of a city market and described it as being stronger than glue or paint which she had experimented with in the past. In reviewing the available Mexican literature and print media, we found several instances where *agua celeste* was used to describe abused inhalants. *Conclusion:* We believe that *agua celeste* abuse may be an emerging trend amongst the working poor of Ciudad Juarez, Chihuahua, Mexico and may potentially cross the border into the United States.

126. Delayed Seizures and Prolonged Toxicity Due to Pediatric Aripiprazole Overdose

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Case report: A previously healthy 2-year-old male presented to the emergency department (ED) with delayed seizures after aripiprazole ingestion. The patient's mother found pill fragments in patient's mouth two days prior to arrival. There were 5-10 tablets of aripiprazole (15 mg) missing. The patient was unusually somnolent the next day and the poison center was contacted 17 hours post-ingestion. Continued observation at home was recommended. The patient continued to be somnolent and later developed drooling and intention tremors. At approximately 46 hours post-ingestion, the patient had two separate generalized seizures witnessed by the parents and the ED triage staff. The patient had normal vital signs on arrival and his physical examination was positive for somnolence and intention tremors. Laboratory studies and brain CT were unremarkable except for an aripiprazole level of 180 ng/mL (60.5 hours post-ingestion). The reporting limit is 20 ng/mL. Somnolence and tremors completely resolved by day 4 of hospitalization. Neurology felt that seizure was aripiprazole related. A follow-up phone call was made on days 9 and 14 post-ingestion, the father stated that patient continued to be tremors and seizure free. *Discussion:* Aripiprazole is an atypical antipsychotic which has agonistic and antagonistic activities at the dopamine and serotonin receptors. It is metabolized by CYP3A4 and 2D6 in the liver to the active metabolite dehydro-aripiprazole. Seizures are reported to occur in 0.1 to 0.3% of adults and adolescents. Two adults have had aripiprazole-related seizures while taking the therapeutic dosage for 6 weeks in one case and for a short period in another. Excessive somnolence, drooling, acute dystonia, hyperglycemia, tremors, prolonged toxicity, neuroleptic malignant syndrome, and extrapyramidal symptoms are reported in children after aripiprzole ingestion. Review of the literature revealed only one inadequately described case of aripiprazole-related seizure in a child (abstract only, no dose, timing, drug levels, or other details reported. *Conclusion:* We report the first well-documented case of delayed-onset seizures in a pediatric patient due to acute aripiprazole overdose.

127. Successful Resuscitation of a Carvedilol Overdose Using Intravenous Fat Emulsion (IFE)

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Background: Experimental evidence demonstrates that intravenous fat emulsion (IFE) improves cardiovascular function following poisoning from a variety of toxins. Actual data from poisoned humans is very limited. We describe the first case of a carvedilol induced cardiovascular collapse, successfully resuscitated with IFE. *Case report:* A 31 year old woman presented to the ER 4 to 5 hours after ingesting approximately 875mg of carvedilol (approximately 12mg/kg). Her initial vitals were: BP, 78/22; HR, 73; RR, 16; and O2 Sat, 97%. She was initially treated with intravenous normal saline, 5 mg of glucagon, an ampoule of calcium chloride and a dopamine infusion. As she remained hypotensive, her dopamine infusion was increased and she was started on infusions of epinephrine and high-dose insulin. She continued to be hypotensive, despite receiving maximum dosages of dopamine and epinephrine, 10mg of glucagon and an intensive insulin regimen. At the suggestion of the on-call toxicologist, the patient was started of IFE therapy. She was treated with a bolus of 100mL of a 20% IFE solution, followed by 150mL over 15 minutes. Within 1 hour and 20 minutes the patient's blood pressure had risen to 132/70. Shortly thereafter, the she was weaned off her vasopressors and insulin infusion, and was successfully extubated. *Conclusion:* This case highlights an extraordinary outcome in an unstable patient with a carvedilol overdose treated with IFE. IFE therapy has a potential role in the treatment of other lipophilic ingestions such as tricyclic antidepressants, calcium channel blockers and toxicity from local anaesthetics. Future case reports and experiences need to be collected in order to define IFE therapy's precise role in the management of overdoses.

128. Lead Toxicity in an Extended Pakistani Family from a Dietary Source

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Background: Routine pediatric blood screening for lead remains the predominant method for detecting environmental pediatric lead poisoning. Adult screening is limited to occupational exposures or clinical symptoms. We report significantly elevated blood lead levels (BLLs) in a Pakistani extended family most likely related to consumption of food prepared with culturally accepted spices/food colorings used in their cooking. Exposure has now extended to family members in two states with potential for widespread cultural health concerns. *Case report:* A preschool physical exam revealed a toddler's elevated BLL (105 µg/dL) and ultimately uncovered pervasive lead poisoning among members of a Pakistani extended family in two states. Over an eight month period, all but one member (a formula-fed infant) of six adults and two children had repeated significant elevations of BLLs ranging from 24.9 to 105 µg/dL with four members requiring multiple chelation treatments. Low levels of lead and arsenic were found in some of the spices used; however, an orange powder, in an unlabeled container, had a lead concentration of 470,000 ppm. BLL elevations persisted despite removal of the spices and orange powder from the home. Symptoms reported by the initial family members included: difficulties with concentration and memory, constipation, abdominal pain, and weakness. One experienced anemia (BLL 80 µg/dL) which resolved following chelation; another suffered a miscarriage (BLL 51 µg/dL). Seven relatives in another state were found to have elevated BLLs (26 to 36 µg/dL). Investigation of the lead source continues with extensive collaboration between staff from local and state health departments in two states, toxicologists and Poison Center staff, and primary care physicians. If the source poses a risk to individuals from a particular culture, appropriate screening and public health advisories will be implemented. *Conclusion:* An incidental finding from a routine pediatric lead screen has uncovered a potential cultural health problem. Further investigation is needed to determine how to prevent future poisonings.

129. A Poison Center's Role in Care for Disaster Evacuees

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Background: In the event of a disaster, natural or man-made, there is a significant likelihood that a portion of the populace will require evacuation. With ready access to medical professionals on a 24-hour basis, PCCs are well-situated to provide services beyond care of the poisoned patient. In addition to basic needs such as shelter and food, necessary assistance for evacuees will include pharmacy and nursing services. The logistics involved in such an incident can be overwhelming, therefore adequate planning is crucial. *Problem:* In the fall of 2008, Hurricane Gustav threatened the Gulf Coast of the United States. Evacuation of areas of potential landfall was initiated; evacuees were transported to several inland facilities. Early in the incident it was determined by command staff in our state that adequate preparation for the establishment of pharmacy services had not been made. *Solution:* Based upon previous interactions with the PCC, the state Chief of Nursing and Incident Operations Chief, who was tasked with establishing a medical clinic, contacted the PCC to request assistance. The College of Pharmacy, which administers our PCC, also operates a retail pharmacy; the combination of 24-hour pharmacist availability and access to necessary medications was ideal for the rapid deployment of a pharmacy to the shelter. PCC pharmacists, in conjunction with Medical Reserve Corps (MRC) volunteers, staffed the pharmacy when not engaged in PCC duties. An additional service provided was the establishment of a basic formulary of low-cost medications with multiple indications. After the event, the PCC participated in "hotwash" sessions with incident command staff to identify opportunities for improvement and future cooperation. *Discussion:* Pharmacists from the PCC were instrumental in the establishment of pharmacy services on short notice. Participation in this event strengthened the Center's bond with our state health department. Because of the performance of PCC personnel in a real-time situation with many of the earmarks of a disaster, the PCC has been invited to participate in additional projects throughout our region. In the future, should circumstances dictate, PCC nursing staff, as well, will be afforded the opportunity to augment the services of the MRC.

130. Comparison of the Effects of "Z-drug" Overdose

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Objective: To describe and compare the incidences of overdose, the different clinical effects and outcomes after acute single ingestion in adults of the nonbenzodiazepine sedatives, "Z-drugs", including zolpidem, zaleplon, zoplicone and eszoplicone. *Methods:* We performed a 4yr(2004-2008) retrospective chart review of a poison center database for adults with acute single drug ingestion of a Z-drug evaluated at healthcare facilities. Patients with coingestants, or in whom complete medical records were not available, or those without known outncome were excluded. Patient age and sex, reason for exposure, drug, dose taken, symptoms, interventions and medical outcomes were extracted from the database. Incidence of adverse effects were compared *Results:* We found 1106 cases meeting criteria, 875 zolpidem, 81 eszoplicone 24 zaleplon, and 3 zoplicone. Intentional ingestions accounted for 83%. Ages ranged from 18 to 96 yrs, median of 40 yrs. Clinical manifestations listed in Table 1. There were no reported cases of death in our study. Comparisons of adverse effects showed no difference between any agent. Reported interventions included activated charcoal 34.3%, IV fluids 10.5%, oxygen 5.3%, intubation 2.7%, naloxone 1.5%, ventilation 1.4%, lavage 1.4%, and flumazenil, vasopressors, cardiopulmonary resuscitation(1 patient) and atropine accounting for less than 1% individually. *Conclusion:* In our case series, the Z-drugs were associated with a low incidence of serious adverse effects when taken as a single ingestion. Consequences of acute Z-drugs overdose included CNS depression, respiratory depression, and hypotension, and these complications were more common with increasing doses ingested.

Symptoms coded

Symptom	Number (Percent)
Lethargy/CNS Depression	768 (69.4%)
Tachycardia	124 (11.2%)
Confusion	64 (5.78%)
Respiratory depression	57 (5.15%)
Unresponsive/Coma	43 (3.88%)
Nausea/Vomiting	40 (3.61%)
Hypotension	25 (2.26%)
Ataxia	24 (2.17%)
Hallucinations	23 (2.08%)
Hypertension	16 (1.45%)
Bradycardia	7 (0.63%)
Sleep Walking/Driving	6 (0.54%)
Headache	4 (0.36%)

CSPI exam passing rates for new candidates

Year	Number of Candidates	Number Who Passed the Exam	Pass Rate Percentage
2005 (Pre-Education)	5	0	0%
2006 (Pre-Education)	8	2	25%
2007 (Education)	4	2	50%
2008 (Education)	4	3	75%

131. Education Initiatives for the Certified Specialist in Poison Information Examinee

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Background: In an effort to improve pass rates on the Certified Specialist in Poison Information (CSPI) examination, various methods of education were instituted. Prior to this initiative, examinees primarily studied on their own accord. *Methods:* The CSPI education initiative for examinees included three main aspects paramount to its success: (1) mentorship, (2) study guides and (3) roundtable discussions and lectures. Every examinee was assigned a one-on-one mentor for the 6 month period prior to the examination. When possible re-certifying CSPI's were paired with non-CSPI candidates. The role of the mentorship was used as a way to provide encouragement, knowledge and support to the examinee. Each examinee was given a study guide with information on toxidromes, decontamination techniques, symptoms expected with exposure, toxic doses and typical treatment recommendations including antidote information. Electronic learning methods were also utilized. A weekly toxicology topic was assigned for 23 weeks and a group of 10 questions and answers on average were emailed to all candidates and mentors. One file included questions only and a second file included the appropriate answers with rationale. All answers were referenced to its appropriate toxicology reference. These questions served as a forum for ongoing discussion and education between the candidate and mentor. Two weeks prior to the examination, the candidates were given roundtable discussions and lectures on various toxicology topics from a team of current CSPI's to boost their knowledge. *Evaluation:* Evaluation of the effectiveness of the education initiative was performed and was overwhelmingly positive. *Conclusion:* CSPI educational initiatives significantly improved pass rates of Specialists in Poison Information. Over a four year period, pass rates increased profoundly from 0% to 75% for first time test takers following the initiation of the CSPI Education. Regional poison centers can improve the pass rate of the CSPI examination by initiating a CSPI Education program.

132. Guanfacine Poisoning Complicated by Autonomic Instability

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Background: Guanfacine is an α_2-adrenoreceptor agonist used as an antihypertensive and for treatment of ADHD and tic disorders. Few reports exist regarding overdose with this agent. We present a case of an acute guanfacine overdose that resulted in initial hypertension followed by orthostatic hypotension. *Case report:* A 16-year old female with Tourette's syndrome presented after ingesting 25 mg of guanfacine. She developed diaphoresis and a dry mouth and informed her parents 8 hours later. A BP of 160/120 mmHg prompted them to take her to the ED. She was given 50 grams of activated

charcoal and monitored for 2 hours. Her BP and HR were: BP of 123-144/81-110 mmHg and a HR 64-81 bpm. She was discharged with a BP of 123/81 mmHg. That afternoon, she had several near-syncopal episodes. 30 hours after her initial ingestion, her BP taken at home was 97/57 mmHg and she was readmitted to the ED. She had symptomatic orthostatic hypotension with a lying BP of 104/50 mmHg, HR 66 bpm; and standing BP of 67/30 mmHg, HR 89 bpm. Her physical exam was otherwise normal. Her laboratory evaluation was normal. Her urine drug screen was negative. Her ECG showed a normal sinus rhythm, rate 67 bpm, with a prolonged QTc interval of 593 milliseconds (ms). She was admitted and continued to have symptomatic orthostatic hypotension that day. She received IV normal saline and never administered pressors. The following morning, she was asymptomatic and her vital signs normalized. A repeat ECG showed a QTc interval of 511 ms. She was discharged without further sequelae. *Case discussion:* Guanfacine is an imidazole compound similar to clonidine, but with more selectivity for the α_2-adrenoreceptor, a longer duration of action, and less sedation and hypotension in therapeutic use. Although there is an abundance of literature detailing clonidine overdoses, little exists regarding guanfacine. *Conclusion:* Guanfacine's favorable pharmacokinetic profile compared to clonidine, with a longer plasma half-life and greater volume of distribution, makes it a preferable therapy for children and adolescents. These same pharmacokinetic characteristics underscore the need for a longer period of monitoring in a patient presenting with an overdose, as demonstrated in this case.

133. Effective Community Contact

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Background: The division of the poison center service area in this state creates a significant travel challenge. Our primary means of communication with safety organization partners is via the telephone. In order to effectively contact regional community agencies for prevention efforts, educators need to understand the best communication strategies. *Methods:* Four counties located at least 200 miles from the poison center were selected. Three types of community agencies were visited in two counties (VC). The same agencies were telephoned in two other counties (TC) for a total of 12 contact agencies. The TC was the control group. Initially, all counties were given educational materials. They received follow-up calls every two months for six months to assess the need for replacement materials. Chi square test was used to compare our control group (TC) and experimental group (VC). *Results:* A total of 23, 450 pieces of prevention materials were distributed to all 12 sites. The total supply per 1,000 residents was 51.57 for TC and 52.64 for the VC. The chi square analysis revealed no significant difference between control group and experimental group. It is interesting to compare the number of materials per 1,000 residents distributed in the four counties to agencies not in the study during the same time period. There appears to be a possible indirect effect in the two visited counties. They had 6.64 materials per 1,000 residents versus 1.18 in the two non-visited counties. The year before the study, for the same areas there was less of a difference between the two areas. *Conclusion:* Neither communication strategy of telephone contact or face to face visit appears to be more effective in creating requests for poison prevention/education materials. Having an agency contact person who was especially interested in promoting poison outreach appears to be a better indicator. This research will assist in developing appropriate education outreach to community agencies. *Discussion:* One limitation of this study was the small number of groups contacted in all four counties because of budget and time constraints.

134. Crotalidae Envenomation Causing Recurrent Coagulopathy and Requiring Treatment for More Than Two Weeks

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Introduction: Victims of crotalidae envenomation treated with Crotalidae polyvalent immune fab ovine (FabAV) may still be subject to recurrent coagulopathy. We report a case of recurrent coagulopathy and thrombocytopenia despite recurrent treatment with FabAV and treatment with expired Crotalinae polyvalent antivenom equine (antivenom equine). *Case report:* A 17-year-old male presented to an outside hospital within 45 min. after an eastern diamondback envenomation. He sustained two bites on the left calf. Upon presentation the patient was tachycardic, diaphoretic and had a diffuse rash all over his body. Swelling was noted on his left lower extremity on the anterior calf and within 2 hours swelling progressed up the leg and down to his foot. The patient was treated with FabAV per protocol and transferred to our ICU for continuation of treatment. After 7 days of repeated FabAV treatments the patient had recurrent coagulopathy including thrombocytopenia and a 7 g/dl drop in Hgb. The use of the full antibody, equine antivenom was then initiated. Despite the use of the equine antivenom the patient still had recurrent coagulopathy and required repeated doses of FabAV therapy. The patient was discharged 17 days after admission once the coagulopathy was improving and stable. At discharge the patient had received 78 vials of FabAV and 10 vials of the antivenom equine. At follow-up, the patient's coagulopathy had improved, however the patient developed foot drop and neurologic deficits in the affected extremity. *Discussion:* Persistent coagulopathy has been documented with rattlesnake envenomation despite the use of FabAV therapy. The current recommendation is to monitor for coagulopathy for up to 2 weeks post envenomation. Despite treatment with FabAV and equine antivenom our patient had recurrent coagulopathy lasting longer than 2 weeks and needing large amounts of antivenom. The patient also had long-term neurologic deficits in the affected extremity. *Conclusion:* Crotalidae envenomation can cause recurrent coagulopathy that can last longer than two weeks. Monitoring for coagulopathy should be considered for greater than 2 weeks post envenomation. In some cases repeated boluses of FabAV should be considered.

135. Isoniazid-Induced Status Epilepticus in a Pediatric Patient Following Inadequate Pyridoxine Therapy

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Background: Isoniazid (INH) is an effective treatment for tuberculosis and among the most common causes of drug-induced seizures in the United States. INH intoxication produces a characteristic clinical syndrome including seizures, metabolic acidosis, and in severe cases, respiratory depression and coma. We present a case of isoniazid-induced status epilepticus in a pediatric patient following inadequate pyridoxine therapy. *Case report:* A 10-month old male presented after being found with his father's INH. The patient was brought to a local hospital where he had a witnessed generalized seizure and was given 650 mg pyridoxine intravenously, which was based on a 70 mg/kg recommendation found in textbooks by the treating health care providers. Five hours after the ingestion, the patient developed intractable generalized seizures. He was given diazepam and then loaded with phenobarbital 20mg/kg, while awaiting more pyridoxine from the pharmacy. He received an additional 2 g pyridoxine for a suspected ingestion of approximately 2.7g INH (290mg/kg total dose) and his seizures promptly resolved. *Case discussion:* Treatment of isoniazid toxicity must address correction of GABA deficiency with pyridoxine replacement and management of life-threatening events. For poisonings in which the amount of isoniazid ingested is known, pyridoxine is dosed on a gram for-gram basis. Several reference textbooks recommend pyridoxine dosing in children not to exceed 70mg/kg. This was the justification for the initial pyridoxine dose administered in our case. However, after review of the referenced literature, the rationale supporting this recommendation remains unclear. *Conclusion:* As soon as possible after INH overdose is suspected or diagnosed, pyridoxine should be administered in a dose approximately equal to the estimated amount of INH ingested regardless of the age of the patient.

136. Isolated Bupropion Toxicity Causing Serotonin Syndrome

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Introduction: Bupropion is an antidepressant with the potential for toxic effects in overdose that commonly include seizures, tachycardia and agitation. Although there are no documented cases of serotonin syndrome (SS) following isolated bupropion ingestions in the literature, the ability of bupropion to potentiate serotonin levels and lead to SS has been reported after use of multiple serotonergic drugs. We report the first case of SS from taking bupropion alone. *Case:* A 15 year-old boy was found at home hallucinating, he then developed tonic-clonic activity and EMS was called. Upon arrival in the ED, he was confused and restless. Vital signs were HR 170 bpm, RR 24 rpm, BP 170/130 mmHg, Temp 98.7 F. On exam, he had dilated pupils and dry oral mucosa, normal tone and reflexes in his arms, but rigidity and +4 reflexes in his legs with sustained clonus at his ankles. He received a total of 8 mg of IV lorazepam and an IV fluid bolus. His initial labs revealed: unremarkable electrolytes, BUN, and creatinine; total CK 991 IU/L; WBC 19,900/mm^3; undetectable ethanol, salicylate and acetaminophen levels. EKG demonstrated a heart rate of 170 bpm, QRS 100 ms, and QTc 434 ms. Unenhanced CT of the head was normal. He was admitted and treated with IV fluids and additional lorazepam for his agitation. A urine drug screen (via GC/MS) was positive only for naproxen and bupropion. Serum bupropion and hydroxybupropion levels drawn 17 hours after his reported ingestion were 280 ng/mL (therapeutic range 50-100) and 3100 ng/mL (therapeutic range <485), respectively. Within 24 hours of his admission, the patient was awake with normal vital signs and neurologic exam. He later admitted to taking 10 tablets of 300 mg sustained-release bupropion. *Discussion:* To our knowledge, there are only three reported cases demonstrating SS in conjunction with bupropion toxicity; however, none of these were secondary to bupropion alone. This case highlights bupropion's serotonergic activity that is becoming more clearly identified in the literature. *Conclusion:* Isolated bupropion toxicity can lead to SS. A careful clinical examination will discern the serotonergic effects from the more commonly seen sympathomimetic effects seen with bupropion.

137. Lipid Emulsion as an Antidote at the Washington Poison Center; Use in Carbamazepine, Flecanide, Hydroxychloroquine, Bupivacaine, and Bupropion

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Background: Accumulating evidence demonstrates the efficacy of lipid emulsion as a successful antidote for lipophilic agent toxicity. Human case reports and animal studies show efficacy in local anesthetic toxicity. Animal studies show efficacy in cyclic antidepressant and calcium channel blocker toxicity. Lipid emulsion may act by providing a "lipid sink" for lipophilic agents in the blood or by providing energy substrate for the myocardium. The Washington Poison Center adopted a broad application stance for lipid emulsion as an antidote in 2007 and is accumulating cases of successful

WA poison center lipid emulsion therapy cases 2007–2008

Patient & Age	Agent	Clinical Toxicity	Outcome & Comments
54 y.o. male	Bupivacaine	Cardiac arrest, asystole	Full recovery (6 months)
37 y.o. female	Bupropion	Seizures, hypotension	Full recovery
51 y.o. male	Carbamazepine	Seizures, hypotension	Full recovery
3 y.o. male	Flecanide	Seizures, hypotension	Brain death, late administration
34 y.o. female	Hydroxychoroquine	Seizures, hypotension	Full recovery

and unsuccessful use as an antidote. We describe our recent experience using lipid emulsion as an antidote. *Case descriptions:* Patients receiving lipid emulsion as an antidote were toxic from bupivacaine, bupropion, carbamazepine. flecanide, and hydroxychloroquine. One patient was in full cardiac arrest and asystolic from bupivacaine. All others were unstable with seizures and hypotension. In all cases, clinical improvement occurred within a few minutes of lipid emulsion administration. One patient had rapid resolution of seizures and hypotension from flecanide, but received lipid emulsion late in the course of toxicity and failed to recover. Carbamazepine, flecanide, and hydroxycholoquine have not been previously described to respond to lipid emulsion therapy. *Clinical implications:* The Washington Poison Center provides a one-page facsimile guideline for lipid emulsion use when recommended to providers. It follows the recommendations of Dr. Guy Weinberg on the website www.lipidrescue.org. Recent recommendations are that lipid emulsion should be used in any cardiotoxic drug poisoning producing life-threatening toxicity.

138. Succimer Chelation vs. Removal from Lead Exposure in Three Symptomatic Phone Cable Recycling Workers: A Case Series

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Introduction: Despite the high profile of lead as an environmental and occupational toxin, lead poisoning remains an ongoing occupational health concern in adults. There remains much debate as to when clinicians should chelate adults with elevated blood lead levels. *Method:* In this case series, three workers developed lead poisoning at a small-scale phone cable recycling operation. *Results:* Presenting symptoms included headaches, abdominal pain, anorexia, and weight loss. All three had elevated blood lead levels (lead 72µg/dL, 69µg/dL, and 82µg/dL). While the three workers were removed from lead exposure and offered chelation therapy, two of these individuals refused chelation therapy. The worker selecting chelation completed two courses of oral succimer (DMSA). At six months from exposure, all three workers were asymptomatic and their blood lead levels were similar (32 µg/dL, 25µg/dL, 17 µg/dL). *Discussion and Conclusion:* Blood lead readings returned to acceptable levels by six months in both chelated and non-chelated workers. In this small case series, removal from lead exposure alone appeared as effective as removal from exposure coupled with succimer chelation.

139. Acute Bromide Toxicity from an over the Counter Dominican Colic Remedy

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Background: Despite an FDA ban on bromides in the US, uncommon exposures still result. We report acute bromide toxicity from the use of a Dominican colic remedy. *Case report:* A 22 day-old girl was brought to the ED by her parents for excessive sleepiness and decreased oral intake over the prior 48 hours. Her birth history was unremarkable and there was no history of familial illness. The parents stated the child had some "colic" two weeks prior, but otherwise the review of systems was negative. The parents had been adding Cordial de Monell, an "elixir" for colic, to each meal starting 12 days prior. Purchased locally in the US, it is commonly used in the Dominican Republic. Listed ingredients include 0.3 grams of potassium bromide. Vital signs: BP 84/35 mmHg, HR 159/min, RR 38/min, and Temp 97.9°F. Pertinent physical findings included lethargy, hypotonia, and slightly diminished reflexes. She responded minimally to IV placement and did not cry during examination. Laboratory results: WBC, 10,500 cells/mm^3; Na, 140 mEq/L; K, 5.8 mEq/L; Cl, 105 mEq/L; HCO3, 26 mEq/L; BUN, 2.5 mmol/L (7 mg/dL); Cr, 0.3 mg/dL; Glu, 64 mg/dL; anion gap, 9 mEq/L. CSF analysis and urinalysis was normal. The patient was admitted to the PICU and treated with empiric antibiotics. For presumed bromide toxicity IV normal saline hydration with chloride containing fluids were given. The infant showed gradual improvement, becoming more responsive and regaining normal muscle tone. By day three, she had regained her normal mental status. A serum bromide concentration from hospital day three was 0.63 mg/dL (5.0 mEq/L). The exposure was reported to the FDA, who confirmed the bromide content of the elixir. *Case discussion:* This case illustrates acute bromide toxicity in an infant, established by an elevated serum bromide concentration, and potassium bromide in the product administered. *Conclusion:* It appears this is the first reported case of bromide toxicity from Cordial de Monell. Bromide toxicity should continue to exist in the differential diagnosis of the sedative-hypnotic toxidrome. Cases of bromide toxicity should be reported to the FDA and local health authorities.

140. Protective Effect of Puerarin on Acute Alcoholic Liver Injury

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Objective: By observing the effect of Puerarin on Malonyldialdehyde (MDA), Superoxide dismutase(SOD), Glutathion peroxidase (GPX), and hepatic pathological changes in rats with alcohol intoxication, provide experimental and theoretical basis for the clinical application of Puerarin in acute alcohol poisoning. *Material and Method:* 30 healthy adult Wistar rats were randomized into 3 groups in average. Rats in Group A (control) underwent normal sodium (N.S.), rats in Group B (alcohol) underwent 40% ethanol (8.0g/kg.d).ig for 5 days, rats in Group C(Puerarin)underwent Puerarin 200mg/kg.d.ip, and equivalent dosage of ethanol. Then, blood and liver sample of rat were extracted for 30 minutes later. Levels of MDA,SOD and GPX in plasma and liver homogenate were detected by spectrophotometer. The liver tissue was observed. *Results:* The level of MDA in plasma and liver in B group was obviously higher than that in A group($P < 0.05$), while the level of MDA in C group was lower than B group ($P < 0.05$). The levels of SOD and GPX were opposite to that of MDA. Under the electron microscope,the cells and structure of hepatic tissue were normal in A group,while the liver of B group showed unclear structure of lobules, stiffness of sinusoids, diffused lipid degeneration of cells, focal necrosis. Cell organs decreased, enlargement of endoplasmic reticulum, reduced quantity of hepatins and swelling of mitochondrion were observed. In the C group, the structure of lobules and hepatic cords remained clear.A few lipids were observed in cells,with swelling of the minority of the mitochondrion, and slightly reduced quantity of hepatins. *Conclusions:* Puerarin increased levels of SOD and GPX, decreased level of MDA in rats with alcoholism,and alleviated hepatic cellular damage, which implies it may have the productive effect on acute alcoholic liver injury.

Table1. Effect of Puerarin on MDA, SOD and GPX in plasma and liver tissue

group	MDA (nmol/ml)	(nmol/mgprot)	SOD (U/ml)	(U/mgprot)	GPX(U/ml)	(U/mgprot)
A(control)	6.18 ± 2.57	3.99 ± 0.87	13.1 ± 3.96	6.18 ± 1.75	14.66 ± 2.73	7.89 ± 2.44
B(alcohol)	10.11 ± 1.88*	6.02 ± 1.96**	7.26 ± 1.93**	3.32 ± 1.21**	8.54 ± 1.79**	4.47 ± 1.06**
C(puerarin)	7.93 ± 2.05 #	4.00 ± 1.21 #	10.10 ± 2.32 #	5.46 ± 1.73 #	11.11 ± 2.04 #	6.00 ± 1.95#

Compared with A *P < 0.05; ** P < 0.01; Compared with B # P < 0.05; ## P < 0.01

141. Acute Pancreatitis in Amanita Phalloides Poisoning

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Background: Amanita phalloides ingestion is a well-known cause of hepatotoxicity. Acute pancreatitis has been reported in a few patients with severe liver injury and multi-organ failure but not in patients with only mild to moderate transaminitis. *Case reports:* A 72 year old woman picked several mushrooms in an area of native oaks. She made a soup and ate one bowl, one grandson (42 kg) ate a full bowl and one grandson (40 kg) ate a half bowl. Both grandsons developed abdominal pain, vomiting and diarrhea 12 hours later. They were brought to a local hospital, where they were treated with IV fluids and antiemetics. Initial hepatic transaminases were normal. The grandmother had onset of symptoms at about 16 hrs after ingestion. The mushrooms were confirmed by mycologist as Amanita phalloides. All three patients were admitted to a tertiary care hospital and were given multiple-dose activated charcoal, high-dose intravenous penicillin, intravenous N-acetylcysteine, intravenous cimetidine (boys only), intravenous fluids, and antiemetics. Approximately 27 hours after ingestion, the grandmother's ALT was 216 IU/L. The boys' ALT values were 63 and 47 IU/L. Over the next 5 days all three patiets showed signs of hepatic injury, and the boys had elevated lipase values (see table) and abdominal pain, consistent with acute pancreatitis. Intravenous silibinin (Legalon-SIL) was obtained from Germany with emergency FDA approval and was given to the boys starting at approximately 72 hours after ingestion. The grandmother received only one 600 mg dose of silibinin at 72 hours, which was associated with a generalized sensation of warmth and dysphoria. All patients recovered uneventfully and were discharged in good condition on hospital day 4 (grandmother) and hospital day 8 (boys). *Conclusion:* Acute pancreatitis occurred in two boys with acute Amanita phalloides poisoning patients despite only mild hepatotoxicity.

	Peak ALT	Peak INR	Peak Total Bili	Peak Lipase
Grandmother	4873 (72 hrs)	1.6 (52 hrs)	1.3 (102 hrs)	44 (72 hrs)
Grandchild A	685 (72 hrs)	1.3 (48 hrs)	1.3 (120 hrs)	396 (72 hrs)
Grandchild B	588 (68 hrs)	1.3 (76 hrs)	1.3 (120 hrs)	303 (72 hrs)

142. Delayed Hepatotoxicity from Iron Despite a Low Serum Level and Minimal Metabolic Acidosis

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We describe a case in which a patient intentionally ingested iron and developed hepatotoxicity despite a scarcity of abnormal laboratory values or hemodynamic compromise. An 18-year-old woman presented after stating she intentionally ingested 50 tablets of 325 mg ferrous sulfate (~54 mEq/kg elemental iron) about 2 hours prior to arrival. The patient presented with vomiting and abdominal pain. Vital signs were age appropriate. Abdominal radiograph was negative for radioopaque foreign bodies. Initial acetaminophen and ethanol concentrations were undetectable. ABG showed a pH of 7.33, pCO2 of 34, and PaO2 of 116. Serum bicarbonate was 22 mEq/L with an anion gap of 11.A 3 hour and 4 hour serum iron levels were 485 and 472 mcg/dL respectively. The patient received supportive care with improvement in gastrointestinal symptoms. Initial AST and ALT were normal. Coagulation profile was normal. Eight hours later, the AST and ALT were 404 and 297 IU/L. Repeat serum iron level at this time was 424 mcg/dL.IV N-acetylcysteine (NAC) was initiated. Serum bicarbonate was 19 and chloride was 108 with an anion gap of 9. Serum lactate was 2.1 mmol/L and resolved within 12 hours to 1.1 mmol/L.24 hours later, the AST and ALT were 1882 and 1725 IU/L, respectively with an INR of 3.1. Serum bicarbonate remained 19 mEq/L with an anion gap of 4. The patient's serum AST/ALT peaked at of 5068/5390 IU/L at 48 hours post ingestion. The patient was transferred to a liver transplantation unit and had a protracted course in the intensive care unit with a slow decline in her transaminases and coagulation parameters over a week. The patient never developed renal failure or encephalopathy. Hemodynamic parameters remained normal. IV NAC was continued until her serum transaminases were both less than 1000 IU/L. Cases of reported iron-associated hepatotoxicity typically involve patients with severe systemic illness and serum iron level greater than 1000 mcg/dL. It appears hepatotoxicity from iron can occur with seemingly trivial initial laboratory value abnormalities.

143. How Do Poisonings in Children < 6 Really Occur? Targeting Outreach Based on an Analysis of Exposure Scenarios

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Introduction: PCC data is often used by poison educators to develop programs. Few published studies analyze PCC data to characterize situations leading to exposures in children in order to improve educational outreach. *Methods:* A review of PCC calls involving exposures in children under age 6 was conducted during a 6 week period. Data collected included: 1) Demographics; 2) Description of the scenario that led to the poisoning exposure; and 3) The substance or product involved. A data abstraction form was completed for each patient case. Patient case scenarios and products were coded based on existing Toxicall categories. New categories of scenarios were created when appropriate. *Results:* A total of 295 cases were analyzed. The mean age of the child involved in the poisoning was 2.7 years old. More than half (59%) involved boys. The majority of calls (77%) came from a parent, 12% from a medical doctor, and 4% from a grandparent. Almost all cases (97%) involved exposures in the home and 94% were ingestions. One quarter (26%) of the reported cases resulted from the product "stored within sight of the child"; 12% were "product temporarily open because in use" and in 6% the child was "inadvertently given medicine twice." New categories of scenarios created included "child climbing to access product" (6%), and "child given the product to play with" (3%). The most common products involved in the cases were non-prescription analgesics (17%); prescription medicines (14%); and non-prescription personal care (11%). *Conclusions:* This study provides useful information for developing new education messages for targeted outreach programs. Although many exposures reflect existing scenario choices, educators should also consider a number of additional exposure situations including the child climbing to access the product and the child given the product to play with. The study also emphasizes the importance of ongoing medicine safety education for parents.

144. Paliperidone (Invega®) Overdose: Prolonged and Resistant EPS from an Atypical Antipsychotic in an Oral Osmotic (OROS®) Delivery System

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Background: Paliperidone (Invega®) is the major active metabolite of risperidone. Both have similar receptor and pharmacologic activity, so would be expected to have similar adverse effect and overdose profiles. We report a paliperidone pediatric overdose with prolonged, treatment-resistant extra pyramidal symptoms (EPS). *Case report:* A 5 year-old male accidentally ingested 27mg of paliperidone at an unknown time. He presented with sinus tachycardia and EPS; drooling, "stiff as a board" and only able to nod yes or no. Gastric decontamination was not attempted. Multiple treatments with diphenhydramine and benztropine transiently controlled his symptoms and he required sedation with lorazepam for agitation and hallucinations. His symptoms gradually subsided and after 30 hours he was discharged home. *Discussion:* Paliperidone (Invega®) is the first atypical antipsychotic medication to use an oral osmotic (OROS®) delivery system. This delivery device uses an "osmotic pump" and laser-drilled holes to provide continuous release of medication. Risperidone does not have a comparable delivery form, but would be expected to produce similar EPS. A search of risperidone-only exposures at the Washington Poison Center (2000 to February 2009) found EPS described in 21 out of 257 cases. The details were reviewed for 14 well-documented cases. Risperidone EPS was rapidly and completely controlled after a single dose of diphenhydramine, benztropine, or lorazepam. In our case, paliperidone EPS lasted at least 18 hours and required multiple doses of medications for control. Prolonged paliperidone absorption from the delivery device likely contributed to the duration of effects. *Conclusion:* EPS from paliperidone overdose may be more severe and long lasting than risperidone. The oral osmotic (OROS®) delivery system likely contributed to the duration of toxicity.

EPS in 14 Risperidone-only cases:

Patients (N)	Ages	Reported risperidone dose: average (range)	Treatment(s) for EPS	Duration of EPS after treatment(s)
3	≤12 years	5 mg (2–14 mg)	Diphenhydramine (single dose)	< 3 hours
11	> 12 years	24 mg (2–120 mg)	Diphenhydramine, benztropine, lorazepam (all single doses)	< 4 hours

145. Altered Mental Status Following Methyl Valerate Ingestion

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Background: Methyl valerate is the methyl ester of valeric acid, the key pharmaceutical component of valerian root (*Valeriana officinalis).* Valerian extracts have been shown in animal models to elicit a benzodiazepine-like reaction at $GABA_A$ receptors. In Eastern Europe, methyl valerate is sold under the trade name Validol® and is marketed as a medication for, "heart disease, angina, motion sickness, nausea, vomiting, hysteria, nervousness, and headaches…." On a PubMed search, there have been no previously reported cases of methyl valerate overdose and only one reported case of valeric acid withdrawal. *Case report:* A forty-eight-year-old Bulgarian-speaking female was brought to the emergency department after being found by local police wandering outside unsteadily and frequently falling in the snow. With the help of an interpreter, it was determined the patient was extremely confused. In her pockets were multiple empty blister packs of Validol® (60mg tabs, 10 pills in each pack) all of which she later stated she had ingested earlier that morning for, "heart pain." She had no significant past medical history and was on no other medications. Vital signs included: rectal temperature, 95.1°; blood pressure, 131/79 mmHg; heart rate, 73 beats per minute; respiratory rate, 20 breaths per minute. Besides poor mental status and slurred speech, the physical exam was unrevealing. Management was with supportive care with IV fluids and passive re-warming. Further work-up included basic laboratory evaluation (only significant for WBC count of 22,100/mm^3); urine drug screen; CT scan of the brain; blood, urine, and CSF cultures; and cardiac evaluation, all of which were normal. With supportive care alone, the patient's mental status improved, and she was discharged home on hospital day number three. *Conclusion:* We report a case of methyl valerate overdose which caused a clinical picture of obtundation not previously described in the medical literature.

146. Public Websites Often Lack Key Information about Appropriate Storage and Dosing of Over-the-Counter Medicines for Children

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Introduction: Recently, FDA provided advice on the appropriate storage and safe use of over-the-counter (OTC) pediatric medicines. It is unclear whether this information is available on websites that are commonly visited by caregivers and healthcare professionals (HCPs). *Objective:* To determine if key information about proper storage and dosing of OTC medicines for children is present on commonly visited public websites. *Methods:* 19 websites were searched (.com sites: babycenter, drugs, emedicine, mayoclinic, medicinenet, medscape, parenting, parents, pdrhealth, thebabycorner, yourtotalhealth.ivillage, webmd, pharmacist;.org sites: aafp, aap, ama-assn, ismp, kidshealth;

Key Messages: Appropriate Storage or Dosing of Medicines for Children	% of Websites (N = 19) Where Key Message Was Identified
Do not use common household spoons or tableware to measure medicines	47%
Store medicines out of the reach of children	45%
Use the dosing device that comes with the medicine	34%
Know or determine your child's weight	26%
Do not give more than the recommended dose	21%
Do not give adult medicines to children	16%

.gov site: healthfinder.gov/kids). Search terms (administer medications, dosing, dosing cup, dosing device, dosing information, medication, medication safety, medication storage, pediatric dosing) were entered into the search function on each website to identify 6 key messages regarding appropriate medication storage and dosing of OTC medicines for children. Each website was searched independently by two HCPs. The number of key messages located by each HCP was used to calculate the average percentage of websites that included the 6 key messages. *Results:* Only 13% of the websites contained all 6 key messages. The following table displays the findings for each individual key message. *Conclusion:* Public websites that are frequently visited by caregivers & HCPs often lack key information about the appropriate storage and dosing of OTC medicines for children. Improved and more widespread access to key information has the potential to help prevent accidental unsupervised ingestions and misdosing of OTC medicines in children.

147. Iatrogenic Ranitidine Overdose in an Infant Causing Neurological Toxicity

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Background: Ranitidine is an H2-receptor antagonist, which as a class, are generally considered very safe in overdose with no expected toxicity. *Case report:* The patient is a 6 month old healthy male born at 39 weeks by c-section for expected large size. He was clinically diagnosed with gastroesophageal reflux disease at 2 months of age and ranitidine was prescribed. The original prescription specified ranitidine elixir (15mg/ml) 1.5 *teaspoons* twice daily. This would represent a dose of 22.5 mg/kg/day, when the maximum suggested dose is 4 mg/kg/day. The pharmacist questioned the dose, but it was confirmed as correct by the physician's office. The mother dispensed the ranitidine as prescribed, and noticed by day three of treatment the child was very cranky, restless, and sleeping poorly. He soon developed a fine intermittent tremor in the upper extremities and head bobbing activity lasting 30-40 seconds at a time. The child's symptoms continued for 3 months until the dosing error was noticed and the ranitidine stopped. All symptoms then resolved within one week, and a follow up EEG at two weeks was normal. *Case discussion:* H2-receptor antagonists are generally considered very safe drugs. The only previous reports of serious toxicity from ranitidine have been in the elderly and those with renal insufficiency. These patients experienced neurological symptoms such as headache, insomnia, tremor, and rarely seizures. Our patient had no history of renal insufficiency, but did receive a greater than five times iatrogenic overdose for three months. The mechanism of toxicity is unclear, but is hypothesized to be from CNS H2-receptor blockade. *Conclusion:* Ranitidine overdose can cause reversible neurological toxicity in infants.

148. Perirectal Use of Lidocaine: A New Form of Foreplay?

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Background: Lidocaine is commonly used as a local anesthetic administered subcutaneously at a recommended dose not exceeding 4 mg/kg. We present an unusual case of lidocaine induced convulsions and cardiac arrest following perirectal infiltration of lidocaine totaling 81 mg/kg with survival. *Case report:* A 34 year old, 86 kg female, presented to an ED with multiple seizures. Her past medical history was unremarkable. She and her husband were planning to engage in sado-masochistic sexual activity. To make the inflictions less painful, she voluntarily allowed perirectal injections of lidocaine that was purchased over the internet. Seven of the 25 grams bought were diluted in 20 ml of saline solution in a non-sterile environment. Forty minutes prior to arrival, the husband injected his wife 20 times, delivering approximately 81 mg/kg of lidocaine subcutaneously. Within 10 minutes, the woman became incoherent and EMS was called to the home. The patient was witnessed to be unresponsive and seizing, each lasting several minutes. Her initial EKG revealed a sinus tachycardia (169 beats/min) before she became pulseless. Successful intubation and ACLS was initiated by EMS with a pulse return of 126 beats/min. She was transferred to a local hospital where she continued to have seizures. Over the ensuing two hours, the patient received intravenous lorazepam, phenobarbital, diazepam, and a continuous midazolam infusion. Her urine drug screen was negative upon arrival. Eighteen hours post exposure, a serum lidocaine level was 23.9 mcg/mL. She remained intubated for the next 3 days with cardiovascular and neurologic improvement noted on each day. EEG and MRI obtained on day 4 of admission were normal. No further seizures were noted, and the patient was subsequently discharged on day 6. *Discussion:* The detected serum level in our case was consistent with levels reported previously associated with cardiac arrest. As more and more medications become available for purchase over the internet, bypassing current prescription restrictions will become more common. Availability of medical information on the internet will also increase the phenomenon of "self-diagnosis" and "self-prescription" by the public, as was seen in our case.

149. Methanol Poisoning Treated with Fomepizole

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Introduction: Methanol has the potential to cause significant toxicity through its conversion to formic acid, resulting in acidosis and ocular toxicity. Fomepizole (4MP) blocks the conversion preventing toxicity. Hemodialysis (HD) (recommended at concentrations >50 mg/dL) removes both methanol and formic acid as well as corrects the acidosis, but is not available at all hospitals at all hours. We sought to evaluate the use of 4MP in patients not treated with HD. *Methods:* This was a retrospective case series of a single Poison Center from 2003 – 2008 of confirmed cases of methanol with concentrations of >50 mg/dL treated with 4MP without hemodialysis. Cases were screened for demographics, co-ingestions, Methanol concentrations, initial pH or serum bicarbonate, ocular toxicity, and number of doses. *Results:* 4 cases with methanol levels of over 50 mg/dL were identified. The average age was 35 years, with half male. Time to presentation when known (3/4 cases) ranged from 1 – 2.5 hours (average 1.8 hours). EG levels ranged from 58 – 132 mg/dL with a mean of 90 (SD ± 31). Initial pH was recorded in 2 cases and averaged 7.41. The average serum bicarbonate when pH was not obtained was 27 mEq/L. One case reported co-ingestion of alcohol alone and one with a beta-blocker and alcohol. The average number of doses of 4MP administered was 6.75. The average half-life on 4MP ranged from 30 – 42 hours. One case was given ethanol to block conversion before 4MP was available. No cases of ocular toxicity were recorded. *Discussion:* Because of the limited availability of HD, we sought to evaluate the effectiveness of 4MP in limiting toxicity due to methanol ingestion. In these four cases, despite having a concentration over 50 mg/dL, HD was not performed due to lack of HD at the treating hospital or no HD despite our recommendations. Our half-life was consistent with previous reported values. No patients developed a worsening acidosis or displayed any other manifestations of toxicity. *Conclusion:* In this limited retrospective case series, 4MP without HD in patients without acidosis appears safe and effective. Prospective studies are needed to further evaluate the indication for dialysis in methanol ingestions in the era of 4MP availability.

150. A Case Study of Lionfish Sting Induced Paralysis

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Background: The lionfish (*Pterois volitans)* has gained popularity with exotic home aquaria owners. The primary symptom following a sting is pain at the site with occasional radiation of pain up the affected extremity. Systemic effects are rare and can include headache, abdominal pain, hypotension, seizures, and syncope. We report a case of lionfish envenomation leading to paralysis of all extremities. *Case report:* A healthy 24 yo male presented to the ED following a lionfish sting to the right middle digit two hours earlier. He reportedly had grabbed the lionfish, possibly resulting in a larger than normal envenomation. Significant initial findings included hypertension, tachycardia, and numbness in both hands. The rest of his neurologic exam was normal; within an hour the patient lost movement in all extremities and became diaphoretic. Abilities to swallow and speak were not affected. His Glasgow score was 9. Hot water immersion of the hand was initiated prior to arrival and continued throughout his hospital stay. Paralysis progressed to all extremities and he was admitted to the ICU. No dysphagia developed and he retained good range of motion to head and neck. All lab work was unremarkable. By 8 hours post exposure the patient had resolution of all paralysis and blood pressure and heart rate returned to normal. UDS was negative for any drugs of abuse. *Discussion:* 108 cases of lionfish envenomation were reported in the literature between 1976 and 2001. Exposures are generally a pain control issue with the most common symptom being pain. Other possible symptoms include swelling, local numbness, erythema, anxiety, dizziness, nausea/vomiting, and difficulty breathing. One case of generalized weakness has been reported but no details are offered. Treatment is generally conservative and supportive with hot water immersion and digital blocks to help alleviate pain. Systemic symptoms, as reported in this case, warrant careful observation. *Conclusion:* This case demonstrates the potential for a lionfish sting to cause large scale neuromuscular weakness. As lionfish continue to invade the Atlantic and Caribbean and gain popularity as an aquatic pet, poison centers need to be aware that significant systemic effects may be encountered.

151. Effect of Therapeutic Acetaminophen Dosing on Urine Excretion of 5-Oxoproline

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Background: 5-Oxoproline (5-OP) is an uncommon cause of metabolic acidosis. Most commonly, it presents in childhood and is associated with congenital deficiency of glutathione synthetase. Over the past several decades reports of severe metabolic acidosis attributed to 5-OP have been reported in adults without a recognized congenital enzyme deficiency. In most of

these cases the individual was otherwise acutely ill, and often acetaminophen (APAP) was being consumed, usually therapeutically. As a common analgesic and antipyretic this may merely be coincidental although a role for acetaminophen in the pathogenesis of this disturbance is worthy of further investigation. The purpose of this study was to look at the urine excretion of 5-OP in healthy adults taking a maximal therapeutic dose of APAP. *Methods:* Healthy adults of normal body mass index and no history of liver disease were dosed with APAP 1 gram four times daily over 5 days. A first morning void urine for 5-OP was collected on day 1 and again on day 6 after completion of the dosing schedule. 5-OP was measured by gas chromatography/ mass spectrophotometry by the Institute of Metabolic Disease at Baylor Research Institute. Based on a power calculation to detect an increase of 20 mmol 5-OP/ mol creatinine 15 subjects were recruited. *Results:* All subjects completed the study without complication. The mean difference between the pre- and post- study urine 5-OP was about 1 mmol 5-OP/mol creatinine. This difference was not significant using the Wilcoxan Signed Rank test. *Discussion:* Our results do not show any increase in urine excretion of 5-OP with routine dosing of acetaminophen. In distinction to reported cases our subjects were healthy and not suffering from any acute or chronic illness, nor were any other medications being used. The etiology of this acidosis in adults remains unclear. Malnourishment, inflammatory mediators associated with acute illness and perhaps an as yet unrecognized genetic trait may be involved. Any contribution from APAP in these cases remains speculative. *Conclusion:* Routine dosing of acetaminophen in healthy adults is not associated with any increase in the excretion of 5-OP in urine.

152. Hyponatremia and Lethargy Following Oxcarbazepine OD in a Pediatric Patient

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Background: Oxcarbazepine (OXZ), an analogue of carbamazepine (CBZ), is indicated for partial seizures (SZ) in pediatric and adult patients. Manifestations of overdose (OD) are somnolence, lethargy, ataxia, SZ, bradycardia and hypotension. Significant hyponatremia may occur following acute OD or chronic therapeutic administration with an incidence of 2.5%. Hyponatremia occurs mostly in the elderly and during high dose administration. The usual initial dose for patients ≤4 years for monotherapy is 8-10mg/kg/day in 2 divided doses with a max of 600mg/day. Very little has been published in the literature regarding pediatric OD of OXZ. *Case report:* A 2 yr, 12.3 kg boy with a PMH of SZ and developmental delay was prescribed OXZ 300mg/5ml at a dose of 1ml in the am and 2ml in the pm. As a therapeutic error, the infant was given 1 tsp in the am and 2 tsp in the pm using a dosing spoon (separated by 11 hours) for 1 day. Due to this dose of 900mg/ day (73mg/kg/day), and SX of grogginess and irritability the patient was referred to the ED. The PCC advised no GI decontamination, supportive care with monitoring of vital signs, EKG, electrolytes, LFT's, and CBC. Two hours after the second OXZ dose, the patient was described as sleepy but easily arousable when stimulated. All vital signs were WNL while the cardiac monitor revealed a NSR. The initial serum Na was 137 mEq/ L (NL = 135-144 mEq/L). During the night, the patient continued to be groggy, weak, "hard to sit up," and vomited 6 times. At 6 hours after the second OXZ dose, IV $D_5$0.45% NS at 50cc/hr was started. The 10 hour serum Na dropped to 132 mEq/L. The 16.5 hour serum Na rose to 135 mEq/L with resolution of SX and D/C to home. All other chemistries remained WNL. *Discussion:* OXZ and its active 10-monohydroxy metabolite (MHD), is reported to have less toxicity and to be better tolerated than CBZ. This case demonstrates the potential for toxicity following an acute ingestion of OXZ in pediatric patients. *Conclusion:* Acute ingestions of OXZ several times above the normal therapeutic range by children should be referred to a HCF for monitoring of electrolytes and mental status changes.

153. Recreational Use of 4-Methylmethcathinone (4-MMC) Presenting with Sympathomimetic Toxicity and Confirmed by Toxicological Screening

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Introduction: Leaves of the Khat plant (*Catha Edulis*) are widely chewed by the Somali community for their stimulant properties. This is due to release of cathinone from the leaves on chewing. Extraction from khat and/ or synthesis of cathinone and the related alkaloid methcathinone are controlled under the UK Misuse of Drugs Act, 1971. However, other cathinone derivatives such as 4-methylmethcathinone (4-MMC, mepherdone) are not currently controlled. 4-MMC is promoted as "safe and legal" alternative to classified recreational drugs. We report the first case of toxicity related to 4-MMC confirmed by toxicological screening. *Case report:* A 22 year old man presented after oral ingestion of 200mg and subcutaneous injection of 3.8g of 4-MMC. He developed palpitations and blurred vision shortly after use. On arrival in the ED he had sympathomimetic features (agitation, 7mm dilated pupils, HR 105, BP 177/111 mmHg). His temperature was 36.3°C and he had normal tone with no clonus. EKG showed a sinus tachycardia only. He was treated with 1mg of oral lorazepam. His sympathomimetic features settled within 6 hours of presentation. Serum and urine samples taken at the time of presentation were sent for toxicological analysis. Toxicological Screening Screening methods were developed for 4-MMC using in-house derivatives of cathinone and methcathinone checked for purity by Nuclear Magnetic Resonance. Samples were screened using Gas Chromatography with Mass Spectrometry. The only substance detected was 4-MMC; no other drugs or alcohol were detected. Liquid chromatography with tandem Mass Spectrometry was used to confirm and quantitate 4-MMC, the serum concentration was 0.15mg/L. *Conclusion:* We report the first case of confirmed, lone, use of 4-MMC resulting in sympathomimetic toxicity. Clinical toxicologists should be aware of the potential for use of these compounds in patients presenting with sympathomimetic toxicity.

154. "Taking Another Look" at Pediatric Ocular Exposures

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Introduction: Ocular chemical exposures are common and pose the challenge of appropriate poison control center (PCC) triage, especially for young, pre-verbal children. Recent experience at our PCC suggests occult or very subtle symptoms may mislead such triage efforts. *Case series:* We report 4 children with ocular injury after topical exposures evaluated over a 4–year period. In each case the child manifested no, or very mild, early symptoms. Case 1 was a 2-year-old boy who rubbed an acetone-based fingernail polish remover into his left eye and complained that it was "stinging". He seemed essentially asymptomatic after 30 minutes of irrigation, sleeping without any discomfort, but preferred to keep a cool compress on his eyes. Several follow-up calls over the night confirmed that he remained sleeping, in no apparent distress. However, the following morning he seemed uncomfortable, and his left eyelid was swollen shut. ED evaluation revealed staining of almost the entire cornea with a question of limbal whitening, interpreted as evidence of severe corneal injury. He was treated initially with topical antibiotic and homatropine, and subsequently steroid was added. He did recover fully but was seen by ophthalmology 8 times over the next several months. Case 2: A 2 year-old boy was asymptomatic after an eye exposure to a methyl salicylate /menthol muscle rub. Following irrigation, ED assessment found a corneal abrasion. Case 3: A 17 month-old girl was asymptomatic after eye exposure to clear nail polish. Despite eye irrigation at home and ED, a mild corneal abrasion was found. Case 4: A 3 year-old boy got a citrus oil-based product in his eye. His eye was irrigated and he was apparently well one hour later. A small corneal abrasion was detected following an eye exam at the ED. *Case discussion:* Our case series suggests that it is challenging for PCC staff to predict potentially significant corneal injury following chemical exposures in young, pre-verbal children. This may reflect subtlety in the manifestations of corneal injury in this age child, obstacles to telephone interpretation of such subtle symptoms, and /or difficulty of parents performing adequate pediatric eye irrigation at home. *Conclusion:* Formal study of pediatric ocular exposure experience is warranted.

155. Verapamil Inhibits the Glucose Transporter GLUT1

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Introduction: The incidence of calcium channel blocker (CCB) poisoning deaths is steadily increasing. CCB-induced hyperglycemia often cannot be resolved by physiological infusions of insulin, but requires high-dose insulin therapy (HDIT). A clearer understanding of the mechanism for the CCB-inhibited glucose uptake may help to further delineate treatment strategies for CCB toxicity. The specific purpose of this study was to investigate the effects of verapamil on glucose uptake in L929 fibroblasts, cells which contain only GLUT1 glucose transporters. *Methods:* A two armed study was performed to study the effects of verapamil on L929 fibroblasts: 1) dose dependant effects of verapamil were initiated by washing L929 fibroblast cells with low glucose (basal level glucose uptake) or no-glucose (activated glucose uptake) containing 0, 50, 150 or 300 µM verapamil. 2) Either 5.0 mM $CaCl_2$ or 4.0 mM ethylenediaminetetraacetic acid (EDTA) was utilized in the above incubation period to determine the effects of calcium on glucose uptake in fibroblast cells. Glucose uptake was then measured using radiolabeled 2-deoxyglucose (2-DG). The cells were lysed and cell contents completely digested. The mixture was added to scintillation vials and the 2-DG uptake was determined using ^{14}C-mannitol as the extracellular marker. *Results:* Verapamil inhibited glucose uptake in a dose dependent manner under basal conditions. Verapamil had a more dramatic inhibitory affect on the activation of glucose transport by glucose deprivation. The effects of verapamil on 2-DG uptake when combined with either calcium or EDTA were virtually identical. *Conclusion:* This study reveals the unique finding that verapamil in a dose dependent manner has a strong inhibitory effect on the transport activity of GLUT1. This effect is not affected by either calcium or EDTA supplementation. GLUT1 is expressed in a wide variety of cell types, is largely responsible for basal level of glucose transport into cells, and is activated by cell stress. The inhibition of GLUT1, especially the inhibition of GLUT1 activation, may be a contributing factor to the hyperglycemia observed in CCB poisoning.

156. Analytical Method Development for Stool Mercury Levels in Newborns and Infants after Receipt of Thimerosal-Containing Vaccines

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The primary objective of this study was to establish a high sensitive analytical method to evaluate the excretion of mercury in a larger cohort of children who received routine immunizations that contained thimerosal by examining mercury levels in stool. Samples were obtained before vaccination and 12 hours to 30 days

after vaccination from 216 healthy children. The infants with gestational ages of >32 weeks were recruited from 3 age cohorts (newborns, 2-month-olds, and 6-month-olds), which differed in body weight and cumulative exposure to thimerosal-containing vaccines. All children received age-appropriate vaccines as routinely administered in Argentina. Mercury levels were determined by cold-vapor atomic absorption and the samples that were positive for mercury were differentiated into total and inorganic species. All samples were coded and assayed in a blinded manner. Results are reported in nanograms of total mercury per gram of stool dry weight (LoQ = 1 ng/g). Each child in this study had samples taken at a maximum of 2 time points, once before vaccination, and once at a randomly assigned time point after vaccination. We estimated the pharmacokinetics of mercury using a model that averages all of the samples obtained from the population rather than evaluating multiple samples from the same individual, to avoid multiple blood draws in these infants. We also measured mercury levels in the administered vaccines and found that the stated amounts from the manufacturers were accurate and that the mercury in the vaccines was exclusively ethyl mercury. Mercury was detected in virtually all stool samples tested and increased significantly after vaccination in all 3 groups. All of the mercury in stool samples was inorganic mercury. There was an increase in stool mercury levels shortly after vaccination, which slowly fell afterward. This pattern would be consistent with an enterohepatic excretion pathway similar to that described for methyl mercury.

157. I <3 Death N Wnt 2 Die: Implications of Text Messaging in Twenty-First Century Suicides

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Background: As technology has advanced, new methods of communication have become available. Specifically, text messaging (also known as instant messaging, IM-ing, or SMS messaging) is an instant form of sending short text messages by portable devices such as cell phones. Suicide attempts are often frustrating, as the specific ingestant may be unknown. In these cases, text messaging may provide answers. We report a series of cases in which electronic communication devices played a central role in identifying suicide attempts by overdose. We suggest a new avenue by which to obtain timely & pertinent clinical information in the case of undifferentiated or unknown toxic ingestions. *Cases: Case 1:* A young female with a history of depression ingested a bottle of "ibuprofen" while her mother was out running errands. After she took the pills, she sent a text message to her friend, admitting to the overdose. The patient denied the ingestion until her friend's text message was shown to her. The patient, ultimately successfully treated for salicylate intoxication with alkalinization and hemodialysis, had a salicylate level of 100mg/dL. She incorrectly identified aspirin as ibuprofen. *Case 2:* A young male without significant medical history presented to the ED with his girlfriend for suicidal ideation. He denied this, and both the ED and psychiatric services judged him to be non-suicidal. However, when the girlfriend was brought back to the treatment area during the discharge process, she showed the nurse several descriptive and suicidal text messages. The patient was confronted with this information and admitted to suicidal plan and history of overdose with ibuprofen. *Discussion:* These cases represent instances where patients admitted to suicidal overdoses only after text evidence was presented to them. In one case, a salicylate overdose may have been overlooked; and in the other, the patient may have been discharged. *Conclusions:* Ancillary information such as a suicide note, can provide important details when evaluating a poisoned, suicidal patient. We present two cases where text messaging via cell phones provided valuable insights in the treatment of suicidal patients.

158. School Nurses and the Poison Center – A Great Marketing Mix

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Background: Based on previously published marketing research about low-income minorities and perceptions of the poison center (PC), parents trust and pay attention to the messages that come home from school via children. To distribute materials through schools, the PC partnered with school nurses (SN) - identified as pre-existing champions of the PC. We used a formative evaluation (FE) to design a point of service display (POSD) with bilingual elements. POSDs were mailed to all schools in the state followed by a summative evaluation (SE). *Methods:* The FE was sent via school nurse supervisor (SNS) listserv with 56 respondents. The Keep Them Safe POSD 8.5 x 11 cardboard stand-up design included a coordinated color scheme, images of faces, poison prevention tips, and a brochure holder with bilingual flyers about first aid and PC attributes. Over 1,200 POSDs were mailed. SE sent via SNS listserv with 146 returns. Both FE and SE had Likert-type, multiple choice, and open ended questions. *Results:* For the FE, 86% of SN were likely to use a PC POSD. Size was a barrier. Important content included: (41) poison prevention, (37) first aid, (19) PC attributes, and (15) specific poisons. 41% felt having materials in multiple languages was important while 36% did not. Spanish was the most requested language. For the SE, 60% received a POSD and placed it in an appropriate and visible location, usually in the SN area or the main office. Of those who received one, 97% were satisfied. SN estimate a total of 4, 616 views per day, although only 47% completed this question. SN most liked the compact size, sturdiness, colors, brochure information and the convenience. *Discussion:* Harnessing a FE, a SE and valuable partners to guide the process of distributing marketing materials to schools is demonstrated. *Limitations:* Both surveys were emailed to SNS listserv and relied on a trickle-down effect while the POSD was mailed directly to individual schools. SN recall, postal problems, and communication/mail delivery problems in schools could account for those that did not receive a POSD. *Conclusion:* SN had input into design and content of a PC POSD via a FE. SN were overwhelmingly satisfied with the POSD in the SE, however 40% of respondents report not receiving a display.

159. A Case of Mirtazapine Induced Dystonia

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Background: Previous reports indicate that mirtazapine overdose is generally associated with mild and predictable clinical effects, including sedation and tachycardia.[1] We report the management of a case of acute upper limb dystonia associated with mirtazapine overdose in a 20 year old man. *Case report:* The patient had allegedly taken a mixed overdose of 225mg of mirtazapine and unknown quantities of paracetamol, alcohol and veterinary furosemide sometime previously. He initially complained of nausea which settled spontaneously and initial examination was unremarkable apart from alcohol intoxication. Plasma paracetamol was undetectable and coagulation, renal and liver function test results were within normal limits. Approximately 14 hours following presentation, the patient complained of a painful spasm of both his hands which began very suddenly. Tone was increased in all hand muscles. Neurological examination was otherwise unremarkable. His temperature was 37.7ºC but physical examination did not reveal any other abnormalities. Plasma calcium concentration adjusted for albumin concentration was within normal limits (2.34mmol/L). Arterial blood pH was 7.47, while the base excess was 3mmol/L and oxygen and carbon dioxide tensions were within normal limits. A slow intravenous bolus of calcium gluconate had no effect on the spasm. Procyclidine was given as an intravenous bolus of 10mg and the patient described a reduction in the pain in his hands within 15 minutes of treatment, although it took 4 hours for the spasm to resolve completely. Serum mirtazapine and nor-mirtazapine concentrations 15 hours post-presentation were 115ug/L (normal 20-100) and 97ug/L respectively. His creatine kinase was raised at 639U/L, settling to 281U/L the next day. *References:* 1. Waring WS, Good AM and Bateman DN. Lack of significant toxicity after mirtazapine overdose: A five-year review of cases admitted to a regional toxicology unit. Clin Tox 2007; 45:45-50

160. Retrospective Review of Dextromethorphan Ingestions in Children Less Than 6 Years Old

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Background: The AAPCC guideline for dextromethorphan (DM) send-in is greater than 7.5 mg/kg. Our system has used a 15 mg/kg threshold for 10 years. We wanted to evaluate which levels caused significant toxicity in our patients (pts). *Methods:* Retrospective study of DM ingestions from 1/1/03 -12/31/07, in children less than 6 yo, which were followed to known outcome. CHR approval obtained and cases blinded prior to analysis. Data collected: age, wt, DM dose, sex, dose accuracy, coingested meds, intent, sxs, use of charcoal (SDAC), admission, onset, duration, and outcome. *Results:* 837 cases met inclusion criteria. Demographics: 55% male, avg age = 2.44 yo, Avg DM dose = 70.8 mg (range 0.5 - 900). Avg mg/kg DM = 5.1 (range 0.1 - 56.3). Pts divided into 3 groups: 1) ≤7.5 mg/kg, 2) >7.5 mg/kg but ≤ 15 mg/kg, 3) > 15 mg/kg. 81.7% in group 1, 12.6% in group 2, 5.5% in group 3. Coingestants: decongestant 73.1%, antihistamine 58.5%, APAP 15.9%, guaifenesin 7.3%, phenothiazine 5.1%, opiate 0.1%. Sx: sedation 75.9%, GI sx 12.5%, ataxia 9.1%, agitation/hyper 8.6%, nystagmus 6.0%, tachycardia 5.4%, mydriasis 4.9%, skin sns 1.9%, hallucinations 1.3%. 7.4% got SDAC and 2.5% admitted. Logistic regression for variables to predict admission: odds ratio (OR) of 0.11 for DM ≤7.5 mg/kg. OR = 1.11 for mg/kg, OR = 21.74 for DM >15 mg/kg, OR = 67.83 for nystagmus, OR = 8.93 for mydriasis, OR = 12.71 for ataxia, OR = 27.19 for hallucinations, OR = 10.23 for tachycardia, OR = 13.36 for SDAC. Group 2 had OR = 1.48 and P value of 0.49. *Discussion:* Nystagmus, mydriasis, and SDAC suggest pts were in an ED and may bias data towards admission. Most doses were estimates adding unreliability. OR = 0.11 for DM <7.5mg/kg suggests reduced risk of admission. For every mg/kg increase, there was a 1.11 OR of admission. High admission potential for DM >15 mg/kg, presence of nystagmus, mydriasis, hallucinations, and SDAC. Coingested drugs had no statistical influence. *Conclusion:* DM >15 mg/kg has a high probability of admission and DM ≤ 7.5 mg/kg is unlikely to need admission. Group 2 was not statistically significant, so no conclusion drawn. There is an increased risk for admission with increasing dose.

161. The Impact of HIPAA on the Delivery of Poison Center Services

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Background: The Health Insurance Portability and Accountability Act (HIPAA) privacy standards were developed to limit unauthorized access to patient health information (PHI). Since implementation in April 2003 poison centers (PC) have encountered resistance or refusal by health care providers (HCP) to share PHI, resulting in an inability to obtain proper follow-up on poisoned patients. This investigation aims to profile situations where the release of PHI was questioned or denied by a HCP and to examine the resolution in each case. *Methods:* A retrospective analysis of our regional PC's 2003-2008 database was performed to

identify all cases where reference to HIPAA appeared in the notes. Each case was reviewed to determine which type of health care entity, department, and HCP cited HIPAA, whether the initial contact on the patient was made by a HCP at the facility or by the PC, and whether the PC was successful in obtaining PHI on these calls. *Results:* 170 cases were identified involving refusal of information or questioning of the PC's right to obtain PHI. The majority of issues were raised by nurses (88%), with most (92%) in hospital settings; 39% critical care units, 37% non-critical care units, 23% ED, and 1% lab. Ironically, in two-thirds of the cases where HCPs questioned the PC's authority under HIPAA, a provider from that entity had initiated contact with the PC for treatment recommendations. Four hospitals in our region accounted for over 30% of the cases. After attempts were made to clarify the PCs role, all requested PHI was provided in 26% of the cases, limited information in 31%, and no information in 43%. The most effective means for obtaining full PHI were providing an oral or faxed explanation of the PC's function as a HIPAA authorized public health provider, or after speaking with supervisory personnel. *Discussion:* Most HIPAA issues were raised by nurses in hospital inpatient settings. Despite explanation, the PC was unable to obtain all requested PHI in 74% of cases. This clearly limits the ability of PCs to provide timely recommendations and obtain adequate follow-up on outcomes. *Conclusion:* This study highlights the need for targeted development of more effective procedures to educate HCPs about poison centers as they relate to HIPAA.

162. Preliminary Study on the Pharmacokinetics of Purified Rabbit Serum PON1 in Rats

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Objective: To investigate the pharmacokinetics of exogenous purified rabbit serum paraoxonase-1 (PON1) in rats, in order to provide evidences for further study as a catalytic scavenger. *Materials and Methods:* Purified rabbit serum PON1 was administered to rats via caudal vein in a dose of 1200U/kg, 2400U/kg and 4800U/kg. There were 66 rats in each dose group (half male and half female), then they were assigned to 11 subgroups randomly. Blood was collected from each rat before drug administration. The subgroups of rats were sacrificed by decapitation at 10min, 20min, 30min, 1h, 2h, 4h, 8h, 24h, 30h, 48h, and 72h respectively after drug administration and blood was collected. The activity of PON1 in each rat at different time points after drug administration was compared with that before drug administration and the difference value was considered as the activity of exogenous purified rabbit serum PON1 in rat. The mean activity values at different time pionts of three groups were fitted using 3P97 pharmacokinetic software. Proper compartment model was chosen according to F test and AIC value for calculation of pharmacokinetic parameters. *Results:* The pharmacokinetics of purified rabbit serum PON1 in vivo fitted linear two compartment model within 1200U/kg-4800U/kg. T1/2α = 2.3~2.35h, T1/2β = 18.76~;19.72h, V(c) = 34.13~35.83ml/kg, CL = 2.18~;2.35ml/kg/h. There was no significant difference ($p > 0.05$) in activity between male and female rats for all three doses. *Conclusions:* For all three doses, the elimination half life of exogenous purified rabbit serum PON1 was long, so the clearance process was slow enough compared to transfer kinetics of organophosphorous poisoning and reaction rates with PON1 in rats. PON1 was almost only distributed in blood all over the body and seldom distributed to other tissues or concentrated in a certain tissue. The essential pharmacokinetic behaviors were the same in male and female rats for all three doses.

pharmacokinetics parameters of three dose groups

parameters	1200U/kg dose group	2400u/kg dose group	4800U/kg dose group
V(c)(mL/kg)	35.83	34.13	34.59
T1/α(h)	2.30	2.39	2.35
T1/2β(h)	18.76	19.02	19.72
k12(1/h)	0.17	0.16	0.16
k10(1/h)	0.07	0.06	0.06
k12(1/h)	0.10	0.10	0.10

163. Beta Blocker Toxicity Successfully Treated with Intravenous Fat Emulsion: A Case Series

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Background: Intravenous fat emulsion (IFE) has rapidly become the antidote of choice for local anesthetic (LA) toxicity. While the mechanism is not fully understood, a growing body of evidence supports a role in mitigating non-LA associated cardiovascular toxicity. Reports of IFE use in cases involving lipophilic and sodium-blocking agents exist and suggest a broader role for IFE. We report two cases of beta-blocker (BB) overdose successfully treated with IFE. *Cases:* Case 1: A 53y/o male intentionally overdosed on carvedilol (Coreg CR) and developed hemodynamic instability. Despite receiving glucagon, hyperinsulinemia/euglycemia, and maximal doses of dopamine and norepinephrine, he remained hypotensive (60's/30's mmHg). After an IFE bolus and drip, he rapidly improved to a HR of 93 and BP of 108/62. He survived to discharge without morbidity. Case 2: A 22y/o female ingested an unknown amount of propranolol in a suicide attempt. In the ICU, she became unstable and rapidly deteriorated into asystole. Standard ACLS was initiated with administration of glucagon, atropine, epinephrine, and several doses of sodium bicarbonate. As a salvage maneuver, she received IFE, and within minutes had a rapid return of spontaneous circulation with a HR in the 90's and SBP of 110. She also was ultimately discharged without sequelae. *Discussion:* A well-defined treatment algorithm exists for BB toxicity. However, both of these cases continued to deteriorate despite aggressive support and established treatment protocols. Carvedilol and propranolol are both lipophilic agents with membrane stabilizing ability. Given these pharmacologic similarities to LA, we deemed IFE an appropriate intervention. In both cases, IFE was given and it brought about rapid improvement, and the patients survived to discharge without sequelae. *Conclusion:* We report two cases of BB overdose, refractory to standard management, that were successfully treated with IFE and survived to hospital discharge. In poisoning due to lipophilic BBs, IFE may be an appropriate rescue treatment for severe hemodynamic compromise.

164. Lepiota Josserandii Induced Fulminant Hepatic Failure Presenting with Pancreatitis

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Background: We report a case of L.josserandii poisoning unique for the following: occurrence in the Midwest US, first report of successful liver transplantation in the US, and marked biochemical evidence of pancreatitis preceding significant hepatotoxicity. *Case:* A 43yo female presented to an ED c/o malaise, nausea, and diarrhea. She reported ingesting 6oz of sautéed mushrooms picked from her yard, and 6 hr later developed abdominal cramping, nausea, vomiting, abdominal pain, and diarrhea. 36 hr post-ingestion neighbors called EMS due to 2 syncopal episodes. EMS reported malaise, nausea, BP 50/38, HR 144, RR 20, and transported the patient after starting IV fluids. In the ED the patients exam was notable for BP 114/63,HR 123, RR 28, dry mucus membranes, tachycardia, tachypnea, benign abdomen, and bloody diarrhea. ED lab values were notable for pH 6.98, pCO2 17.9 mmHg, bicarb 10 mmol/L, lactate 10.9 mmol/L, anion gap 28, lipase 702 U/L, AST 125 U/L, ALT 107 U/L, INR 1.7, BUN 35 mg/dL, creatinine 2.9 mg/dL, WBC 22.4 K/mm^3. She was transferred to a liver transplant center and the mushroom identity was confirmed by a mycologist via photo images utilizing the Illinois Poison Center's SHROOMS 911 service. ICU tx included vitamin K, acetylcysteine, fresh frozen plasma, and cryoprecipitate. Encephalopathy and worsening lab values developed on hosp day 6: INR 18, lactate 11.8 mmol/L, AST 4206 U/L, ALT 2920 U/L. Day 7 the patient underwent liver transplant. Liver path showed panacinar necrosis consistent with amatoxin poisoning. She was discharged home on day 12. *Discussion:* Amatoxin containing mushrooms include Amanita, Galerina, and Lepiota spp. Lepiota spp. were not associated with poisoning in N. America until the 1980's. Although L. josserandii ingestion has been reported in the US, survival and liver transplantation has not. Furthermore, the report of pancreatitis is unique. *Conclusion:* This case supports the concept that amatoxin containing mushrooms, specifically L.josserandii, may be pancreatotoxic, and that biochemical evidence of pancreatitis preceding significant hepatotoxicity may be of prognostic value.

165. Ethylene Glycol Poisoning Treated with Fomepizole

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Introduction: Since the introduction of fomepizole (4MP), it has gradually replaced ethanol as the initial treatment of choice while awaiting confirmation of ethylene glycol (EG) ingestion. It essentially completely blocks EG conversion to its toxic metabolites while awaiting hemodialysis, which the manufacturer recommends for levels of > 50 mg/dL. We sought to evaluate the use of 4MP in patients who were not treated with hemodialysis (HD). *Methods:* This was a retrospective case series of two Poison Centers (PC) from 2001 – 2008 of confirmed cases of EG with concentrations of >50 mg/dL treated with 4MP without hemodialysis. Cases were screened for demographics, co-ingestions, EG concentrations, initial pH or serum bicarbonate, peak creatinine level, and number of doses. *Results:* 24 cases with EG levels of over 50 mg/dL were identified. The average age was 40.7 years, with half male. EG levels ranged from 52 – 429 mg/L with a mean of 138 (SD ±97), median 89 mg/L. Initial pH was recorded in 14 cases and averaged 7.32. The average serum bicarbonate when pH was not obtained was 22. Six cases reported co-ingestion of alcohol alone, one with APAP and alcohol, and one case of dimenhydrinate alone. Four cases were treated with ethanol as initial treatment before 4MP was started (2 cases had ethanol as a co-ingestion), in one case isopropyl alcohol was given as the hospital did not have either ethanol or 4MP. The median number of doses of 4MP administered was four. Peak creatinine was 1.4 mg/L, although no value was recorded in 3 cases and was "normal" in two others. *Discussion:* This the largest series of cases in which 4MP was used without concomitant HD with no further progression of acidosis or development of renal failure. Previous single case reports and series have reported levels up to 706 mg/dL that have been treated successfully without HD. *Conclusion:* In this limited retrospective case series 4MP without HD in patients without acidosis

appears safe and effective. Prospective studies are needed to further evaluate the indication for dialysis in EG ingestions in the era of 4MP availability.

166. State Legal Statutes for Poison Center Liability

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Background: Poison Control Center (PCC) liability is poorly defined. Because very few cases are disclosed publicly, the true incidence of risk is unknown. We sought to examine state statutes to determine the number of States that have defined indemnification for PCC. *Methods:* A search of Westlaw was conducted to find state statutes and common law decisions that define poison center indemnification and immunity via search terms ("poison control," "immunity," "indemnification" and "medical director"). Language in each statute and case was reviewed to determine criteria for immunity and indemnification including: non-profit status, requirements for protocols or guidelines, adherence to guidelines. *Results:* A total of 5 states were found that have statutes delineating PCC liability: California(CA), Florida(FL), Louisiana(LA), Texas(TX), and Tennessee(TN). Elements attached to liability as defined by the State: No charges (CA), non-profit status (LA), guidelines (CA), acting in good faith (CA), (LA), (FL), gross negligence or wanton misconduct (CA), (LA), (FL), (TN). TX only defines that the State will indemnify the PCC. Several states (NC, MO, IL, CT, GA) have common law or statutory "public immunity" doctrines which could, hypothetically, cover state created PCCs, but such doctrines do not specifically include PCCs within their scope. Additionally, almost all states have sovereign immunity doctrines which may protect PCCs to the extent they are state created, funded and operated. This area of the law, however, remains undefined as no reported cases exist litigating the issue. *Conclusion:* Very few states have statues that define PCC liability. Other centers attempting to initiate such legislation can use these models as a benchmark for their state.

167. Nurse Interpretation of the EKG QRS Width

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Background: Poison Centers obtain most case data, including EKG information, from nurses. The accuracy of nurse-based EKG information has never been studied. *Objective:* To determine if nurses can identify critical EKG characteristics that affect management decisions following tricyclic antidepressant overdose. *Methods:* Emergency Department, Medical Intensive Care Unit, and Coronary Care Unit nurses were recruited and divided into three study groups. Participants reviewed a series of 12 EKGs. Five EKGs had a normal QRS and seven EKGs had a widened QRS. Participants were asked (1) if the QRS complex was wide (yes or no) and (2) to measure the QRS interval. Group 1 (n = 11) received written instructions on how to determine QRS width. Group 2 (n = 12) received no specific instructions. Group 3 (n = 13) received verbal instruction on QRS measurement. Proportions correct were determined for each group. The measured QRS width was considered correct if within 20 ms or 1.96 standard deviations of the gold standard (mean of three different physician measurements). Between group differences were analyzed by Student's two-tailed t-test ($p < 0.05$). *Results:* Raw data appears in the table. The gestalt rate of determining if the QRS complex is wide (Y/N) was significantly greater than correctly measuring the QRS interval for all groups. Verbal and written instruction did not improve accuracy of measuring QRS width. *Conclusion:* Our data indicate that nurses are able to differentiate wide versus narrow QRS complex most of the time. However, they were not able to accurately measure the QRS duration. Neither verbal nor written instructions improved accuracy. Additional methods of collecting information beyond phone discussion may be required to improve reliability of poison center EKG data.

	Proportion Correct	
Group (n)	Is the QRS wide (Y/N)?	Measured QRS width
All (36)	77%	44% (p = 0.0001 vs Y/N)
Wide EKGs only (36)	60%	39%
Narrow EKGs only (36)	99%	50%
No instruction (12)	77%	43%
Verbal (13)	75%	40% (p = 0.6 vs No instruction)
Written (11)	77%	49% (p = 0.4 vs No instruction)

168. Incidence of Hypoglycemia in Sitagliptin Overdose

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Background: Sitagliptin (Januvia®) represents the first of a new class diabetic treatment, a DPP-4 inhibitor, used to increase the insulin response to high blood glucose and decrease the levels of gluconeogenesis in the liver. There are no published studies looking at the toxicity of sitagliptin in overdose. The purpose of this study is to review the incidence of hypoglycemia in all exposures to sitagliptin in 2007 and 2008 reported to a Poison Center Network. *Methods:* The Poison Center database was searched for all records of human exposure to sitagliptin from January 1, 2007 to December 31, 2008. *Results:* A total of 72 sitagliptin exposure cases were found. Average age was 33.7 years (range: 1–87), 36 female and 36 male. Sixty-nine cases (95.8 %) resulted in no reported hypoglycemia and 62 (86.1%) reported no symptoms. Twenty-nine (40.3%) were overdoses involving exposures to sitagliptin in conjunction with at least one other antihyperglycemic agent. There were three (4.2%) reported cases of hypoglycemia, all involving poly drug ingestions. *Discussion:* Less than five percent of the total sitagliptin exposures resulted in any clinically significant hypoglycemia. There were no instances of hypoglycemia in isolated sitagliptin double doses. All of the hypoglycemia cases involved polydrug ingestions. Only one occurred in the absence of another hypoglycemic agent. That was an intentional poly-drug ingestion of olmesartan, naprosyn, pregabolin and sitagliptin in unknown quantities. The others occurred after a double dose of insulin and sitagliptin and a double dose of glyburide and sitagliptin. This study is limited by its retrospective nature, the number of cases reported and its reliance on patient histories. *Conclusion:* This is the first study of sitagliptin in overdose. Overall, sitagliptin overdoses appear to have a very low risk of clinically significant hypoglycemia and the majority of cases could be safely managed at home. When taken with other antihyperglycemic agents, greater care should be taken as the risk of hypoglycemia increases. However, further research is needed to better define the clinical effects of sitagliptin as the drug's use increases.

169. The Works

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Background: The cause of coagulopathy, a known complication of HCl ingestion, is not well documented. We present 2 cases of coagulopathy following HCl ingestion. **Case 1:** A 57yr old presented with emesis 30min after drinking 1-2cups of The Works toilet bowl cleaner. She developed respiratory failure requiring intubation. Acidosis and coagulopathy with hematuria and coffee ground gastric secretions (ABG 6.94/40/59/6.4, INR 2.12) were noted. On transfer to a tertiary center she was tachycardic and hypotensive (HR 120bpm, and BP 79/59mmHg), with 200mL of dark red nasogastric tube drainage. She received 4units FFP, $NaHCO_3$(150mEq/L), and omeprazole. She developed DIC (D-dimer > 4500ngFEU/mL, INR > 12.1, PTT 71.3sec, TCT 34.1sec, fibrinogen 71mg/dL). At the receiving hospital Hgb was 3.4gm/dL and ABG was 7.00/43/300/10.5/-20 on 100%FIO_2. She received fluid boluses, blood products, a $NaHCO_3$ drip, norepinephrine, vasopressin, and dopamine. Because of continued hemodynamic instability, the family withdrew care. She expired 17hrs after ingestion. **Case 2:** A 31yr old presented after ingesting an unknown amount of acetaminophen, zolpidem, and clonazepam, followed by The Works toilet bowel cleaner 10hrs later. She developed hematemesis, hypotension(SBP 40mmHg), and respiratory failure, requiring dopamine(20mcg/kg/min) and endotracheal intubation. She was anemic(Hgb 11.5g/dL) with elevated lactate(3.7mmol/L) and acetaminophen levels(12hr level 97mcg/mL). She received n-acetylcysteine and was transferred to a tertiary center. Acidemia, elevated transaminases, and coagulopathy(VBG 7.31/25/49/12.3/-12 on 50%FIO_2, AST 699units/L, ALT 473units/L, INR 2.9, PTT 65.7sec, fibrinogen 69mg/dL, D-dimer > 4500ngFEU/mL) were noted. Peak AST and ALT were 10038 and 5011units/L respectively, and total bilirubin 13.2mg/dL. Norepinephrine(12mcg/min) replaced dopamine. She received 4units FFP and 6units of platelets. She stabilized in the ICU, recovered from her ingestion, and was discharged 2mo later. *Case discussion:* Our cases developed significant coagulopathy. HCl can induce cellular damage with necrosis, tissue factor production, and clotting cascade activation. HCl may directly damage clotting factors and other regulatory compounds. *Conclusions:* These cases remind practitioners of the coagulopathic potential of HCl.

170. Secular Trends in Human Exposures from the National Poison Data System: 2000 – 2008

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Background: NPDS provides poison centers the opportunity to examine national aggregate human exposures, animal exposures, and information calls for each AAPCC generic category (926 minor grouped into 161 major). *Methods:* We ran NPDS enterprise reports for years 2000-2008 and examined the change over time in human exposures as the absolute (linear regression of calls/year) and relative (doubling time from linear regression of log-calls/year) for each major generic category and total cases. *Results:* Of the 162 regressions, 113 of the linear and 111 of the log regressions were statistically significant ($p < 0.05$, 2000-2008, N = 9). The table shows the top 20 major categories (with $p < 0.05$), number of 2008 calls, and the mean rate of increase (doubling time in years). *Discussion:* The table rank (by increasing number of exposures) shows the categories contributing most to the overall increase in exposures (and the categories with decreasing exposures). The doubling time is the mean growth rate over this time period. *Conclusion:* These quantitative trend descriptions suggest where poison centers might focus interventions and training, help predict future workload, and demonstrate the inherent value in NPDS data by generic category over time.

Increase in NUMBER of human exposures

Rank	Increase Calls/Y	2008 Calls	Doubling Time (Y)	Major Category
1	9088	156,165	8.77	Misc Sedative/Hypnotics/Antipsychotics
2	5000	90,356	9.52	Misc Cardiovascular Drugs
3	3858	124,124	19.18	Misc Foreign Bodies/Toys/Misc
4	3228	80,829	14.05	Acetaminophen Alone
5	3185	88,059	15.42	Misc Antihistamines
6	3096	71,310	12.85	Acetaminophen Combinations
7	3087	77,750	14.19	Misc Alcohols
8	2883	107,474	22.03	Nonsteroidal Antiinflammatory Drugs
9	2580	37,344	6.67	Opioids
10	2414	113,887	29.20	Misc Topical Preparations
11	2371	129,292	35.21	Misc Cosmetics/Personal Care Products
12	2159	29,800	7.30	Misc Other/Unknown Nondrug Substances
13	1998	89,639	27.18	Misc Antidepressants
14	1844	44,253	13.32	Misc Anticonvulsants
15	1706	37,558	12.66	Multiple Vitamins: Pediatric Formulation
16	1698	23,980	7.45	Misc Cold and Cough Preparations
17	1603	24,410	7.30	Antacids
18	1507	24,403	8.47	Other Misc Drugs
19	1411	27,816	10.81	Disinfectants
20	1324	27,313	11.18	Misc Muscle Relaxants

171. Severe Hemolysis in Pediatric Case after Ingestion of Miracle Mineral Solution™

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Intro: Alternative medicines are available in the home and are a possible source of unintentional ingestion in young children. Occasionally, these toxicants are a source of morbidity. *Case report:* A 32 month old previously healthy child was found with an open container of Miracle Mineral Solution. The family thought he had taken a swallow even though the customary dose is only a few drops. The child was given an unknown dose of oral charcoal by the family. On arrival to the Emergency Department, the child was listless and pale. His heart rate was 140, blood pressure 106/40, with a pulse oximeter reading of 82% on nonrebreather oxygen mask. His arterial blood gas on supplemental oxygen demonstrated a pH of 7.41 with pO2 of 243 mmHg and pCO2 of 32 mmHg with methemoglobin (methgb) level of 9.4%. His hematocrit (Hct) was 31 g/dL, total bilirubin 4.3 mg/dL, haptoglobin 1 mg/dL, and LDH 480 U/L. His Hct declined over the next 13 hours to 23 at which time he was transfused to a Hct of 30. His methgb level improved and Hct appeared stable over the next 9 hours. He was released to home and returned the next day with a nadir Hct of 21 at which time he was again transfused. Family denied recurrent exposure. A sample of the solution was provided by the family. The solution was tested for oxidizing agents using diphenylamine (0.5% solution) in sulfuric acid (60% v/v). A deep blue color was initially formed, indicating a positive test result. *Discussion:* Miracle Mineral Solution™ is advertised as containing sodium chlorite that is supposed to release chlorine dioxide and reduce human pathogens. Directions state to mix a few drops of the solution with citric acid at a 1:5 ratio, add water, and take orally. Sodium chlorite is considered an oxidizing agent and may reduce glutathione and increase hydrogen peroxide production in red cells. One case report of an intentional ingestion of sodium chlorite in an adult male resulted in methemoglobin production and hemolysis. *Conclusion:* We describe a case of acute hemolytic crisis and mild methemoglobinemia in a child with an unintentional exposure of a sodium chlorite solution.

172. Seizure, Rhabdomyolysis and Death Following Intentional Overdose of Caffeine-Containing Weight-Loss Supplement

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Many potentially toxic dietary supplements are available over the counter and unregulated by the FDA. A 23 year-old female ingested 100 capsules of "Stacker 3" weight loss product. Each capsule contains 250 mg of caffeine, and another 250 mg of caffeine-containing kola nut, green tea, and guarana, and multiple other unquantified substances. On arrival she was anxious and diaphoretic with BP 135/109, HR 139, RR 28, O2 saturation 98%, and afebrile. Gastric lavage, activated charcoal and IV NSS bolus were instituted. The patient had a generalized seizure 28 minutes after arrival and received lorazepam IV. Seven minutes later she had the first of 3 VFib arrests over a 3-hour period. She was intubated and resuscitated using standard ACLS protocol. Return of spontaneous pulses was achieved after each arrest. Arrival labs revealed K+ 2.7 mEq/L, CO2 17 mEq/L, anion gap 22, and glucose 205 mg/dL. Urine drug screen, APAP and salicylate levels were all negative. Repeat labs revealed a persistent anion gap metabolic acidosis. In the ICU, she was hemodynamically unstable for 24 hours requiring norepinephrine infusion. During that time she received multiple dose activated charcoal. She developed severe rhabdomyolysis with serum CPK peak over 500,000 U/L. Her clinical course was complicated by renal and liver failure as well as persistent hypokalemia and hyperglycemia. At 36 hours she underwent hemodialysis. At 43.5 hours she arrested and did not survive. A caffeine level from her arrival labs returned at 189.1 mg/liter (normal 8-20 mg/liter). Because of the unquantified "natural" substances in this product it is difficult to estimate the actual ingested dose of caffeine. Due to its ubiquitous use as a stimulant, anorexiant, and pain reliever in our society, many consumers and physicians likely consider caffeine to be a relatively safe drug. Caffeine toxicity is typically mild but severe cases (>10 grams or 150-200 mg/kg) exhibit seizures and hypotension due to adenosine antagonism and beta-adrenergic stimulation. Clinicians should be aware of the ingredients and potential lethality of unregulated weight loss products. The fact that this product is readily available without prescription highlights a flaw in federal regulations.

173. Direct Cardiotoxicity from an Acute Pentavalent Arsenic Ingestion

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Background: Inorganic trivalent (TA) and pentavalent arsenic (PA), are interconverted in vivo. TA binds to sulfhydryl groups and inhibits glycolysis and the Kreb's cycle. PA replaces phosphate in ATP and uncouples oxidative phosphorylation, and arsenic can produce oxygen free radicals. Acute arsenic cardiotoxicity is commonly manifested as dysrhythmias. We present a case with evidence of both dysrhythmia and direct myocardial ischemia from PA. *Case report:* A 57 yo healthy male intentionally ingested 3 grams of granular PA and presented to the emergency department 6.5 hours later with nausea, hematemesis and abdominal pain. His initial ECG showed ST depression in leads II, III, and aVF with hyperacute T waves in leads V2-V5. After transfer to a tertiary center 9 hours post ingestion, his blood pressure was 117/56 mm Hg, heart rate 100 bpm, ECG had ST depression in leads V3-V6 with a QTc of 610 ms, and the troponin I was 0.51 ng/mL. The troponin I continued to rise to 6.81 ng/mL at 19 hrs and 17.49 ng/mL at 27 hrs post ingestion. The patient was treated with IV fluid boluses, gastric lavage, endoscopy, dimercaprol, mechanical ventilation, vasopressors and continuous venovenous hemofiltration. The patient died approximately 32 hours post-ingestion from multisystem organ failure. His 8 hour post-ingestion urinary inorganic arsenic concentration was 264 μg/L. *Discussion:* A variety of ECG findings may be seen with acute arsenic poisoning including conduction blocks, QT interval prolongation, T wave changes, as well as ventricular tachycardia and fibrillation. Cardiovascular complications and cardiomyopathy have been described after chronic arsenic exposure. *Conclusion:* This case of acute PA toxicity demonstrated early laboratory and ECG signs of cardiac ischemia before refractory hypotension and multi-system organ failure developed. These findings suggest that acute cardiac ischemia may result from acute PA induced reduction in myocardial ATP production, and free radical generation.

174. Elevated Glycolate Levels after Unintentional Pediatric Ethylene Glycol Ingestion

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Background: Glycolic acid levels, though not routinely performed, can be a useful adjunct in the diagnosis of ethylene glycol exposure/poisoning. *Case report:* A 4 y-o male was noted to have some lethargy and had complaints of headache and dark brown urine the evening prior to admission. The morning of admission, he had ataxia and slurred speech. Work-up for meningitis, including LP, blood cultures and Head CT were all negative. Laboratory values noted an anion gap acidosis and he was transferred to a tertiary care center. Laboratory values upon admission revealed: Arterial Blood Gas: pH 7.282, pCO_2 17.5, pO_2 119 Na137; Cl109; CO_2 13; K 4.1; BUN 11 Cr. 0.6; glucose 92; acetone negative Lactic acid 1.5mmol/L; ammonia 42; Ethylene glycol (EG) was equivocal at 5.1 mg/dl (LOQ 5 mg/dL) Later analysis of this specimen confirmed a glycolic acid level of 31 mg/dL Bicarbonate drip was started and he was admitted to the PICU, fomepizole was administered, and arrangements were made for possible hemodialysis. However, he did well with hydration and alkalinization, and was discharged home in good condition after 3 days. Due to unexplained ethylene glycol poisoning, the tertiary care facility was able to perform ethylene glycol and glycolic acid analysis on blood from referring hospital that had been frozen and saved. After confirmation of ethylene glycol poisoning, a Child Protective Services investigation was started, centering suspicion on the child's babysitter. *Case discussion:* Ethylene glycol poisoning can be missed if all of the parent compound has been metabolized into

Ethylene glycol and glycolic acid levels

Time of Blood Draw	Ethylene Glycol Level (mg/dL)	Glycolic Acid Level (mg/dL)
Day 1: 0915	43	82
Day 1: 1036	28	61
Day 1: 1855	5.1	31
Day 1: 2310	< 5	6
Day 2: 1043	< 5	< 5

toxic metabolites and patients present with severe metabolic acidosis of unknown etiology. Blood frozen from presentation can be retrospectively analyzed for glycolate to confirm EG exposures. *Conclusion:* Glycolic acid analysis is a useful analysis to confirm EG exposures, especially in late-presenting cases.

175. Does Postmortem Toxicological Analyses of Tetrahydrocannabinol (THC) in Aviation Accidents Accurately Identify Its Physiological Impairment at the Time of Accident?

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Objectives: Postmortem toxicological testing performed by the Civil Aviation Medical Institute (CAMI) is routine after a fatal aviation accident. Potentially significant amounts of postmortem drug redistribution are well described in the literature. If not accounted for when interpreting postmortem drug levels, determination of drug physiological impairment as being responsible for accident causation is a questionable practice. *Methods:* We searched the National Transportation Safety Board's (NTSB) database from 1996 to 2006 to find cases where toxicological findings were primary for determining accident causation. Our initial search yielded 109 cases out of the 59,899 cases in the database of which we found 15 where solely THC impairment was identified as having a role in accident causation. Toxicology reports for each pilot victim were reviewed specifically examining the blood concentration of both THC and the metabolites 11-Hydroxy THC (active) and THC Carboxylic Acid (inactive). We compared these values with the suggested values for THC impairment and the additional consideration of possible postmortem redistribution to determine if accident causation from THC impairment was supported. *Results:* Of the 15 cases that met our exclusion criteria, we found 10 cases that when attempting to determine accident causation solely based on toxicological findings, might yield erroneous results. In fact, in three of the cases, only the inactive metabolite was detected and yet the NTSB investigator in charge determined that physiological impairment with THC was causal in the accident. *Conclusion:* Postmortem redistribution of THC is well documented in the literature. Additionally, numerous authors have stated that postmortem and antemortem drug levels have no correlation and any attempt to do so in forensic cases should be avoided. In cases where there is no other plausible explanation for the accident, the determination and inclusion of THC impairment solely based on toxicology findings is questionable and warrants additional study and cautious consideration.

176. Just When You Thought It Was Safe: The Brown Widow Spider (Latrodectus Geometricus) Makes Her Presence Known on the Gulf Coast

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Background: On May 11, 2007, a New Orleans newspaper noted that entomologists at the local university Ag Center had reported increasing sightings of the Brown Widow Spider (previously common only in Florida) in communities along the Louisiana Gulf Coast. The previous year they had been seen only as far west as Mississippi and to that date, no confirmed human bites from this species had been reported to the Louisiana Poison Center. *Case report:* In the summer and fall of 2007 two cases of envenomation were reported and managed by the Louisiana Poison Center. In each case the spider was either brought to the treating physician for identification or described in exact detail to the Poison Center Specialists and confirmed by internet photos. Each case presented with classic abdominal cramping and considerable patient discomfort. One case was treated with benzodiazepines until resolution of symptoms three days later. The second case eventually received Black Widow antivenom and immediate resolution of symptoms after two days of unsuccessful pharmacologic management. *Conclusion:* We report the first confirmed cases of envenomation by the Brown Widow (Latrodectus Geometricus) in Louisiana and advise other states to be aware that traditional Black Widow antivenom is effective and may be beneficial in severe symptomatic envenomations.

177. Teletoxicology: A Toxicological Diagnosis Made on a Mobile Phone Camera

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Background: Most physicians carry a mobile phone, and many of these now include integral high quality digital cameras. Mobile phone cameras can prove useful in providing visual information to toxicologists and poison center staff. We report a case which illustrates how technology can help in the practice of toxicology. *Case report:* An 80-year-old female was brought to an emergency department after she ate mushrooms picked by her son. She had nausea and vomiting, was found unresponsive and required intubation. She was noted to have posturing and later developed seizures that were treated with phenytoin. A CT head and an EEG done were negative. Patient liver function and renal functions tests were normal. The patient did well with supportive care and was extubated and discharged home later with no residual deficits. A picture of the ingested mushrooms was sent via a mobile phone camera to the on-call toxicologist and a tentative diagnosis of Amanita muscaria was made based on the image. This diagnosis was later on confirmed by the mycologist on the actual sample of mushrooms. *Discussion:* Mobile phones have become ubiquitous and those with cameras offer a means to deliver pictures to the poison center. However, transmission issues, small screen size, and photographic quality complicate their use. *Conclusion:* In our case, the value of "on the spot" photography helped in establishing the tentative diagnosis. We feel that the use of camera phones in hospitals can make a valuable contribution to clinical diagnosis and management in toxicology.

178. An Evaluation of Hepatotoxicity and Nephrotoxicity of Liposomal Amphotericin B

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Introduction: Hepatic and renal function are important considerations when selecting antifungal therapy. This investigation of liposomal amphotericin B (L-AMB) was conducted to determine the incidence and factors associated with the development of hepatotoxicity and nephrotoxicity. *Methods:* A retrospective chart review was conducted of 100 consecutive patients receiving L-AMB at doses of 1, 3, and 5mg/kg. Hepatotoxicity was defined as an increase of bilirubin greater than 1.5 mg/dl or AST and ALT greater than 3-5 times the normal range. Nephrotoxicity was defined as an increase in serum creatinine of 0.5 mg/dl or an increase of 50% from baseline. Patients were included if they were 18 years of age or older and received L-AMB at one of the indicated doses. Patients were excluded if they had developed hepatic or renal dysfunction prior to L-AMB administration. Baseline demographics were collected including age, gender, baseline serum creatinine, immunosuppression regimen, intravenous (IV) contrast exposure, concomitant hepatotoxins or nephrotoxins, and length of L-AMB treatment. *Results:* 75 patients were included based upon the predefined inclusion/exclusion criteria. 21% (16/75) developed hepatotoxicity based upon the predefined criteria. There were no additive correlates for this adverse effect. Overall, 56% (42/75) of patients developed nephrotoxicity. 74% (31/42) were exposed to IV contrast and 90% (38/42) were receiving nephrotoxins concurrently. Age, cumulative dose, concomitant nephrotoxins, and IV contrast exposure were associated with increased nephrotoxicity ($p < 0.001$). *Conclusion:* The development of hepatotoxicity was observed; however no correlates (age, dose escalation, or cumulative dose) were significantly associated with its occurrence. Overall nephrotoxicity with L-AMB was common and often multifactorial. Lipid amphotericin B products are associated with lower rates of nephrotoxicity than conventional amphotericin; however, in this analysis L-AMB was associated with a high incidence of nephrotoxicity.

179. Acetylcysteine (NAC) Use for Acetaminophen (APAP) Overdose in Patients Weighing over 100kg

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Background: NAC dosing for APAP overdose is weight based (140-oral or 150-IV mg/kg) but some toxicologists recommend a maximum dose based on a patient weight of 100kg. Little clinical data describe the use of NAC for APAP poisoning in patients weighing over 100kg. The study aim was to describe demographics and outcomes of patients weighing over 100kg treated with oral or IV NAC for APAP poisoning. *Methods:* Patients were identified from a multicenter retrospective safety study of NAC for APAP overdose. We included patients with a recorded weight of >100 kg. Charts were double abstracted by trained abstractors using a standardized form. Data collected included demographics, patient weight, maximum serum APAP and ALT, coingestants, NAC loading dose, acute vs. repeated ingestion, adverse events (AEs) and outcome (hepatotoxicity [ALT > 1000 U/L], transplant, or death). Descriptive statistics were used. *Results:* Of 503 patients included in the study, 37 (7.7%) weighed >100kg, and 21 had no weight recorded. Mean age for >100kg patients was 40.0 years (SD 13.8), mean weight 114.9 kg (13.3) [range 101-160], with 54.1% females. Coingestants included alcohol in 5 (13.5%), antihistamines in 6 (16.2%), and opioids in 17 (45.9%). There were 19 (51.4%) acute, 8 (21.6%) repeated, and 10 (27%) unknown ingestions. In the >100kg group 13 (35.1%) received oral NAC for initial treatment, 23 (62.2%) IV, and 1 (2.7%) unknown. Mean loading dose was 135 mg/kg (SD 12.6) for oral administration and 142 mg/kg (16.1) for IV. Total NAC loading dose was 15.9 gm (SD 2.4) for oral and 16.0 gm (2.7) for IV. Outcomes included hepatotoxicity in 13 of 32 (40.6%), 0 transplants, and 3 of 36 (8.3%) deaths. Of 12 patients evaluable with the Rumack-Matthew nomogram, 3 of 5 high-risk patients developed hepatic injury. 10 (27.0%) related AEs (all vomiting and non-serious) occurred in the >100kg group: 8 with IV, 2 with oral NAC. There were no anaphylactoid reactions. *Conclusion:* Patients weighing >100kg were underdosed by 5–8 mg/kg (3.6–5.4%). AEs were fairly common but not serious. Patients >100kg appeared to be protected without weight-based dosing.

180. Anaphylaxis Following Repeat Bite by Venezuelan Eyelash Viper (*Bothriechis Schlegelii*)

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Background: Anaphylaxis following a snake bite may clinically resemble a severe true envenomation. Anaphylactic reactions following snake bites are rare, except in individuals with previous bites by the same or similar species. We describe anaphylaxis in a man bitten by an eye lash viper (*Bothriechis schlegelii*) with multiple prior snake bites. *Case report:* A 58 year-old male herpetologist with a history of over 25 previous snake bites was bitten on index finger of left hand while handling a Venezuelan eyelash viper (*Bothriechis schlegelii*). He immediately developed blurry vision, dyspnea and loss of consciousness. Paramedics found

him hypotensive (systolic blood pressure of 40-60 mmHg), obtunded, with swollen tongue. His left hand had two puncture marks with local swelling and redness. In the ED he received normal saline fluid bolus, epinephrine and dopamine drip, diphenhydramine, methylprednisolone, sodium bicarbonate, and ondansentron. He received six vials of Cro-Fab ™ prior to transfer to our trauma center. On arrival, he was awake, alert, with stable vital signs (T 36.3, P 97, R 24, BP 109/79 mmHg, O2 saturation 98% on O2 at 4 L/min). He had mild swelling and erythema of the left hand without progression. He received no more antivenom, was quickly weaned off epinephrine in the ED, and was admitted for observation. He had no progression of swelling beyond the wrist, had normal platelet counts (range 134 to 156 K/cumm) and coagulation studies (INR range 1.24 to 1.25, PTT range 15.7 to 16.1 sec; fibrinogen 271 mg/dL), and was discharged 48 hours later with no complications. *Discussion:* Anaphylaxis rarely occurs with snake bites, unless prior similar snake bites have occurred. It may be IgE mediated. Cro-Fab ™ might be helpful in envenomations by the eyelash viper, a South American crotalid. However, in this case anaphylactic shock was more likely than severe envenomation given the rapid improvement after diphenhydramine and epinephrine, the mild local symptoms, and the normal laboratory studies. *Conclusion:* Patients with repeated snake bites could present with explosive type I hypersensitivity reactions and anaphylaxis after a repeat venomous snake bite.

181. When Yellow and Blue Make Patients Green: Nitroaniline Cases at Multiple Hospitals

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Background: Malicious deployment of a chemical agent might result in simultaneous presentation of acutely ill patients (pts) to multiple facilities (HCFs) as "unknowns." An actual exposure scenario challenged the Poison Center (PC), HCFs and EMS agencies. *Case report:* 9 men were exposed to p-nitroaniline during questionable activities on a holiday weekend at a plant. When symptoms began hrs later, they agreed to present to different HCFs with unspecified "chemical exposure," to avoid discovery. The PC received calls minutes apart from 2 HCFs regarding pts exposed to chemicals with severe respiratory distress and altered LOC. HCF A had 3 pts who looked green in color; 1 unconscious and 2 vomiting, and misidentified the agent as organophosphate. HCF B had 1 pt exposed to a yellow chemical identified as "byronitroalkaline" who arrived in respiratory arrest. The PC toxicologist suspected that green skin resulted from yellow skin stain plus cyanosis, both concordant with an aniline dye. Methgb levels ranged from 32-72%. Within 1 hr 2 more HCFs received similar pts. The PC quickly guided them to the diagnosis of methemoglobinemia and methylene blue treatment. Actions, however, taken by various HCFs and response agencies remained independent of toxicologist guidance. These included quarantine/closure of 2 EDs; a HCF lab and an ICU; multiple rounds of victim decon because of yellow-dyed skin; detainment and decon of HCF staff, ED pts and bystanders; confiscation of belongings and disposal as "hazardous waste;" and activation of an out-of-state Hazmat cleanup contractor. *Discussion:* Para-nitroaniline is a methgb former absorbed through skin and lung. Patients who had showered and changed clothes did not represent a contamination risk to EDs. Misinformation resulted in over-reaction. *Conclusions:* Cohesive working relationships are essential amongst EMS 1st responders, treating physicians, the PC, incident commanders, and public health authorities. PCs working closely with their medical directors can be an invaluable member of the disaster and emergency preparedness system

182. Methanol Poisoning with Putaminal Necrosis. Late CT Findings in Emergency Department

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Summary: During 2007 6 cases of methanol poisoning attended at the emergency department of Guillermo Almenara National Hospital, in which CT scans appeared in the first day were normal and after three days CT scans of most of them showed putaminal lesions. *Introduction:* Putamen necrosis is the well known lesion in the brain that can be identified on computed tomography, There are another brain lesions like necrotic lesions in the brain white matter. *Methods and results*: During 2007 23 patients with methanol poisoning were attended at the emergency department of Guillermo Almenara National Hospital, in Lima – Peru. Seven of them died in their first day in the hospital because of their critical condition. Five patients entered the UCI department and the other ten patients were attended at the emergency department during at least the first five days. All the patients underwent the known treatment which consisted in ethanol treatment and haemodialisis. We took brain CT scans to 10 patients in the first and the third day. Six of them showed putaminal lesions (60%) in the the second brain CT scan. *Discussion:* Initial presentation ussually includes central nervous systems symptoms and includes dizziness, headache and malaise, followed by visual disturbances in one third of the patients. There is a latent period of 12 to 20 hours. The most common pathological findings include necrotic areas of the putamen region and in some cases we can find haemorragic regions. Moreover we cand find lesions around the brain white matter *Conclusion:* Although the early brain CT scan can show no lesions, the late CT show an important percentage of lesions in the putamen region.

183. Perilous Propositions: Intubating the Salicylate Poisoned Patient

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Introduction: Cardiac arrest occurring shortly after the intubation (ETI) of salicylate (ASA) poisoned patients has been reported. While worsening acidosis and hypercapnea have been implicated, the role of hypoventilation is unclear and ventilator management has not been well-described. *Case series:* Poison center charts from 7-01-04 through 12-31-08 were reviewed to identify intubated ASA-poisoned patients with peak ASA levels >45 mg/dL. Eighteen cases were found. Particular attention was paid to: 1) available pre- (PRE) and post-intubation (POST) arterial blood gases (ABG) with ventilator settings (6 cases), or 2) cardiac arrest. Four patients arrested shortly after ETI, with 1 successful resuscitation. All POST gases worsened after ETI [Table 1]. In case 1, where hemodialysis (HD) was performed prior to ETI, the POST ABG did not significantly worsen. In cases 3, 5, and 6, despite deliberate hyperventilation (HV), the POST ABGs still worsened to varying degrees. In case 8, correction of K^+ of 6.0 (initial 3.7) with the first arrest led to recovery of sinus rhythm. *Discussion:* Due to the inherent nature of ASA toxicity, minute ventilation (MV) requirements can be much greater than what is typically provided to mechanically ventilated patients. Despite deliberately high ventilator settings to match patients' MV, the POST ABG pH and pCO_2 can still worsen. Initiation of HD before ETI, when possible, may be protective. Death has been attributed to an acidosis-induced rise in the ASA CNS burden. The contributions of $NaHCO_3$ derived hypercapnea and acidosis-associated hyperkalemia are unknown. *Conclusion:* Optimal strategy for adequately ventilating ASA-poisoned patients remains to be elucidated.

Table 1.

Case# Age/Sex	Peak ASA (mg/dL)	PRE pH/pCO2	Vent ?/TV (mL)	POST pH/pCO2	HD before/ after	NaHCO3	Death
#1 66y/f	74.6	7.58/18.4	18/500	7.50/18	Y/before	Y/before	N
#2 49y/m	53	7.38/36	20/800	7.29/na	N	Y/before	N
#3 20y/f	89	7.4/15.2	30/500	7.26/22	Y/after	Y/after	N
#4 71y/m	101	7.55/15	16/500	7.21/81	Y/after	Y/before	Asystole-lived
#5 56y/m	45	7.36/9.6	22/700	7.28/40.5	Y/after	Y/before	N
#6 36y/m	94	7.33/20	30/550	7.09/73	N	Y/before	Asystole
#7 24y/f	90	7.1/30	na	na	Y/after	Y/before	Asystole
#8 14y/f	94	na	na	na	Y/after	Y/after	Asystole

184. A Therapeutic Misadventure: Prolonged Elimination Half Life of Acetaminophen in a 3 Day-Old Child

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Background: Acetaminophen is a commonly used analgesic. We report an acetaminophen overdose in a 3 day-old child due to a therapeutic error resulting in an elevated blood level and a significantly prolonged elimination half-life. *Case report:* A 3 day-old infant was mistakenly given 3 doses of acetaminophen (APAP) each containing 151 mg/kg, resulting in a total dose of 453 mg/kg of acetaminophen in a 24-hour period. The mother was instructed to bring the child to the emergency department (ED). In the ED, the patient's APAP blood level was 312.6 mcg/mL with normal hepatic transaminases. This level was drawn approximately 5 hours after administration of the last dose of APAP. The patient was started on IV N-acetylcysteine (NAC). Thirteen hours after the last dose, lab results included an APAP level of 241 mcg/mL, AST 70 IU/L, ALT 24 IU/L, and INR 1.7. Labs,24 hours after the last dose, showed an APAP level of 148.5mcg/mL, AST 47, ALT 23, and INR 2.05. Fresh frozen plasma was given. The child was asymptomatic. Labs, 36 hours post exposure, included APAP 59.9 mcg/mL, AST 39, ALT 28, and INR 1.45. At 48 hours post exposure, APAP level was 23 mcg/mL, AST 39, ALT 28, and INR 1.5. Labs drawn 63 hours post exposure showed APAP less than 2mcg/mL, AST 42, ALT 35, and INR 1.11. The IV NAC was continued throughout this timeframe. Labs, 72 hours post exposure, showed AST 31 and ALT 35. NAC was discontinued at this time. 96 hours post exposure; AST was 22 and INR 1.1. The infant was discharged home. *Discussion:* In this case, the decision was made to treat with NAC therapy only. Other treatments were discussed but not initiated because the child remained asymptomatic. The case was also unique in that the elimination half-life (T1/2) of APAP was prolonged, with an apparent T1/2 of approximately 11.4 hours over a 43-hour period. Because of the prolonged half life, an extended course of NAC therapy was indicated. *Conclusion:* We present a unique caseof a significant acetaminophen overdose in newborn that was successfully treated with an extended course of NAC. The child had only mild elevations in the transaminases and INR.

185. Did Massive Recall of Digitek® Tablets Increase Number of Digoxin Exposures to a Poison Control System?

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Introduction: Digoxin has a narrow therapeutic index with high incidence of morbidity and mortality. In April 2008, manufacturer Actavis recalled Digitek® digoxin tablets as may contain double labeled amount of drug. Recall to March 2006 involving 800million tablets. Null hypothesis: no increase in number of moderate, major or death outcomes secondary to manufacturing error. *Methods:* Retrospective review of all digoxin exposures to a poison control system from March 2004-February 2008. Data extracted from electronic database using terms:digoxin, digitek, lanoxin comparing two time intervals: 1) 03/04-02/06 (before manufacturing error) and 2) 03/06-02/08 (after manufacturing error). Total numbers of exposures were identified. Cases with moderate, major and death were also identified and tallied. Chi square analysis was performed. *Results:* From 03/04-02/06 there were a total of 679 digoxin exposures. Of these, 148 had outcome of moderate, major, or death(22%). All except one moderate case was managed at a health care facility. There were 113(17%) moderate, 29(4%) major and 5(0.7%) deaths. In the period from 03/06-02/08, there were a total of 610 cases. All were managed at a health care facility. Of these, 165 had an outcome of moderate, severe, or death(27%). There were 137(23%) moderate, 26(4%) major and 2(0.3%) deaths. There was statistically significant increase in total number of moderate, major and deaths after manufacturing error period than before ($p = 0.028$). *Conclusion:* During period of manufacturing error, there was a statistically significant increase in digoxin exposures with moderate, major or death outcomes. However, a decrease in the percentage of deaths. The recall of Digitek® tablets may have increased moderate, major or death outcomes from digoxin exposures in a poison control system database. Larger, retrospective studies are required to confirm our findings.

186. The Current Status of the Practice of Inpatient Medical Toxicology at the Bedside in the US

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Background: Traditionally, the provision of medical toxicology (MT) consultation to patients has occurred remotely over the telephone as a poison center service. In recent years, an increasing number of medical toxicologists have established consultative and inpatient services where the delivery of consultation has shifted to the bedside. This bedside consultation model is comparable to the standard practice pattern of most other medical specialties. We investigated the current prevalence of bedside toxicology practice in the U.S. *Methods:* An electronic survey was sent to all American College of Medical Toxicology (ACMT) members asking questions on bedside MT practice patterns. An inpatient MT practice was defined as providing care to the patient at the bedside either as a consultant or as the inpatient attending. Care delivered to the patient while working as the emergency physician or over the telephone was not considered MT bedside care. *Results:* There are 500 members of ACMT. Of these 350 are board certified in MT (the others are trainees, recent graduates who have not yet passed the boards, international members or emeritus members). These 350 represent 90% of those who are board certified in MT. 114 ACMT members answered the survey. 95 (83% of respondents) have an inpatient MT practice. In some cases, 2 or more members from the same program (or site) responded to the survey. Taking into account duplicative responses from the same program, we identified 45 distinct sites that see inpatients at the bedside and record the number of patients that they see each year. The aggregate numbers of patients seen in the past year by these centers exceeded 14,000. Individual site census varied from 10 to more than 1000 per year. Most respondents expressed an interest in participating in a national research network and/or bedside based toxicosurveillance system. *Conclusions:* This is the first study providing information about the prevalence of inpatient MT practice in the U.S. Although a historic comparison of prevalence of this type of practice is not available, it appears that there is growing diffusion of medical toxicologists into bedside patient care and a significant potential for multi-center collaborative research and surveillance.

187. National Survey for Epidemiology of Paraquat Poisoning in Korea

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Objectives: Paraquat poisoning by ingestion is often fatal. Most paraquat poisoning studies conducted in various countries were retrospective or simple collection of individual reports in prospective studies. Although all these data are not sufficient to understand overall paraquat poisoning, it is helpful to compare epidemiological status between different countries or regions. In this study, we described epidemiologic status of paraquat poisoning in Korea, which was based on national prospective survey entitled 'Research on the actual state of pesticide poisoning in Korea and guidelines for diagnosis and treatment of pesticides poisoning'. *Method:* Research on the actual state of acute pesticide poisoning in Korea was conducted through 38 large hospitals nationwide from August 2005 to July 2006. Outcomes of paraquat intoxication were categorized as recovery or death. *Results:* Total 1,610 patients acutely intoxicated with pesticides. Of the 520 intoxicated patients with paraquat, male was 63.1% and the median age was 54 years. The incidence of paraquat poisoning was high between the ages of 40 and 69, and 98.0% of the poisoning occurred through oral route. Intentional poisoning accounted for 87.9% of paraquat poisoning and the proportion of adults older than 20 years was 99.0%. There was no accidental paraquat poisoning at all in patients less than 20 years old whose median age was 16.5 years. Most frequent clinical manifestations were nausea (32.9%) and vomiting (32.7%), followed by irritability (30.3%), confusion (19.4%), dyspnea (19.4%), sorethroat (17.7%). Overall fatality rate of paraquat was 73.5%. The fatality rates of paraquat poisoning increased with the amount ingested. The paraquat volume ≤5ml contributed 5.3% to the fatality, >5-10 ml 40.0%, >10-20 ml 51.4%, >20-40 ml 68.3%, >40-60 ml 81.3%, >60-100 ml 92.9%, >100-200 95.1%, and >200 ml 100%. *Conclusion:* The overall paraquat fatality in Korea was 73.5%, which is similar with other countries or regions. The results indicated that paraquat is potentially lethal in humans, and the risk of fatality is directly related to the amount ingested and absorbed.

188. Dramatic QTc Narrowing after Intralipid Administration in Quetiapine Overdose

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Background: QTc prolongation can be caused by various drugs including antipsychotics, which have been reported to cause sudden death through torsade de pointes (TdP). QTc intervals >500ms or >60ms from baseline are associated with an increased risk of TdP, although no reliable tool can accurately predict its development. *Case report:* A 16 year-old girl with bipolar disorder and recent gastrotomy for battery ingestion was transferred to the intensive care unit from the psychiatric ward after ingesting 38 tablets of quetiapine 300 mg, which she had been spitting out after each dose and hoarding in a sock. Other medications included lamotrigine and lithium (Li^+). She was hypotensive (70/30), tachycardic (150s), and stuporous, responding only to deep painful stimuli with incomprehensible sounds, but maintaining oxygenation on a non-rebreather mask. Labs: pH 7.31, K^+ 3.8, CO_2 21, Cr 0.9, Glu 183, Mg^{2+} 2.0. Serial Li^+ levels were therapeutic. EKG: Sinus at 127 bpm, QRS 92ms, and QTc of 610ms (baseline 462ms). Due to mental status depression, hypotension, and extremely prolonged QTc with concern for degeneration of cardiac rhythm, intralipid was administered. A one hundred milliliter (mL) bolus of a 20% lipid emulsion was given intravenously over 5 minutes, followed by a 420 mL infusion over one hour. Within one half hour, the QTc interval narrowed to 433ms. Two hours after completion of the infusion, the QTc was 652ms. By morning, the QTc had normalized and remained at baseline. Her GCS improved from 7 to 10 shortly after the infusion and then to 12 a few hours later. Eleven hours after her ingestion, she was alert and speaking clearly. A lamotrigine level was 1.3 mcg/mL (3.0-14.0). *Discussion:* Successful resuscitations from cardiotoxicity of local anesthetics and selected lipophilic agents using intralipid "rescue" therapy have been reported. A temporally-associated narrowing of the QTc occurred in this case after initiation of intralipid, with recurrent widening upon its discontinuation. There may have also been some benefit in recovery time to baseline mental status. *Conclusion:* We present a case of QTc narrowing occurring with intralipid infusion. Further investigation of intralipid effects on drug-induced prolonged QTc may be warranted.

189. Comparison of a Toxicology Fellowship Caseload with the Core Content of Medical Toxicology – Implications for Training and the New ToxIC Group

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Introduction: The 2003 Core Content of Medical Toxicology (CCMT) was created to provide "the organizational framework for the development of the medical toxicology certification examinations & details the knowledge to be tested…." It also serves "as a template for the development of medical toxicology fellowship curricula." One of the 5 sections of the CCMT addresses specific toxicants. Questions have been raised as to the use of the CCMT for the creation of the board exam versus the caseload that toxicologists actually manage. Also, the ACMTs newly created Toxicology Investigators Consortium (ToxIC) provides an opportunity for programs to join in multicenter clinical research. Knowledge of program caseloads will assist the TocIC group in assessing possible research. *Purpose:* To compare the patient caseload from a toxicology fellowship to the "Toxins & Toxicants" section of the CCMT & to provide a framework for discussion of research opportunities for the ToxIC group. *Methods:* The caseload of the fellowship is maintained in a spreadsheet that was formatted to be like the CCMT. The spreadsheet was queried. *Results:* The fellowship caseload includes 1312 exposures. The CCMT categories had to be modified in order to optimize exposure numbers. The analgesics category was complicated by 12% being mixed agents. All 4 subcategories of the "psychotropics" were highly represented (16.5% total) - (Anxiolytics & sedative-hypnotics, Antidepressants, Antipsychotics, & Mood stabilizers [lithium]). Very few exposures occurred in most categories in the major category "Industrial, Household, and Environmental Toxicants." The exceptions were "Cleansers & Caustics" and "hydrocarbons." *Conclusions:* Many categories

and subcategories of the "Toxins and Toxicants" section of the CCMT had very few exposures. This reflects that debate, about the use of the CCMT for the development of toxicology fellowship curricula, is appropriate. Also, concerns over the use of the CCMT to develop the toxicology board exam are understandable. Program Directors must adjust the didactic portions of their programs accordingly. Opportunities for conjoined clinical research for the new ToxIC were delineated.

190. Acute Encephalopathy with Concurrent Metabolic and Respiratory Disturbances in First Known Human Ingestion of Banamine (Flunixin Meglumine) and Acepromazine

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Banamine is a potent, non-narcotic, non-steroidal, analgesic agent recommended for musculoskeletal disorders in horses. Lethargy, weight loss and rare fatalities have been reported in horses. Acepromazine is a potent neuroleptic agent used as a tranquilizer, anti-emetic, and antipyretic in dogs, cats and horses. It has been known to cause cardiovascular collapse secondary to bradycardia and hypotension and rarely seizures. There are only a few case reports of human ingestion of acepromazine and none of the combination.

We report a 43 year old female who works as a horse trainer who presented with altered mental status after an intentional injection of an unknown amount of Banamine and acepromazine. The patient was awake but confused and lethargic; oriented to person only. Vital signs were stable. Physical exam was otherwise normal. Laboratory abnomalities included a pH of 7.57 with potassium of 2.6meq/L and CO2 of 16 mmol/L. AST/ALT peaked at 382/190 IU/L respectively. Her chest x-ray and head CT scan were normal. A urine tox screen was positive for benzodiazapines. Levels of Banamine and acepromazine were not performed. Her hospital course was complicated by worsening alkalemia, an upper GI bleed (requiring transfusion) and elevated liver enzymes. Her metabolic/respiratory derangements and encephalopathy cleared with supportive measures. Patient was discharged home after 6 days with psychiatry follow-up on out-patient basis.

Human ingestion of medication prescribed for animals is not common. In this case, the patient had access through her work as a horse trainer. The mental status changes seen in this patient were possibly due to either medication or the combination. Her gastrointestinal bleed may have been due to the Banamine. Human exposure to veternarian medication can not always be predicted by their effect in animals.

191. Fatality from Ammonium Bifluoride Poisoning after Ingestion of Grout Cleaner

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Background: Ammonium bifluoride poisoning can lead to systemic toxicity and death. Previous case reports involved automotive products, such as aluminum wheel and tire cleaners. We report a fatal case of ammonium bifluoride poisoning after ingestion of EZ Kleen Grout Cleaner. *Case report:* Our poison center was contacted concerning a 3 year-old male who drank 1-2 ounces of a liquid commercial grout cleaner stored in a soda bottle. The child presented to the ED with vomiting of blood-tinged saliva. The exact product was unknown, and the products listed as grout cleaners in Poisindex were reviewed. They contained ingredients that would cause local tissue injury, and thus the poison center provided recommendations for evaluation and treatment of caustic ingestion. Ninety minutes later, the father identified the exact product and an Internet search determined it contained ammonium bifluoride. The poison center recommended serial ECGs, serum calcium determination and aggressive calcium repletion. An ionized calcium level was 0.6 mg/dL. The child was verbal but lethargic. As calcium repletion was started, he developed a ventricular dysrhythmia. Despite resuscitative efforts, including aggressive calcium chloride administration, he died 4 hours post exposure. Further research showed that the product contained an estimated 14-21% of ammonium bifluoride. *Discussion:* Ammonium bifluoride poisoning is well described following exposure to wheel cleaning products, but there are no human reports of poisoning from other commercial products. Poisindex has 3 products coded to ammonium bifluoride, none of which were a grout cleaner. This commercial grout cleaner contained ammonium bifluoride. Accidental exposure to ammonium bifluoride can be fatal. *Conclusion:* It is important for poison centers to be aware that industrial grade grout cleaners can contain ammonium bifluoride.

192. How Many Acetaminophen Pills Do Suicidal Patients Ingest?

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Background: In 1998 authorities in the United Kingdom (UK) restricted sale of acetaminophen (APAP) to 16 tablets in retail stores and 32 tablets in pharmacies. Similar rules have been suggested for the United States (US). *Objective:* To determine how many APAP tablets are ingested in single-substance suicide attempts in the US. *Methods:* This is a retrospective cohort study of National Poison Data System cases from 2000-2008. Inclusion criteria: 1) adult APAP formulation, 2) acute ingestion, 3) single substance ingestion, 4) suicidal intent, 5) age ≥13 yrs, 6) quantity of APAP reported, 7) quantity units reported as grams, mg, pills/tablets, or "each" and 8) certainty of ingestion "exact" or "estimated." For ingestions reported in grams or mg, a tablet size of 500 mg was assumed. Descriptive statistics and exact odds ratios were used. *Results:* 44,736 ingestions met inclusion criteria. The median number of APAP tablets reported to have been ingested was 20 (12–37). 32,803 ingestions (73.3%) involved ≤32 tablets. This proportion remained stable over the 9-year study period. Patients who took >32 tablets were older (median age: 21 vs 18 yrs) and more likely to be male (36.2% vs 23.5%; OR 1.85, 95% CI: 1.76–1.93). Serious effects (major clinical outcome or death) were more common in the group that ingested >32 APAP tablets (755/11,933, 6.3%) than in the group that ingested ≤32 tablets (422/32,803, 1.3%) (OR: 5.18, 95% CI: 4.58–5.86). The median number of tablets ingested in cases with serious effects was 50 (30–75). After adjusting for the age and gender, the OR for serious effects associated with ingestion of ≥32 tablets was 4.53 (95% CI: 4.00–5.13). *Discussion:* The effectiveness of pack size limits in the UK has been hotly debated. Based on a calculation of population attributable risk, the maximum "opportunity" for UK-style restrictions in the US is to prevent 3.3 deaths and 64 major clinical outcomes from single-substance suicidal overdose reported to poison centers each year. *Conclusion:* Restrictions on APAP pack sizes similar to those enforced in the UK have a modest potential to reduce acute overdose mortality and severe morbidity in the US.

193. Is an Initial Severity Score after Crotalid Envenomation Associated with Antivenom Vials Needed To Treat?

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Background: Crotalid snake bites may result in severe morbidity and rarely death. Crotalidae polyvalent immune Fab (FabAV) is currently indicated for treatment for North American crotalid envenomations. *Study Aim:* To determine if an initial modified severity score for crotalid envenomation predicts the number of FabAV vials needed for initial control (IC). *Methods:* Data collected during a multi-center retrospective cohort study of snakebite patients at 17 US sites treated with FabAV between 2002 and 2004 were analyzed. Number of vials used was at the discretion of the treating site physicians. A modified version of the snakebite severity score was calculated using a 7-point scale based on specific criteria regarding venom effects, including progression of local swelling, hematologic effects and systemic effects. Severity scores were calculated based upon venom effects at start of FabAV. Achievement of IC of envenomation was determined using standard criteria. We compared the mean number of FabAV vials used to achieve IC by severity score. *Results:* 247 patients were treated with FabAV. 209 had adequate information to calculate a severity score; 181 mild/moderate (score 1 to 4) and 28 severe (score 5 to 6) patients. 174 of 209 patients achieved IC. Table 1 shows mean vials for IC by severity score. Patients with mild/moderate envenomations required an average of 7.4 (95% CI 6.6-8.1) vials of FabAV to achieve IC whereas severe envenomations required an average of 10.6 (95% CI 7.5-13.6) vials. *Conclusion:* In general, patients with higher severity scores required larger FabAV doses to achieve initial control. However there was a wide variation in the number of vials used in patients at each severity score. Because of wide interindividual variability, initial severity scores alone cannot be used to determine FabAV dosing.

Tabel 1.

Modified snakebite severity score	Number of patients	Mean vials for IC	95% CI
1	3	4.0	*
2	63	6.3	5.6–7.1
3	62	7.6	6.2–9.1
4	30	9.4	7.5–11.2
5	13	9.7	6.6–12.9
6	3	14.0	0–31.9

194. Delayed Salicylate Treatment Requiring Massive Potassium Supplementation

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Introduction: Hypokalemia often coexists with acute salicylate intoxication. Potassium supplementation is a necessary adjuvant for correction of the acid-base imbalance and required to achieve an alkaline urine environment for enhanced salicylate elimination. We report a patient that required nearly one thousand milliequivalents (mEq) of oral and intravenous potassium supplementation. *Case report:* A patient with PMH of chronic alcohol abuse presents to the ED smelling of alcohol, confused and disoriented, with a low-grade fever. Initial laboratory values 1.5 hours after presentation revealed a serum potassium level of 3.1 mmol/L, and a salicylate level of 69.3 mg/dL. Laboratory values drawn at 4 hours and checked at 12 hours after presentation (during change of shift) noted a salicylate level of 78.1 mg/dL, a bicarbonate level of 25.3 mmol/L, an ethanol level of 0, and a serum potassium level of 1.7 mmol/L, despite 200 mEq of oral and intravenous potassium. In the setting of altered mental status, Renal was contacted for emergent hemodialysis and poison center recommendations included rapid potassium supplementation and urine and serum alkalinization. The patient developed increasing respiratory secretions necessitating rapid sequence intubation. Hemodialysis was stopped due to hypotension requiring vasopressor support. CVVH was started, and fluid balance and oxygen saturation continuously monitored. The patient continued to receive oral and intravenous potassium, with a total of 969 mEq administered over the hospital course. Serum potassium levels reached 3.8 mmol/L at 14 hours

after the initial nadir of 1.7. *Discussion:* During the initial alkalotic phase of salicylate intoxication, there is renal excretion of potassium, sodium, and bicarbonate in an attempt to conserve hydrogen ion. With severe potassium depletion, there is a renal shift to conserve potassium by excretion of hydrogen ion. This aciduria enhances salicylate reabsorption and slows its elimination. Potassium repletion is necessary, along with the administration of sodium bicarbonate, to achieve the alkaline urine environment necessary for enhanced salicylate elimination. This case demonstrates that massive potassium supplementation may be required to achieve normokalemia.

195. Are Healthcare Professionals Prepared To Respond to a Radiation Event? A Survey of the Medical and Government Literature. Opportunities for the Toxicology Community To Enhance Preparedness

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Background: Radioactive materials are ubiquitous and readily diverted. Of all WMD threats,anecdotal evidence,opinion pieces,government reports,even the well investigated World at Risk Report suggest radiation is the least taught, and greatest vulnerability in preparedness. *Objective:* To identify and characterize current state of research and identify radiation preparedness gaps & voids in knowledge, planning- and differences in preparedness across disciplines. *Method:* Multiple Medline ® keyword searches ("radiation preparedness,""physicians radiation terrorism" etc,& assessment of government studies on radprep. Inclusion criteria:all review publications/ research addressing healthcare preparedness re:radiation 2002 – 2009. Exclusion criteria: op/ed,case reports or studies pre_2002. IRB exempt. *Results:* Each search category yielded <14 publications. Data showed concordance across studies: nurses, physicians, medical trainees &emergency responders expressed = concern re: knowledge, lack of practice/drills, or ability to respond to a radiation event. A study >1500 nurses revealed significant concerns on personal knowledge, and dept/facility ability to respond. <40% Prehospital emergency providers feel prepared for radiological events. A study comparing residency program training: 85% Peds, 87% FP and 21% reported little/no training in radiation; consistent with other studies comparing knowledge across specialties. *Discussion:* Widespread radioactive sources make it likely an accident or intentional event will occur. In all papers reviewed, study participants expressed a need for more training, and their ED/hospital facilities insufficiently prepared for a rad event. The absence of studies addressing radiation compared to biological/chemical underscore the vulnerability. Respondents also wanted information about radiation expertise. *Conclusion:* This study confirms government research **radiological threats remain** the least emphasized. Toxicologists can take a greater role in radiation preparedness and are in a unique position to provide expertise& educational programming.

196. Findings in Germany Concerning Liquid Products and Substances Involving an Aspiration Risk

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Background: Cases of hydrocarbon ingestion are frequent in man all around the world and the spectrum of the products involved are in the range from degreasing fluids to tyre cleansers. Reports in Germany have often shown that only some defined liquid products and substances caused typical aspiration symptoms. For hazard assessment of liquid products and substances the BfR Documentation Centre for Poisonings analysed appropriate data pools containing poisonings with cases of aspiration in the last 20 years. *Methods:* The BfR Documentation Centre for Poisonings found appropriate data only in its own compulsory data collection since 1990. The main focus of the investigation of the cases of poisonings associated with aspiration risk were symptoms and signs like coughing, depression of breath, cyanosis, aspiration and chemical pneumonia, The investigations had been in particular; 1) cases from the spontaneous German Federal Reporting System Para 16e of "Physicians" for cases of poisoning between 1990-2008 enclosed with additional 2) cases from the BfR Study "Dangerous Lamp Oils" between 2000-2006 with reports of about 450 German childrens' hospitals. The data were compiled and analysed by means of the SAS-System, seriousness rating by Poisoning Severity Score. *Results:* Out of a total number of 57,093 reports on cases of poisoning, concerning liquid products and substances 472 cases were due to partly serious aspiration / pneumonia (330 cases with paraffine- / petroleumdistillate- / kerosene - containing lamp oils / grilllighters, 30 cases with solvent petroleum containing insectides, 26 cases with detergent-containing cleaners and other). Out of the total cases we could not document cases with petrol, diesel, solvents, edible oil and other hydrocarbons. *Conclusion:* Based on reports by German physicians (1990-2008) enclosing cases of the BfR Lamp Oil Study (2000-2006), we think a real aspiration risk is only associated with ingestion involving paraffine-, petroleumdistillate-, kerosene- and detergent-containing liquid products and substances. Basing on these figures on human ingestions only distinct hydrocarbons carry a risk of aspiration and not the group in general.

197. Prolonged Acetaminophen Absorption Secondary to a Possible Pharmacobezoar

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Introduction: Acetaminophen (APAP) is typically rapidly absorped after ingestion. Though several case reports have described prolonged absorption and half-life secondary to possible pharmacobezoar formation, no radiographic or endoscopic evidence of an APAP pharmacobezoar has been reported. We report a case of Tylenol PM^R ingestion with markedly decreased rate of absorption in the setting of a possible pharmacobezoar as seen on abdominal x-ray. *Case:* A 29 year-old previously healthy man was found unresponsive with an open bottle of Tylenol PM^R. He was intubated and brought to the emergency department with the following vital signs: heart rate of 110bpm and blood pressure of 110/80mmHg. Initial plasma acetaminophen level was 318 mcg/mL, AST/ALT were 54 and 60 IU/L, INR was 1.4, and arterial pH was 7.31. An EKG revealed a right bundle branch block with a QRS duration of 140 milliseconds (ms) and QTc of 450 ms. Intravenous sodium bicarbonate and N acetyl-cysteine (NAC) were started and the QRS duration narrowed to 84ms. Plasma acetaminophen level peaked at 714 mcg/mL 22 hours after presentation. An abdominal x-ray 28 hours after presentation revealed displacement of the nasogastric tube, suggesting a pharmacobezoar in the stomach. Post peak plasma APAP levels showed a slow decline. CVVH was initiated approximately 51 hours after presentation with minimal effect in APAP removal or improvement of clinical course. Hepatic failure ensued despite continued NAC therapy and he patient died 61.5 hours after presentation. *Discussion:* We provide the first radiographic evidence of pharmacobezoar formation following APAP ingestion. Concurrent anticholinergic toxicity likely contributed to the delayed absorption and possibly bezoar formation. Further, the prolonged, continued absorption resulting in markedly elevated APAP levels suggests that more aggressive decontamination was indicated. *Conclusion:* APAP Pharmacobezoar formation should be considered with prolonged APAP absorption. The potential for delayed rise may warrant serial APAP levels. Aggressive decontamination measures may be indicated in these cases.

CVVH results

Time (hours): From Initial ED Presentation	Verapamil Plasma Levels (mcg/ml)*	Verapamil Ultrafiltrate Levels (mcg/ml)
21	0.92	
24.5	1.0	
28.5	0.73	0.46
30.5	0.55	0.29
38.5	0.82	0.33
44.5	0.8	0.24

*Verapamil Therapeutic Plasma Levels: 0.09 –08211; 0.35 mcg/ml

198. Hyperinsulinemic Euglycemia, Continuous Veno-Venous Hemofiltration, and Extracorporeal Life Support for Severe Verapamil Poisoning: Case Report

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Background: Novel approaches to the treatment of calcium channel blocker (CCB) poisonings are currently under investigation as often times treatment is refractory to initial standard of care. We report a case of verapamil toxicity for which hyperinsulinemic euglycemic (HIE) therapy, continuous veno- venous hemofiltration (CVVH), and Extracorporeal membrane oxygenation (ECHMO) was utilized. *Case report:* A 15-year-old female with past medical history significant for Tetrology of Fallot presented to the emergency department (ED) with a 3rd degree heart block apparently due to an intentional overdose of 35 sustained-release verapamil 120-mg tablets. Patient went into cardiac arrest and was successfully resuscitated. Post-resuscitation, the patient remained hemodynamically unstable despite calcium and vasopressor therapy. In addition, intravenous fat emulsion (IFE) was tried; however, did not yield significant hemodynamic improvement most likely due to suboptimal dosing. HIE therapy was titrated to 3 units/ kg/hr of regular insulin and 30% dextrose with improvement in heart rate from 47/min to 81/min within 16 hours; however, mean arterial pressure did not improve. ECHMO with CVVH was initiated in an attempt to remove any free fraction verapamil. The patient made a full recovery. *Case discussion:* During shock, the myocardium's primary energy source is through carbohydrate oxidation of which HIE therapy is felt to make available. Verapamil is not known to be amenable to hemodialysis; however, in an overdose, we suspected that free fraction may high enough to be cleared through high-flow CVVH. *Conclusion:* HIE and ECHMO may be considered in a CCB toxic patient who is refractory to conventional modalities. We found that high-flow CVVH was able to remove verapamil from the plasma.

199. Using Technology To Harness and Organize Expertise in the Development of Health Education Materials: How a Wiki Can Help You Collaborate

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No materials were available for lead poisoning prevention educators to use with at-risk consumers on the topic of lead in imported Mexican candy. A grant provided funding to create a line of education products that would be collaboratively built by consumers with the input of a vast array of health educators. Materials had to be consumer-friendly and satisfy the content and usability needs of educators and organizations on small budgets. Collaboration with a vast array of educators and experts

in the field was imperative and the challenge was to find a way to gather input from over 50 people on all aspects of research, content development and design.

A wiki was created to manage content development and allow the exchange of feedback between all participating educators and experts. A wiki is a collection of web pages designed to enable anyone with access to contribute or modify content at any time. Lead poisoning prevention staff, childhood providers, and other stakeholders across the country participated. Numerous versions of text, images, and colors were evaluated and discussed through the wiki. All content, language, colors, images, and layout were reviewed multiple times through the wiki. Stakeholders were able to see each other's edits and comment.

A group of materials to use in lead prevention efforts where imported Mexican candy may be a contributing factor in childhood lead exposure. Materials include teaching tools for consumers, retailers and health care providers. A minority of participants experienced difficulty adapting to new technology for writing, editing and sharing content; the majority reported ease of use with the wiki. This tool allowed for collaborators to stay involved in the development of materials and provide and share feedback.

Using a wiki to collaborate on health education materials is an innovative and successful method to ensure stakeholder engagement and ownership. It provides an opportunity to be part of the development process and creates buy-in that results in greater use of materials. Since the projects completion, county lead prevention programs have incorporated materials or content into their curricula.

200. United Kingdom Poisons Information Database (UKPID) – A Centralised National Database

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Background: The UK National Poisons Information Service records all telephone enquiries on a database that has been specially designed for the purpose. Historically this information was held separately by the unit taking the enquiry. *Method:* In July 2007 the UK implemented a centralised database that is considered unique - the UK being the only country where all national poisons enquiry data are held together in one place. This innovative database contains detailed information in clearly defined and nationally agreed data fields. It has a number of important functions depending on the requirements of the user. It gives real time access for staff involved in the management of a specific patient through a web-based interface, irrespective of where the enquiry is answered. Since enquiries to the National Poisons Information Service are case specific, it is a requirement that patient details and all information relevant to the case are recorded, together with any management advice that is provided. When necessary other Poisons Units can access, but not alter, the database via a secure website. Details regarding the exposure, symptoms and advice given prior to their involvement is available to each Poisons Unit, thereby ensuring continuity of care for specific individuals. The database also allows the extraction of specific and anonymised data in a range of different outputs, tailored to the specific requirements of the user. This is useful in a research context and also in identifying trends in poisoning. For example, defined subsets of data can be extracted, manipulated and then subsequently exported for analysis or graphical representation. *Results:* The database was implemented across the UK in July 2007 and is used successfully for accessing data in real time when required and providing reports on poisoning trends. *Conclusion:* The introduction of a comprehensive national database has facilitated individual patient management and the development of a truly integrated National Poisons Information Service. It has the potential to be a powerful tool for poisoning surveillance within the UK.

201. Bactrian ("Double Hump") APAP Pharmacokinetics after Overdose

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Recently, several cases of acute apap OD have resulted in the [apap] increasing, then decreasing as expected, followed by another increase to a 2nd peak. We reviewed the literature describing these double peak pharmacokinetic cases to identify common characteristics, etiologies and predictability. *Methods:* with keywords "acetaminophen" and "pharmacokinetics" limited to humans. NACCT abstracts 2005–2008 were reviewed searching for "acetaminophen" in the keyword index. *Results:* 264 articles reviewed; 3 cases found. 3 abstracts were also identified. 2 unpublished cases were added for 8 cases total. 6/8 cases had co-ingestions of antimuscarinics, benzodiazepines or opioids (unclear in 1 abstract; unlikely in 1 case). Ingested apap amount was 26–100g(mean 61g). The 1st peak [apap]s were 170–584mcg/dL (2–41h after presentation. The nadir[apap] ranged from 33–386mcg/dL(10–65h), dropped a mean 45%. The 2nd [apap] ranged from 133–562mcg/dL(14–75h), a mean increase of 229%. Liver injury occurred in 6/7 cases, with peak AST of 1153–6000 IU/L (41–120h). In 3 cases, NAC was inappropriately stopped after 21h and was associated with liver injury and delayed rise in AST (peak 120h after ingestion). *Discussion:* Most cases, but not all, had co–ingestions. The time to peaks and peak values showed no definitive pattern. All cases of double hump pharmacokinetics were large ingestions(mean 61g). NAC was inappropriately stopped in several of these cases, with subsequent liver injury with delayed AST peaks(5d). *Conclusion:* Bactrian(double hump) pharmacokinetics may be associated with large apap ODs, co-ingestions, and may be associated with liver injury and delayed AST peak.

202. Chaos to Stability: Innovative Delivery of Drug Identification Services

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Background: The Cincinnati Drug and Poison Information Center (DPIC) experienced unprecedented growth in demand for drug identification (Drug ID) services between 2000–2007, resulting in a request every three minutes by 2008. Such demand stressed DPIC's ability to respond to emergency situations without interruption and prevented cost effective use of its licensed poison specialists. Our objective was to design a system capable of regulating Drug ID requests based on available staffing resources. *Method:* Prior to June 2008, all incoming calls were triaged by a live staff member within three ring cycles. System redesign incorporated four primary features: 1. Electronic Triage: A phone tree was used to prioritize calls prior to the point of service, including an 'opt-out' function for immediate assistance. 2. Call Regulation: Drug ID requests were routed to a single work station, prioritized below more urgent calls and paced to facilitate timely documentation. 3. Rotating Pharm-D interns were utilized to manage Drug ID requests and 4. Procedures were implemented to minimize the risk of Drug ID callers bypassing the 'system'. Patient and family focus groups were used to measure overall system effectiveness and ease of use. *Results:* Our primary outcome measure evaluated the percent of time that Drug ID requests did not cause overall call volume to exceed five calls per hour per staff member. Prior to implementation, the system failure rate was greater than 50 percent (average 53%, range 49–59%). Upon full system integration, failure rates dropped below 10 percent with a projected savings of $95,000 in personnel costs. Additionally, the number of Drug ID calls managed by certified poison specialists decreased over 100 percent - better matching resources to services. Customer and staffing satisfaction survey scores were also noted to improve from pre-implementation levels. *Conclusions:* Described is an innovative blend of resources and technology that has taken our system from a state of chaos (failure rate > 50%) to level two reliability (failure rate < 10 percent) with improved customer satisfaction and reduced costs.

203. A Rare Clopidogrel Death in a Multidrug Suicide Attempt

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Background: Clopidogrel, the 2nd most prescribed drug in the world (25 million Rx 2007) is an anti-platelet drug, licensed for the prevention of ischemic events in patients w/myocardial infarction(MI),stroke or vascular events at further risk for blood clots. Gastrointestinal, and intracranial bleeding, atrial fibrillation and heart failure have been reported in overdose. Clopidogrel exposures and fatalities are not well described. Tess and PCC data suggest this is a safe drug with rare deaths. A Medline search revealed limited information on clopidogrel exposures. We report a fatality involving clopidogrel and other medications. *Case:* A 54 yo female ingested metoprolol extended release 25 mg tablet, unknown quantity of clopidogrel (Plavix ®) 75 mg tablets, 1 tablet of diazepam (Valium ®), 1 tablet of 250 mg carisoprodol (SOMA ®) as a suicide attempt. Transported via EMS to HCF; PCC called en route. Pt in sinus bradycardia & hypotensive (BP 61/22). Labs:Urine tox+ benzodiazepines. Chem 7 Na 130, CO2 16, Glucose 372, BUN 21, Creat 1.5, Ca 5.7, T.protein 3.8, Albumen 2, PT 14.8. PCC advised risk of bleeding, and also recommended glucagon: 5–10 mg bolus followed by a glucagon drip. HCP reported Pt started bleeding from IV sites, remained hypotensive. Abd CT revealed a large amount of blood within abdomen. Patient subsequently expired. *Discussion:* Patient admitted taking a "large amount" of clopidogrel. Mechanism of action is inhibition of ADP-induced platelet aggregation acting ultimately on glycoprotein GPIIb/IIIa complex. TESS & PCC report few deaths from clopidogrel. Adverse effects are uncommon; usually involve bleeding. Deaths mostly involve multidrug ingestions, & therapeutic error. Suicides using clopidogrel remain uncommon. This fatality involved multiple drug ingestions, most affecting the cardiovascular system, caused significant bleeding & hemodynamic collapse. Recent studies involving stent and cardiovascular surgery patients have revealed an increased risk of bleeding. This case illustrates life threatening manifestations can develop from taking an excessive amount of clopidogrel. Health care providers of acute overdoses involving clopidogrel should aggressively monitor for visible and internal bleeding.

204. Tramadol: Non-Narcotic or Opioid?

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Background: Tramadol abuse has been reported from several countries. Observationally, calls to poison centers related to tramadol, particularly abuse of tramadol, are increasing. This study aims to evaluate impact of tramadol utilizing post-marketing surveillance techniques. *Methods:* NPDS data including every opioid exposure from 2000 through 2007 was obtained. Extracted data were entered into a SQL Server database with a multidimensional analytic architecture for analysis. Cases with tramadol as first opioid coded were identified (so each case represents a unique individual, not exposure). Information and trends assessed included (1) tramadol calls (2) tramadol calls as a percent of total pharmaceutical calls (3) tramadol as a percent of calls related to prescription opiates (4) abuse and intentional misuse as a percentage of all tramadol calls and (5) tramadol by significant clinical effect. *Results:* 42138 unique calls came in where tramadol was the first named opioid. Tramadol calls rose 155% over the 8 years of

the study. In the same period, pharmaceutical exposures to the NPDS database rose 30.5% (by least squares trend line). As a percent of all opioid related calls tramadol calls rose 43%. 1441 of 17,058 (8.4%) of teens and adults evaluated at a healthcare facility following an exposure to tramadol as the only agent were known to experience a related seizure. All 87 deaths were in these age groups. 13% of tramadol related calls were coded as abuse or misuse (rising from 11.1% to 14.8%) 99% of intentional abuse and misuse cases occurred in teens or adults. Tramadol has an impact on children as well—11% of all tramadol cases (4706) were in children < 6years exposed unintentionally. The number of children exposed per year more than doubled over the 8 year period (from 409 to 953), but was a stable portion of tramadol calls. *Conclusion:* Overall, tramadol exposure, particularly abuse and misuse, has increased significantly. A majority of cases are evaluated at a health care facility. This "non-narcotic" opioid is behaving more like a narcotic in this post marketing survey.

205. Pediatric Buprenorphine/Naloxone Poisoning: A Case Series

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Buprenorphine/naloxone (Bup/nx) is a newer treatment for opioid addiction. Buprenorphine is an opioid with less euphoric effects than other opioids and theoretically less abuse potential. In addition, Bup/nx has a long half life (~ 37 hours) and has been reported to require large doses of naloxone for reversal of poisoning. We present a case series of three pediatric patients with accidental Bup/nx ingestion.

Case 1: A previously healthy 2 year old 12.7 kg male ingested an unknown amount of his father's Bup/nx 8mg/2mg tablets. He presented to the ED 30 minutes after ingestion and was found to be awake and alert with normal respiratory effort. One hour after arrival the patient began to develop hypoventilation and altered mental status. He was given 2 mg of naloxone with clinical improvement and required an additional 2 mg over the next hour for recurrent symptoms of hypoventilation and drowsiness. He was then started on a naloxone drip at 2 mg/hr. The patient continued to exhibit signs of opioid toxicity until about 12 hrs post ingestion. The naloxone infusion was continued for a total of 33 hours for a total dose of 50mg.

Case 2: A previously healthy 3 year old 21.2 kg male ingested 1 tablet of Bup/nx 2mg/0.5mg. Approximately 30 minutes after ingestion the patient was noted to be drowsy and the pill bottle was found opened. He presented to the ED where he received 2 mg of naloxone with improvement in mental status. He was transferred to a pediatric ICU for further observation. He did not require any additional naloxone and was discharged 14 hours post ingestion.

Case 3: A previously healthy 14 month old 8.7 kg male ingested an unknown amount of his father's Bup/nx 8mg/2mg tablets. He presented to the ED 30 minutes after ingestion with decreased level of consciousness. He was given a dose of naloxone 0.8 mg and transferred to a pediatric ICU for further observation. He did not require any additional naloxone and was discharged 27 hours post ingestion. *Conclusion:* Bup/nx is a newer treatment for opioid toxicity with a long half life. We present a pediatric case series of accidental Bup/nx ingestion illustrating the clinical course of buprenorphine poisoning. These patients may require prolonged observation and treatment.

206. Lethal Serotonin Syndrome Associated with Ondansetron Administration

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Introduction: Activation of serotonergic receptors is a recognized cause of serotonin syndrome but is also hypothesized to contribute to malignant hyperthermia. The following is a case of a child with a known muscular abnormality and susceptibility to malignant hyperthermia (MH), who died from apparent serotonin syndrome after receiving a therapeutic dose of the serotonergic antagonist ondansetron. *Case Presentation:* A 5 year-old male presented to the ED with vomiting and abdominal pain. He was born at 34wk by uncomplicated vaginal delivery with a homozygotic twin; he had unilateral ptosis and undescended testicle. During orchiopexy at 3yo, he received sevoflurane and developed malignant hyperthermia (MH) treated with Dantrolene. Genetic study for mutations in the ryanodine *RYR1* gene found a single *RYR1* new variant at the heterozygous level localized in exon 87: Arg3983His (c.11948G > A) that was responsible for the patient's susceptibility to MH. The mutation was also present in the monozygotic twin brother. His vital signs and physical exam in the ED were normal. He received 2 mg ondansetron in the ED and tolerated oral fluids prior to discharge. Four hours after receiving ondansetron, he returned to the ED with a body temperature of 40.0 C, increased muscle tone, pH 7.33, and K 15meq/L. He died after CPR failed to reverse asystole. *Discussion:* We report a case of potential serotonin syndrome in a child with RYR1 mutations and a history of MH. A relationship between serotonin receptors and MH has been theorized. First, serotonin syndrome has been observed in MH-susceptible pigs receiving 5HT2 agonists. Second, serotonin syndrome has been prevented in these animals by treatment with 5HT2 antagonists who received inhalational anesthesia. Ondansetron, a 5HT3 antagonist, may divert sufficient serotonin to 5HT2 receptors to trigger serotonin syndrome. Ondansetron should be avoided in MH-susceptible persons.

207. Fatal Metoprolol-Donepezil (Aricept®) Interaction

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Background: Acetylcholinesterase inhibitors (AI) may enhance the effects of Beta-Blockers (BB). We report a patient who presented with severe hypotension, bradycardia, and hypoglycemia after allegedly taking extra doses of donepizole by mistake, along with her regular dose of a BB, that resulted in her demise. The post mortem blood levels were therapeutic for the BB and above the therapeutic range for donepezil. This is the first death reported from the combination of a reversible centrally acting AI which may have enhanced the CV depressant effects of a BB. *Case:* A94 yr old female presented comatose with a BP of 60/palp, HR 24 bpm and glucose of 17. She had been chronically taking 5 mg of donepezil and 50 mg of metoprolol daily. She became confused and took a few extra doses of the donepezil PTA. Abnormal labs were: K 5.8, CO_2 9, glucose 218, BUN 34, Cr 2.1, anion gap 33, t. bili 2.4, AST 463, ALT 227, PT 30 sec, INR 2.8. Management consisted of100% oxygen, IV dextrose, atropine, IV infusions of glucagon, dopamine and a transcutaneous pacer. Although her BP increased to 113/40 and HR to 55 bpm, on day 2 she succumbed to a CPA. A donepezil blood level of 210 ng/ml (therap. 30–75 ng/ml) and metoprolol level of 0.035 mcg/ml (therap 0.035–050 mcg/ml) drawn on day 2. No autopsy was performed. *Discussion:* Donepezil is a synthetic central acting AI that has been used clinically for Alzheimer's disease since 1997 in dosages of 5–10 mg daily. OD with AI can result in cholinergic crisis characterized by bradycardia, hypotension, respiratory depression, collapse and convulsions. Metoprolol is a $beta_1$-selective adrenergic blocking agent used for hypertension in dosages of 50–100 mg daily. Several case reports have described the development of severe bradycardia and hypotension in patients taking BB when administered with an AI as a reversing agent for neuromuscular blockade. This is the first case report of a patient who died from enhanced cardiovascular effects of a BB induced by donepezil. *Conclusion:* This case illustrates that life threatening manifestations can develop from taking an excessive amount of an inhibitor of a central acting acetylcholinesterase such as donepezil in combination with a beta blocker.

208. Survival of Amanita Virosa Poisoning Treated with Plasmapheresis

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Background: Amanita species are the most lethal mushroom poisoning, with mortality reported as high as 53% in children below age 10. There is no specific antidote and treatment has historically included supportive therapy, thioctic acid, silybinin, penicillin, N-acetylcysteine and cimetidine. Detoxification techniques, such as plasmapheresis, have been used with variable efficacy. *Case report:* A 12 month-old male ingested a mushroom from the yard of his home. Six hours later, he developed vomiting and irritability. After a seizure in the emergency department of a local hospital, he was admitted and treated supportively for presumed gastroenteritis. He was transferred to a tertiary care pediatric hospital due to elevated liver function tests and worsening mental status. On arrival to the ICU, ingestion of *Amanita virosa* was identified with specimens brought in by family members and consultation with a mycologist. Lab analysis showed ALT = 11,864 U/L, AST = 15,863 U/L, INR = 7.5 and a serum lactate 28.2 mg/dL. He received cimetidine, high-dose penicillin, N-acetylcysteine and supportive measures while awaiting liver transplantation. On day two, he developed obtundation, ARDS, ascites and hypotension requiring pressors. His serum ammonia increased to 62 mmol/L and a urine assay for amatoxins was positive (UC Davis Veterinary Lab). Since he was no longer a transplant candidate, plasmapheresis was performed from day 4 to day 10. He was noted to have gradual clinical improvement beginning day 13. He was transferred out of the ICU on day 34 after a complicated course, and discharged from the hospital on day 44 with no major neurological sequelae. *Discussion:* Although plasmapheresis is a not a proven therapy for amanita poisoning, there are reports in the literature associated with improved outcome. Plasmapheresis is thought to remove protein-bound amatoxins, toxic metabolites, and immunomodulatory factors. *Conclusion:* We report a case of survival from severe poisoning with *Amanita virosa* treated with cimetadine, high dose penicillin, n-acetylcysteine and plasmapheresis.

209. Facial Dyskinesia in a Child Following Ingestion of Modafinil

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Background: Modafinil is a CNS stimulant drug used for improving wakefulness in patients with excessive daytime sleepiness associated with narcolepsy. The exact mechanism of action is unclear. The stimulant effects are believed to occur by decreasing GABA-mediated neurotransmission. Modafinil also causes an increase in extracellular dopamine without increasing dopamine release by binding to the dopamine reuptake sites. We report the first known pediatric case of oral-facial dyskinesias related to modafinil ingestion. *Case report:* 2 yo child had ingested a 200mg modafinil (Provigil ®) tablet. One hour after ingestion, the child presented to the ED with the restlessness, facial dyskinesia and tachycardia. The Poison Center was called and recommended a dose of activated charcoal and use of benzodiazepines. Despite a dose of activated charcoal and a dose of midazolam, symptoms persisted. While in the ICU, the patient was given 12.5 mg of diphenhydramine and lorazepam. The restlessness subsided but the dyskinesia continued. After 17 hours of ICU observation, the symptoms completely resolved, and the child was subsequently discharged home. Upon poison center follow-up several months later, the child was

well, without noted sequelae. *Conclusion:* Modafinil is an FDA approved medication for daytime sleepiness associated with narcolepsy. This is the first reported case of a child who has developed oral-facial dyskinesia following the ingestion of modafinil.

210. Management of Paediatric Poisoning at a Referral Hospital in Zimbabwe

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Background: Acute poisoning is an important cause of morbidity and mortality in children especially in the developing countries. Despite its significant contribution to childhood injury few studies have been reported from the developing world. In Zimbabwe published work on acute childhood poisoning has focused mainly on the epidemiological trends, with little information on the management of the poisoned patient. Thus limited information is available on the appropriate management of the poisoned child in Zimbabwe and as such there is no baseline data for audit and evaluation of the management. This paucity of publications necessitated this study on the management of paediatric poisoning in Zimbabwe. Objective. *Methods:* A retrospective review of case notes for all poisoning admissions of children 15years old and youngerfor the period January 2003 to December 2005. *Results:* A total of 115 cases were reviewed. Distribution of cases according to age was as follows; 0–5yrs (30.4%), 6–11yrs (11.3%) and 12–15yrs (58.3%). The main agents involved in child poisoning were pesticides (51.3%), Pharmaceuticals (18.26%), Animal envenomations (15.65%), Household chemicals (8.70%) and others (5.12%). Emergency care measures instituted included antidote use (46.09%), circulatory support (35.65%), gastric lavage (33.91%), single dose activated charcoal (12.17%) and emesis (2.61%). Vital signs monitored were temperature (93.04%), blood pressure (61.74%), pulse rate (86.96%), respiratory rate (75.65%). The mean stay in hospital was 2.04days (SD 1.34). Only on e death was recorded for the study period. *Conclusion:* The major toxicant class in children was pesticides. Emergency management mainly consisted of antidote use circulatory support. Clinical evaluation extensively employed monitoring of vital signs, temperature, pulse and minimal use of laboratory tests. Gastric lavage was the GIT decontamination that mostly used. Atropine was the mainly used antidote due to the High incidences of Pesticide poisoning. Patients were hospitalised for a relatively short period.

211. Subacute Selenium Toxicity from a Nutritional Supplement

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Background: Selenium (Se) is an essential trace element, but can be toxic in larger amounts. In May 2008, US FDA reported 201 individuals with adverse reactions to liquid nutritional supplements containing excess Se and chromium (Cr), distributed by Total Body Essential Nutrition of Atlanta, GA. *Objective:* To describe the clinical features and estimated total Se ingested by 8 patients with Se toxicity who presented after use of Total Body Formula Peach Nectar liquid supplement. *Discussion:* The adult Recommended Daily Allowance (RDA) for Se is 55 mcg. Since daily Se intake in the US is >80 mcg/day, routine Se supplementation is not recommended in the US. Two recent meta-analyses showed inconclusive evidence whether daily Se prevented cardiovascular disease or decreased mortality. Based on the analysis of this product, our cases ingested approximately 24 mg/day of Se (400x the US RDA) and 1.8 mg/day of Cr. In spite of high ingestion of Cr, none of our cases manifested clinical features of Cr toxicity (gastrointestinal hemorrhage, pancreatitis, hemolysis or renal failure). *Conclusion:* Subacute Se toxicity may manifest within 1 week from initial ingestion.

Case report

Age/Sex	Estimated Dose (mg)	Days of Exposure	Blood Se (mcg/L)	First Symptom/ Onset (Days)	Main Symptoms
40 y/M	576	24	732	Muscle aches(<7)	Diarrhea, abd pain, alopecia, onycholysis, memory & sensory abnormalities
38 y/ F	576	24	318	Alopecia (7)	Diarrhea, abd pain, gen. hair loss, onycholysis, memory & sensory abnormalities
16 y/ M	576	24	391	Nail changes (7)	Diarrhea, alopecia, onycholysis, memory changes
59 y/ M	1441	60	300	Diarrhea (<7)	Diarrhea, alopecia, onycholysis, memory changes
56 y/ F	1441	60	524	Diarrhea (<7)	Diarrhea, gen. hair loss, onycholysis, memory changes
45 y/ F	1153	48	150	Alopecia (<7)	Nausea, Constipation, alopecia, onycholysis
51 y/ M	432	56	660	Malaise (<7)	Diarrhea, abd pain, alopecia, onycholysis, memory changes
48 y/ F	240	10	264	Alopecia (7)	Foul breath, metallic taste, alopecia, onycholysis, memory changes

Alopecia, finger nail changes and GI symptoms were the most common findings seen in our case series. Ingestion of 1.8 mg/day of Cr did not result in clinical effects.

212. Ototoxicity of Prescription Opioids

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Introduction: Hydrocodone has been reported as a potentially ototoxic drug. The objective of our study was to evaluate the correlation between prescription opioid use and ototoxicity, reported as tinnitus or deafness in poison center cases. *Methods:* Poison center cases reported to the RADARS® System (2003–2006) for fentanyl, hydrocodone, hydromorphone, methadone, morphine, oxycodone and tramadol (2006 only) were evaluated for ototoxicity using the codes for deafness or tinnitus. The notes field was also searched for the terms tinnitus, tinnitus, deaf and hearing loss. Identified cases were excluded if there was coingestion of an aminoglycoside, aspirin, furosemide, salicylate, quinine, or quinidine. Confirmed non-exposure, animal cases, or charts lacking a 3-digit ZIP code were also excluded. Data were then normalized by the Unique Recipients of Dispensed Drug (URDD) to evaluate frequency of each complication per recipient of the drug. *Results:* Reported cases of tinnitus were; fentanyl 2, hydrocodone 57, hydromorphone 1, methadone 15, morphine 3, oxycodone 29, tramadol 6. Cases included in the study group; fentanyl 1, hydrocodone 25, hydromorphone 1, methadone 9, morphine 2, oxycodone 17, tramadol 2. The reported cases of deafness and hearing loss were; fentanyl 7, hydrocodone 10, hydromorphone 0, methadone 8, morphine 1, oxycodone 5, tramadol 2. Cases included in the study group were; fentanyl 6, hydrocodone 6, hydromorphone 1, methadone 6, morphine 1, oxycodone 3, tramadol 1. *Conclusions:* The overall rate of opioid-associated ototoxicity reported to poison centers is extremely low. When present, methadone had a significantly higher rate of reported ototoxicity compared to other prescription opioids. Further research is warranted to elucidate factors that impact ototoxicity and opioid use.

Normalized Results from RADARS® System

	Tinnitus/ 10,000,000 URDD	Hearing loss / 10,000,000 URDD
Fentanyl	20.24	121.42
Hydrocodone	19.88	4.77
Hydromorphone	0	0
Methadone	282.23	188.15
Morphine	45.09	22.54
Oxycodone	42.76	7.55
Tramadol	21.17	10.59

213. Use of a "Single Bag" System for Intravenous N-Acetylcysteine at a Children's Hospital

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Background: Intravenous n-acetylcysteine (NAC) is FDA-approved for acetaminophen (APAP) poisoning as an infusion of three different NAC concentrations for three different time periods. This has led to provider confusion, interruptions in therapy, and has complicated patient-tailored duration of therapy. After a death associated with NAC overdose, our hospital chose to utilize a "one bag" protocol using a single concentration of 3% NAC. We report one year of experience. *Methods:* The pharmacy database at a children's hospital was reviewed for i.v. NAC given during 2008. Subject recruitment was confirmed by cross-check with a regional PCC database. The study hospital prefers oral NAC, but allows i.v. NAC for vomiting, unconscious, or late-presenting patients, and for patients transferred in after initiation of i.v. NAC. Charts were abstracted for demographics, indication for NAC, total dose and volume infused, interruptions in NAC infusion, peak recorded AST, minimum serum Na, and reports of adverse drug events. Treating medical staff were surveyed electronically for anecdotes of adverse events or administration problems. *Results:* A cohort of 15 subjects (9 female, 6 male) was identified. 14 were treated for APAP overdose; 1 for non-APAP liver failure. Age range was 5 to 18 years (median = 16 years). The duration of i.v. NAC therapy ranged from 18 to 136 hrs. 4 of 14 APAP overdose patients, all "late-presenters," developed an AST > 1000 U/dL; none required liver transplantation. No clinically significant hyponatremia was noted. No unintended NAC interruptions occurred, and no adverse events were reported. *Discussion:* After years of off-label use of inhalational NAC i.v. as a 3% solution, our hospital now gives i.v. NAC off-label as a single concentration. The aim is to simplify drug prescription and preparation, reduce dosing errors and

interruptions, and to facilitate patient-tailored duration of therapy. This data is limited by low sample size derived from a single institution, but is an important start to evaluating this process. *Conclusion:* Our hospital had a good experience with a "1-bag" NAC protocol. Further safety and efficacy data may make this protocol an acceptable alternative in other clinical settings.

214. Agents of Opportunity in the Healthcare Setting

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Objective: Agents of Opportunity (AO) are agents of any class (biological, chemical, pharmaceutical, and radiological) that are vulnerable to diversion from intended use to malicious action (harm, psychosocial impact). The purpose of this study was to determine what agents available in academic medical centers (AMCs) are of concern as an AO possibly for use against the healthcare system. The AO equation: agent + dissemination mode = AO developed by the AO Study team led to clear identification of AOs. *Methods:* As a substudy of a larger Department of Defense grant, a survey was sent to 621 employees (nominated by supervisors) at 4 AMCs within one system and interviews were conducted with employees from all fields (clinical, maintenance, engineering, etc.) for nominations of possible AOs. Nominated agents must exist within the medical center and those on the CDC's Select Agent Class A list were excluded. These nominations were then discussed and debated by local expert panels and the list was narrowed to those with the greatest potential for use (e.g., access, quantity, dispersability), dissemination (i.e. the AO equation), and consequence (e.g. harm, psychosocial impact). These agents were then used to develop threat mitigation scenarios in another substudy of the grant. *Results:* A total of 109 AOs were nominated by 89 survey respondents and 102 interviewees. These consisted of: 22 biological, 48 chemical, 23 pharmaceutical, and 16 radiological AOs. The experts narrowed this list to: 7 biological, 10 chemical, 7 pharmaceutical, and 4 radiological AOs. The biological AOs included multiresistant bacteria, gastroenteritis producing bacteria, pulmonary viruses, and blood borne illnesses. The chemical AOs included cyanide salts, toxic alcohols, CO, and asbestos. The pharmaceutical AOs included long-acting or potent opioids, chemotherapy agents (e.g., cisplatin, cyclophosphamide), and inhalational anesthetics (e.g., isoflurane, sevoflurane). The radiological AOs included cobalt isotopes and cesium salts. *Conclusions:* Most agents nominated by employees in AMCs were of little concern to local experts. The nominations were narrowed to the AOs of concern, using the AO equation, due to likeliness to cause harm and or psychosocial impact.

215. Neonatal Ethanol Intoxication

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Background: Neonatal ethanol (EtOH) intoxication is infrequently reported. EtOH metabolism may be complicated by the underdeveloped activity of alcohol dehydrogenase (ADH) in neonates. We present a case of EtOH ingestion in a neonate resulting in intoxication and respiratory failure, with an apparent near-normal rate of EtOH elimination. *Case report:* A 26 day-old healthy male (weight 3 kg), born by vaginal delivery at 40 weeks gestation, was brought by his 17 year-old mother to the Emergency Department (ED) after ingesting EtOH. The mother admitted that she had left a water bottle which contained rum in her bedroom; her friend had prepared formula for the baby using the contents of that bottle. The patient reportedly consumed four ounces of the formula. He vomited afterwards; the mother smelled EtOH in the vomitus and immediately brought him to the hospital. In the ED, the patient was initially tachycardic (HR 185/min) and tremulous; a blood ethanol concentration (BEC) was 169 mg/dL. Assays for drugs of abuse, acetaminophen, salicylates, methanol, ethylene glycol, and isopropanol were negative. 1.5 hours after ED presentation, the patient required intubation due to periods of apnea and oxygen desaturation. He was admitted to the Intensive Care Unit where he was noted to have bicycling-type movements of his extremities. The BEC peaked at 202 mg/dL approximately two hours post-ingestion, and decreased to 98 mg/dL six hours later. The patient was extubated the following morning and had an uneventful remaining hospital course. During the course of his hospitalization, he never experienced hypothermia, hypoglycemia, or other electrolyte abnormalities. *Discussion:* The apparent elimination rate in this patient (17 mg/dL/hr) includes a period of tissue distribution and thus overestimates the actual elimination rate. Nonetheless, given the immature activity of ADH in the neonate (estimated at less than 10-20% of adult ADH activity), other pathways likely contributed to the metabolism of EtOH in this patient as well. *Conclusion:* EtOH intoxication in neonates may result in a prolonged duration of symptoms, without metabolic derangements. Neonatal EtOH elimination from a variety of pathways may approach adult rates.

216. Survival Following Intentional Glyphosate/ Surfactant Ingestion Despite the Development of Acute Renal Failure

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Background: Limited data exists regarding the toxicity and management of glyphosate/surfactant poisoning. We present a case of severe toxicity with recovery. *Case report:* A 66 year old schizophrenic male with a past medical history of moderate arterionephrosclerosis, presented to the emergency approximately 5.5 hours after ingesting 7-8 ounces of Roundup® Concentrate (18-25% glyphosate, surfactant 6-8%) Upon presentation, the patient was awake, alert and oriented. Vital signs included: heart rate, 83 beats per minute; blood pressure, 154/100 mmHg; respiratory rate 18 breaths per minute. He was afebrile with oxygen saturation on room air of 96%. His sole complaint was of a sore throat with episodic vomiting which was noted to appear white and frothy. Initial laboratory results were only significant for: serum creatinine (Scr), 1.7 mg/dL. After 24 hours Scr increased to 3.9 mg/dL and serum bicarbonate (HCO3) fell to18 mEq/L. Despite hemodialysis on hospital day 2, renal function and acidosis continued to worsen with a peak Scr, 6.1 mg/dL and HCO3, 16 mEq/L on hospital day 3. Ethylene glycol and diethylene glycol toxicity were excluded via laboratory confirmation. A subsequent renal biopsy showed acute tubular necrosis. Hemodialysis was required for 10 days with improvement in renal function to baseline function over 5 weeks. Mental status and vital signs remained normal throughout his course. Bleeding esophageal ulcers and erosive gastropathy was documented with endoscopy requiring parenteral nutrition which was advanced to a solid diet upon discharge, 43 days after admission. *Case discussion:* Literature cases of intentional glyphosate/surfactant containing product overdose are scant. In all previously reported cases, fatality occurred co-incident with the development of renal failure. We report the first case of glyphosate/surfactant product ingestion resulting in survival after development of acute renal failure. *Conclusion:* Glyphosate/ surfactant products can rarely result in survivable and reversible acute tubular necrosis after acute large overdose.

217. A New At-Risk Population: Suicide Attempts by Poisoning in Patients 40-64 Years of Age

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Background: Death by suicide is rising nationally, and the population experiencing the most rapid rise is the 40-64 year age group, with annual increases over the last 10 years of 2-3% compared to <1% in the general population. The purpose of the study was to determine whether there was a parallel trend for poisoning suicide attempts, and to examine the characteristics of suicide attempts in this age group. *Methods:* We retrospectively reviewed exposures reported to the NJ Poison Information and Education System (NJPIES) from 2000 to 2008. Cases categorized as intentional suspected suicide were included. Demographics and medical information were used to evaluate the patterns of suicide attempts overall and in particular in the 40-64 age group. *Results:* The overall rate of suicide increased from 36.4 to 50.2 per 100,000 people over the nine-year period with an annual increase of 4.7%. The 40-64 age group had the highest rate increase of 10.1% annually from 2000 to 2008. Approximately 60% of these were female. In contrast to the other age groups, this group was more likely to have more than two substances ingested, to be evaluated in a healthcare facility (HCF) and to have a more serious outcome. The most common substance class involved was sedative-hypnotics followed by analgesics. *Discussion:* Suicide rates in patients from 40–64 years are rising nationwide. We discovered a parallel trend in suicide attempts by poisoning. This age group had the highest rate of rise in the last nine years and was more likely to have polypharmacy ingestions of prescription drugs, particularly sedative-hypnotics. This largely unrecognized trend requires further attention and surveillance to guide effective treatment and prevention strategies. *Conclusion:* Although much attention is appropriately focused on the prevention of suicide in younger age groups, there has been a steady rise in the older age group which becomes steeper each year. Primary prevention efforts should include psychiatric and emotional health screening in this group. It is imperative that poison centers are cognizant of this increase and consider all overdoses in this age group as serious suicide attempts.

218. Pattern of Adult Carvedilol Ingestions Reported to Poison Control Centers

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Background: Carvedilol is a nonselective beta-adrenergic blocking agent indicated for the treatment of mild-severe congestive heart failure. There is limited information on adult carvedilol ingestions reported to poison control centers. *Methods:* Cases were all carvedilol ingestions by patients age 20 years or more reported to 6 poison control centers during 2000-2008. Multiple substance ingestions and patients not followed to a final outcome were excluded. The distribution of cases by selected demographic and clinical factors was determined and the mean dose (MD) calculated for those cases where the dose ingested was reported. *Results:* Of a total 70 cases, the dose was reported in 45 (mean 71.3 mg, range 12.5-625 mg). Of total cases, 47.1% were male and 52.9% female. The mean age was 62.7 years (range 26-92 years). The most commonly reported exposure reasons were 71.4% therapeutic error (MD 57.0 mg), 15.7% suspected attempted suicide (MD 261.7 mg), and 7.1% general unintentional (MD 21.9 mg). The management site was 58.6% on-site (MD 39.6 mg), 28.6% already at/en route to healthcare facility (MD 166.2 mg), and 12.9% referred to healthcare facility (MD 80.0 mg). The medical outcome was 68.6% no effect (MD 58.8 mg), 14.3% minor effect (MD 37.5 mg), 14.3% moderate effect (MD 133.5 mg), and 2.9% major effect (MD 250.0 mg). The most frequently reported adverse clinical effects were 14.3% dizziness (MD 50.0 mg), 12.9% hypotension (MD 172.4 mg), 5.7% bradycardia (MD 331.3 mg), and 4.3% drowsiness (no MD reported). The most commonly reported treatments were 27.1% dilution (MD 46.3 mg), 21.4% activated charcoal (MD 171.5 mg), 20.0% IV fluids (MD 183.5 mg), and 15.7% cathartic (MD 181.7 mg). *Discussion:* The majority of patients were managed on-site. Those cases involving healthcare facility management had a higher MD than those managed on-site. Most ingestions resulted in no effect. Those ingestions resulting in moderate-major effects had a higher MD than less serious

ingestions. *Conclusion:* Most adult carvedilol ingestions reported to poison control centers are likely to involved doses that can be managed on-site without serious outcome. Higher doses may result in serious outcomes and should be referred to healthcare facilities.

219. Impact of Hurricane Humberto on Texas Poison Control Center Calls

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Background: After Hurricane Humberto made landfall as a Category 1 hurricane in Texas on September 13, 2007, 4 counties were declared disaster areas. This study examined whether the pattern of poison control center calls from these counties changed during the period immediately after the storm. *Methods:* Data were obtained from Texas poison control centers. The total number of various types of calls received (call volume) during September 13–27, 2007 (the day of hurricane landfall and 14 subsequent days) was compared to a historic range (HR) based on the formula: historic range for 2007 time period = (mean number of calls for corresponding time periods during 2003, 2004, and 2006) +/– 3 standard deviations. If the number of calls in 2007 fell outside of this historic range, then it was considered to be higher or lower than what would be expected. *Results:* The mean daily call volume during September 1–12, 2007 (prior to the hurricane) was 35; the mean daily call volume during September 13–30, 2007 (during and after hurricane landfall) was 39. During September 13–27, 2007, the call volume for total calls was 539 (HR 404–800), total human exposures 260 (HR 162–328), gasoline exposures 5 (HR –2–5), food poisonings 2 (HR –3–4), water contamination 0 (HR 0), carbon monoxide exposure calls 9 (HR 0), drug identifications (IDs) 121 (HR 149–187), and other information calls 158 (HR 33–344). *Discussion:* In the 4 Texas counties that were declared disaster areas after Hurricane Humberto made landfall, the call volume for total calls, total human exposures, gasoline exposures, food poisonings, water contamination exposures, and information calls excluding drug IDs did not differ from what was expected. However, the number of carbon monoxide exposure calls was higher than expected and the number of drug ID calls was lower than expected. *Conclusion:* Poison control centers are likely to receive an increase in certain types of calls, such as carbon monoxide exposures, after a hurricane, although other types of calls may remain unchanged or actually decrease.

220. Massive Venlafaxine Ingestion Resulting in Hypotension and Pharmacobezoar Formation

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Venlafaxine is a nontricyclic antidepressant. Once thought to be as safe as SSRI's in overdose, its mortality actually resembles that of TCA's. Toxicity and complications include seizures, dysrhythmias, serotonin syndrome, rhabdomyolysis, respiratory failure, and coma. We report the 2nd case of a venlafaxine pharmacobezoar, and the first to document CT imaging and endoscopic photography of the pharmacobezoar. We also offer clinical, radiographic, and sonographic criteria for bezoar diagnosis.

A 55 year old female with a history of multiple suicide attempts presented to the ED 6 hours post ingestion of 16 grams of venlafaxine. Though awake and answering questions on arrival, she quickly deteriorated and required intubation. Her venlafaxine level 6 hours after presentation was 17.9 mg/L (range in fatal cases: 6.6–89 mg/L). Over the next 24 hours she developed profound hypotension refractory to multiple vasopressors. Gastric distension developed with attempted lavage, leading to an investigation for possible bezoar formation. CT scan confirmed a 5.5 cm x 6.5 cm x 7.5 cm intragastric mass. After the bezoar was removed endoscopically, the patient's hypotension resolved, and her clinical picture improved temporarily. Unfortunately, she had already suffered severe neurological insult. The family elected to terminate treatment, and the patient quickly expired.

A pharmacobezoar is defined as a mass or concretion of medication and medication vehicles. Risk factors include ingestion of medications known to cause bezoars, altered GI anatomy or motility, dehydration, bowel hypoactivity. Pharmacobezoars are of clinical importance because they can act as repositories for medications leading to continued absorption over a long period of time. There is no clear consensus regarding optimal treatment for pharmacobezoars. Proposed treatment includes gastric lavage, whole bowel irrigation, gastroscopy, pharmacologic treatment and laparotomy. As in this case, bezoars can frustrate attempts at gastric decontamination. Early gastroscopy or imaging should be considered in patients with refractory or persistent hemodynamic instability after venlafaxine overdose.

221. Isolated Mescaline Toxicity Confirmed by GC-MS

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Introduction: Mescaline (MC), from the peyote cactus is a hallucinogen. Prior reports of MC toxicity usually have neither confirmed MC nor excluded coingestants with comprehensive screening. Our experience has been that most pts sent to us claiming MC use had consumed hot cocoa mix purchased on the street. We recently cared for a pt with isolated MC toxicity that was confirmed by GC-MS, allowing us to confidently describe isolated, severe mescaline toxicity. *Case report:* A 16 y.o. Native American girl with hx of hypothyroidism was found "convulsing" and "dry heaving." At an ED VS showed T 37.0, HR 122, BP 127/99, R 24 and 100% sat on O_2. She was agitated, combative and vomiting, with jerking movements of arms. Speech was incomprehensible, pupils dilated & nonreactive, and skin moist and warm. She received diazepam and naloxone before ET intubation and propofol; HR then normalized. Routine lab studies, a UDS for drugs of abuse, head CT & LP were unremarkable but for high TSH. An ingestion was denied by family. However, en route to us a brother admitted she drank 12–16 oz of peyote extract a few hrs earlier – a substance kept in their refrigerator for religious purposes. A comprehensive UDS, including GC-MS, showed a large MC peak, diazepam and propofol. Sedatives were held and she awoke over 16 h, remained confused and unsteady on her feet for several hrs, but confirmed consumption of peyote and recalled only becoming sleepy. By 24 h she was discharged. *Discussion:* MC's hallucinogenic action may result from partial agonism of 5-HT_2 receptors. It's rapidly absorbed and is eliminated via hepatic metabolism and as unchanged drug in the urine. $T_{1/2}$ is ~; 6 h. Pts usually experience vomiting, HTN, tachycardia, sweating and mydriasis before hallucinations. Our pt's syndrome was more severe than typically described, and no other relevant agents were detected. This was the 1st time we have seen a case of MC toxicity confirmed by GC-MS in 26 yrs. Analysis of samples provided by previous pts showed brown powders containing theobromine, caffeine and sucrose. *Conclusion:* Confirmed isolated severe MC toxicity comprised agitation, possible seizures, vomiting, mydriasis, hypertension and tachycardia, with full recovery within one day.

222. Eye Exposure to Live Coral Can Result in Prolonged Conjunctival Injection

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Background: Coral are marine organisms that grow in large colonies. Calcium carbonate is excreted to make a skeleton that forms the reefs typically found in tropical waters. Coral feed by using nematocysts that discharge when contacted by nearby prey. Depending on the species of coral, the nematocysts contain various toxins that can immobilize or kill their prey. Coral are colorful and grow well in salt water aquariums. Aquarium enthusiasts buy and sell pieces of coral. Larger pieces of popular species are cut into smaller pieces, sold or traded and transplanted in a new aquarium to grow. *Case report:* A 31 y.o. man was cutting a piece of live Echinophyllia Coral with a diamond bladed saw when he felt a small fragment hit his right eye. He briefly irrigated the eye with water. Three days later he presented to an urgent care clinic because of persistent pain and redness. His eye was irrigated with 1 liter of normal saline. On examination, lateral conjunctiva was markedly injected but there was no evidence of corneal abrasion or foreign body. He was prescribed gentamicin ophthalmic solution. Six days post-exposure, the patient described the eye as very red with no pain and no improvement noted. Nine days post-exposure the eye was unchanged. Fourteen days post-exposure, examination revealed a superficial corneal lesion and conjunctival injection. Tobramycin with dexamethasone ophthalmic solution was prescribed. Over the next 4 weeks the bright red color in his eye gradually improved. Six weeks after the initial exposure the redness had mostly resolved. The patient never experienced any changes in visual acuity. *Discussion:* Coral venoms have many different toxic properties. Some have hemolytic and antimicrobial activity. Some have been noted to be toxic to fish and mice and others cause tissue necrosis in competing species of coral. Because of the severity and extended duration of conjunctivitis and the lack of any significant abrasion, it is possible that the patient's symptoms were venom related rather than caused by a mechanical injury. *Conclusion:* We report a case of prolonged conjunctivitis after exposure to a fragment of live coral. Symptoms slowly resolved after treatment with antibiotic and steroid ophthalmic drops.

223. The Radiological Emergency Medical Management (REMM) and Chemical Hazard Emergency Medical Management (CHEMM) Programs: Two Critical Information Resources

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Among the many challenges inherent in planning for and responding to mass-casualty incidents, one of the most pressing is the issue of obtaining reliable information, both in the preparedness phase and also in the response phase of the disaster. A little appreciated aspect of disaster information management is the recent confusing multiplication of courses and web sites purporting to provide accurate and relevant clinical information, much of which is contradictory. The Radiological Emergency Medical Management (REMM) program, developed by the National Library of Medicine, is an innovative response to the need to provide not only a dependable source of information but also a user-friendly mechanism for sorting through the information necessary for planning and response involving radiological and nuclear mass-casualty events. It is available online and also as a downloadable program capable of being used in its entirety even if Internet access becomes unavailable during a disaster. The Department of Health and Human Services, in collaboration with the National Library of Medicine, is currently developing the Chemical Hazard Emergency Medical Management (CHEMM) program, a toxicologically based analog of REMM. This presentation will serve as an introduction to REMM and CHEMM, their use, and their relevance to toxicologists and others who may be involved in the clinical response to radiological and nuclear disasters.

224. Minimal Change Disease Associated with Intentional Elemental Mercury Injection

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Background: Injections of elemental mercury (Hg) can have a wide variation of clinical effects from no

symptoms to death. In general, systemic effects are considered uncommon. Nephrotic syndrome has been previously reported in association with mercury injections but is usually a membranous glomerulonephropathy. We present a case of minimal change disease associated with injection of elemental mercury. *Case report:* A 34-year-old male, with a history of schizophrenia and polysubstance abuse presented to the ED with complaints of lower extremity edema, abdominal distention, and increasing shortness of breath over the previous four days. He reported self-injection with elemental mercury which he collected from an old broken thermostat three years before this presentation with unclear intent. Baseline laboratory values during the initial admission showed normal renal function, electrolytes, glucose, acid-base balance, and urine analysis. Two days after admission, the patient's total urine Hg concentration was 3007.6 mcg/L, the whole blood Hg concentration was 203.7 mcg/L, and the urine Hg/creatinine ratio was 1205 mcg Hg/g Cr. At this time, the patient was found to have a urine protein concentration of 3134 mg/dL, a serum protein concentration of 2.9 g/dL, and a serum albumin concentration of 1.1 g/dL. A kidney biopsy was consistent with minimal change disease. The patient was treated by surgical excision of a mercury depot in his antecubital fossa. He was initially started on penicillamine and was lost to follow-up for some time. On return to care he was started on DMSA and his Hg levels decreased to 353 mcg/L (urine), 127 mcg/L (blood), and 526.9 mcg/g Cr (UHg/Cr ratio). *Discussion:* Systemic effects of injected mercury are uncommon because elemental mercury is slowly oxidized in the body to inorganic forms. One previous case of minimal change disease was reported from dermal exposure to inorganic mercury. This is the first reported case of minimal change disease associated with an injection of elemental mercury. The pathophysiology is not completely understood but believed to be secondary to autoimmune causes.

225. Adverse Drug Reactions (ADR) Reported to the National Poison Center Database System (NPDS)

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Background: monitoring of ADR is an important part of post marketing surveillance of prescription drugs. With their staff of highly trained professionals, open public access and 24-hour availability, poison centers (PC) may be an important source of information for collection of reports of ADR. *Method:* evaluation all exposures from 2000-2008 reported to NPDS for 15 separate drugs with the reason for exposure of Adverse reaction – drug. 15 drugs were selected that had been released in the US market after 2000, from a broad variety of drug classes including: erectile dysfunction, atypical antipsychotic, analgesic/narcotic, stimulant, Alzheimer's agent, atypical antidepressant, smoking deterrent, incretin enhancer, direct renin inhibitor and sedative/hypnotic. *Results:* There were 4160 ADR reported with the 15 drugs. The mean and median time from date of drug marketing release to first report of ADR in NPDS was 77 days and 82 days respectively, with a range of 12 days to132 days. The 5 drugs with the highest annual rate of ADR had mean and median time to 1st report of 30 and 24 days, respectively. Continued annual rate of reports of ADR increased 1 standard deviation from annual mean (SD) in 6/15 drugs, decreased in 3/15 and did not change in 6/15 drugs. The caller initiating the report of the ADR was the public in 2985 patients (72%). *Discussion:* ADR in NPDS appeared soon after marketing of the specific drugs, suggesting NPDS may be a sensitive tool for surveillance. The primary source of the reports was the general public. Because the motivation for calling the PC is help or information in managing the effects of the drug, as opposed to "reporting an ADR", public use of PC allows collection of ADR reports from a group not likely to use more traditional avenues (e.g. MedWatch or report directly to company). Such open reporting may significantly improve recognition and tracking of ADR. *Conclusion:* monitoring of NPDS for ADR may offer a new avenue of untapped information and allow for improved post marketing surveillance.

226. Afrin Gargle; a Novel & Dangerous Method To Control Pharyngeal Bleeding

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Background: Oxymetazoline is an imidazoline vasoconstrictor commonly found in topical decongestant medications like Afrin®. Imidazolines cause central and peripheral alpha-2 stimulant effects, producing a clinical syndrome similar to clonidine. Overdose or intoxication from ingestion or excessive mucosal application of oxymetazoline has resulted in altered mental status, miosis, diaphoresis, hypotension, bradycardia, and respiratory depression. *Case description:* A 15 year-old male was admitted to the Intensive Care Unit after developing altered mental status, vomiting, and bradycardia. He presented to the Emergency Department (ED) with pharyngeal bleeding 8 days after an uncomplicated tonsillectomy. While in the ED, he was given a cup of ice with Afrin® nasal spray poured over it. The patient was instructed to gargle with the Afrin® & spit it out. He was told to avoid swallowing it. The patient gargled three times with the cold liquid in the cup, vomiting after the third episode. He was amnestic to further events in the ED and remembers waking in the ICU about 12 hours later. ED and ICU records indicate the patient developed bradycardia (pulse 20-30), altered mental status, respiratory depression, and episodes of apnea. He was not intubated, but required 36 hours of ICU care before resolution of bradycardia and somnolence. He was evaluated by a Pediatric Cardiologist who could not find a cause for the episode. The patient's mother, a registered nurse, became suspicious after researching the side effects of Afrin® and called the Poison Center. Interviews with ED staff confirmed his symptoms began immediately after gargling with iced Afrin®. The medical director of the ED reported the idea came from one of the Otolaryngologists. A Pub Med search of Afrin®, oxymetazoline, imidazoline, and gargle produced no similar cases. A Google search provided a single hit describing the procedure in postoperative instructions from an Ear, Nose, and Throat clinic in Frisco, Texas. Inadequate serum was available to test for oxymetazoline. *Clinical implications:* This case demonstrates a novel, but potentially dangerous, method of controlling pharyngeal bleeding with Afrin® and the vasoconstrictor oxymetazoline. This practice should be discouraged.

227. Using a Broadcast Fax To Notify Health Care Facilities about Trends in Poisoning

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Background: In an attempt to alert our state's health care facilities (HCF) on trends in poisoning, our poison center utilized our computer fax machine's broadcast fax capabilities. The broadcast fax allows us to send a fax to a 'group', in this case all washington state emergency departments. *Method:* A one page alert summarizing the information was dical director, reminded emergency department staff of 24/7 poison center access, the availability of a toxicologist for consultation, and encouraged them to call for any exposure or questions. An email address was also provided it they wished to receive future alerts via email as well. *Results:* Although we had no calls regarding potential poisonings related to the trends addressed in the alerts, we did note an increase of 0.91% in HCF calls, during a time when our overall call volume decreased 0.66%. The alerts appear to be well received by the health care facilities and call center staff reported positive verbal comments made during routine hcf calls. Several emergency department managers requested to be put on the email list. *Conclusion:* Our center found this was a low maintenance, inexpensive, and effective way to keep health care facilities updated on current trends in poisonings. An added bonus was increased poison center utilization. Further monitoring of the process will be necessary to determine if this increased HCF call volume is significant and will continue.

228. Palytoxin Poisoning Following Dermal Contact with Zoanthid Coral

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Background: Palytoxin is most commonly reported after ingestion of seafood. We report the first case of palytoxin poisoning from dermal absorption with local toxicity from zoanthid coral in a patient with intact skin. *Case:* A 25-year-old female handled a zoanthid coral without any barrier protection from home aquarium with plan to replicate coral. After handling she noted metallic taste and perioral paresthesia followed by hives and lip edema. Patient presented to emegency department with hand edema, erythema and pruritis. Vital signs: 138bpm, 145/101, O2 sat 97%. Oropharynx was clear. Urticaria noted on bilateral upper arms, thighs, abdomen, upper chest, and back without evidence of infection or abraded akin. Patient handled same coral previously without reaction but was wearing gloves. Rash treated as hypersensitivity reaction with diphenhydramine, methylprednisoline, and lorazepam 1mg with improvement of symptoms. Vital signs normalized after treatment. Discharged with oral prednisone and diphenhydramine. *Conclusion:* Palytoxin poisoning is most coomon after ingestion of seafood. We present the first case of dermal absorption from intact skin from handling palytoxin from a zoanthid coral resulting in neurologic and dermal effects.

229. Automation and the Hazard of Human Error Results in Unexpected Toxicity during Routine Blood Donation

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Background: An automated donation process has improved the efficiency of blood donation. The effect of the human aspect on this technology resulted in the inadvertent transfusion to a blood donor of a citrate solution that is not intended for intravenous use. *Case:* Paramedics were called to transport a 61 year old plasma donor who was inadvertently transfused with 4 g of sodium citrate in 250 ml fluid that was labeled as not intended for intravenous use. On the scene, EMS observed the patient having over 6 PVCs per minute. On arrival to the ED, the patient presented with facial flushing, hypertension, tachycardia, blurred vision, dizziness, generalized numbness, nausea, and headache. Initial ED vital signs: BP 177/106, HR 102, RR 20, SpO2 97%. The patient had no significant past medical history. He was given two doses of oral lisinopril 10 mg and two doses of hydralazine 5 mg IV to control his hypertension. Brain computerized tomography revealed normal brain scan. Serial ionized calcium levels were monitored over a 24 hour period with no indication of hypocalcemia. On discharge, the patient complained of a mild headache, but all other symptoms resolved. *Discussion:* The patient was monitored for toxicity and any adverse effects that may result from infusion of a product not intended for intravenous use. An individual's repetitive routine and utilization of automatic devices that incorporate a variety of safety functions that include pumps, sensors, and alarms give a false sense of security. The automated donation process is designed to increase efficiency in the harvesting of blood products and to decrease potential adverse effects to the donor. *Conclusion:* The potential for human error is always present. In this case, an infusion of a medication that was not intended for intravenous use resulted in unexpected toxicity.

230. Collaboration between a Poison Center (PC) and Occupational Safety and Health Administration (OSHA)

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Background: OSHA relies heavily on voluntary reporting to identify sites for inspection for potential unsafe workplace conditions. PC receive calls from both the public and healthcare professionals concerning workplace exposures, with more than 48,000 workplace exposures (1.95% of all human exposures) annually. A percentage of these calls may reflect cases of unsafe working conditions responsible for the worker injury. We sought to evaluate the outcome of a collaboration between one PC and state OSHA. *Method:* The poison center reported to state OHSA office all cases of workplace exposure that involved a workplace related toxin and more than a trivial exposure. The PC attempted to identify the workplace location to allow identification of the site for possible direct inspection by OSHA. After evaluating the reports OSHA determined if an inspection was warranted and reported back to the PC the outcome of the inspection. *Results:* The PC provided 107 reports to the state OSHA office in 2008 resulting in 5 site visits and 4 remediation efforts, including implementation of personal protection equipment use, installation of rinsing stations and worker safety training. These worksites had not been reported previously. Reported medical outcome was major n = 1, Moderate n = 27, minor n = 53, no effect n = 5 and not followed n = 21. Route of exposure was: ocular n = 44, dermal n = 42, inhalation n = 30, ingestion n = 15, other n = 4, injection n = 1. *Discussion:* The mission of PC to reduce morbidity from poisoning supports a collaborative role between PC and regulatory groups, allowing for possible remediation of workplace conditions and reduction of future exposures at these work sites. Route of exposure with occupational exposures are significantly different from general poison center cases. *Conclusions:* poison centers are a potential valuable surveillance tool for occupational regulatory groups to help improve worker safety.

231. Loperamide Overdose in a Neonate and Subsequent Reversal with Naloxone

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Background: There have been case reports and basic science studies demonstrating the efficacy of naloxone as a reversal agent for loperamide overdose. We report the youngest human with loperamide-induced coma, respiratory depression, and ileus; all successfully reversed with administration of naloxone. *Case report:* A 14 day old male was given a 1mg PO dose of loperamide for diarrhea, and was given another 1mg 7 hours later. He was brought to the emergency department for evaluation shortly thereafter due to his lethargic nature. He was unarousable and apneic in the emergency department and was endotracheally intubated and admitted to the ICU. He then developed an ileus, with no bowel sounds and no passage of gas or stool. A 0.1mg/kg intravenous bolus of naloxone was administered and the child became arousable. He would have been extubated immediately if the providers would have had a naloxone infusion ready. An intravenous naloxone infusion was subsequently started, and they extubated him 2 hours later. He had no further respiratory depression. The providers also noted return of bowel sounds shortly after the naloxone administration, as well as passage of gas and stool. The naloxone drip was continued for 72 hours and the patient had an uneventful remainder of his hospital course. *Case discussion:* Loperamide is a xenobiotic marketed for its antidiarrheal effect. It is contraindicated in infants under the age of 24 months. 1mg PO is the dose recommended for infants over two years of age and 13kg of weight. This patient met neither of those criteria. Loperamide acts as an agonist at multiple opioid receptors (mainly mu), and can cause a clinical profile of an opioid overdose. Naloxone efficacy has been shown to reverse the side effects of loperamide. There are published reports of naloxone use in newborns to reverse the effects of xenobiotics other than loperamide. *Conclusion:* This patient is the youngest reported to have loperamide-induced coma, respiratory depression, and ileus reversed with naloxone. Loperamide can cause a life threatening side effect profile in overdose of a 2 week-old infant. Naloxone can be used as an effective reversal agent in the case of a loperamide overdose at this young age.

232. The Toxic Trio: Valproic Acid, Lithium & Carbamazepine

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Background: Patients with altered mental status and seizure or psychiatric disease often present with an unclear medication history. Commonly prescribed medications include valproic acid (VPA), lithium (Li), or carbamazepine (CZN) of which our regional poison center (RPC) often recommends obtaining these serum concentrations. Regularly ruling out supratherapeutic concentrations without a known history of ingestion may help direct care. *Methods:* Cases from our RPC coded as VPA, Li, and CZN, from January 1, 2006 to December 31, 2008, were searched. All patients with supratherapeutic concentrations (VPA >100 mcg/mL, Li >1.2 mEq/L, CZN >12 mcg/mL) were evaluated for the following criteria: 1) those with altered mental status and an unclear history of seizure or psychiatric disorder and 2) a mediation profile not including VPA, Li, or CZN. *Results:* Twenty-six patients met the inclusion criteria: 8 patients in the Li group (1.9-5.2 mEq/L; mean 2.9), 9 patients in the CZN group (13.4-38.8 mcg/ml; mean 23.2) and 9 patients in the VPA group (113-247 mcg/ml; mean 158). All patients survived and were treated with supportive care; however, one patient had a Li level of 5.2 mEq/L and received hemodialysis. *Discussion:* In altered patients potentially being treated for seizure or psychiatric disorders and unknown ingestions or medication lists, obtaining concentrations of VPA, Li, and CZN may help direct care and provide clinically relevant information. *Conclusions:* Our RPC detected twenty-six patients with supratherapeutic VPA, Li, or CZN concentrations in patients with potential indications for the agent, but no available history of drug ingested or medication list. A prospective study is warranted to evaluate the usefulness of obtaining these concentrations in this patient population.

233. The Spice of Life: A 12-Year Review of Nutmeg Exposures

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Introduction: Nutmeg is widely used as a household spice. There are a number of citations in the medical literature of its abuse as a psychoactive agent, primarily for its purported hallucinogenic effects; these reports are primarily limited to case reports. *Methods:* We performed a retrospective review of the California Poison Control System database for all cases of single-substance human exposure to nutmeg for the time period 1997-2008. Data collected included age, gender, route of exposure, whether exposure was intentional, clinical effects, duration of effects, treatment, and medical outcome. *Results:* A total of 119 patients were identified, ranging in age from 1-96 years with a mean of 22 years. Results are shown in the Table. Most commonly reported effects were tachycardia (n = 24), vomiting (n = 22), agitation (n = 16), hallucinations (n = 15), dizziness (n = 12), abdominal pain (n = 9), and nausea (n = 6). Therapies administered included activated charcoal (n = 5), benzodiazepines (n = 4), antiemetics (n = 4), IV fluids (n = 3), and gastric lavage (n = 1). *Conclusion:* In this case series, most cases of nutmeg exposure were associated with minor or moderate clinical effects, with tachycardia, CNS

Distribution of nutmeg exposures

	Intentional (%), n = 86	Unintentional (%), n = 33	Total (%), n = 119
SEX			
Male	67 (77.9)	18 (54.5)	85 (71.4)
Female	18 (20.9)	15 (45.5)	33 (27.7)
Unknown	1 (1.2)	0 (0.0)	1 (0.8)
AGE (years)			
<13	0 (0.0)	8 (24.2)	8 (6.7)
13–20	69 (80.2)	3 (9.1)	72 (60.5)
>20	14 (16.3)	22 (66.7)	36 (30.3)
Unknown	3 (3.5)	0 (0.0)	3 (2.5)
ROUTE OF EXPOSURE			
Oral	82 (95.3)	31 (93.9)	113 (95.0)
Insufflation	4 (4.7)	0 (0.0)	4 (3.4)
Dermal	0 (0.0)	1 (3.0)	1 (0.8)
Ocular	0 (0.0)	1 (3.0)	1 (0.8)
TREATMENT SITE			
Home	33 (38.4)	22 (66.7)	55 (46.2)
Doctor's office	0 (0.0)	1 (3.0)	1 (0.8)
Refer to ED	9 (10.5)	5 (15.2)	14 (11.8)
ED	39 (45.3)	3 (9.1)	42 (35.3)
Inpatient (non-ICU)	1 (1.2)	2 (6.1)	3 (2.5)
Inpatient (ICU)	4 (4.7)	0 (0.0)	4 (3.4)
OUTCOME			
None	10 (11.6)	8 (24.2)	18 (15.1)
Minor	43 (50.0)	15 (45.5)	58 (48.7)
Moderate	20 (23.3)	6 (18.2)	26 (21.8)
Major	0 (0.0)	0 (0.0)	0 (0.0)
Death	0 (0.0)	0 (0.0)	0 (0.0)
Unable to follow (potentially toxic exposure)	13 (15.1)	4 (12.1)	17 (14.3)

effects, and gastrointestinal upset most commonly seen. Intentional exposures were more likely to require medical evaluation.

234. Creation of a Secure Web Service To Visualize Poison Center Data for Nationwide Biosurveillance

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Background: BioSense is an automated, real-time biosurveillance system for disease monitoring and response. Currently, data are received and maintained in a central warehouse, pre-processed to map chief complaints and diagnoses, and analyzed using time series charts, line listings, and maps. Problems with this centralized model include a loss of source control over the data, duplication of effort, difficulty keeping data current, and the need for centralized mass storage. BioSense is evolving to a federated model, based on secure web services, which will allow the sharing of data while minimizing data stewardship issues. The National Poison Data System (NPDS) serves as a data repository for all 61 poison centers but does not yet have time series functionality. A collaborative federated initiative can augment available NPDS data tools. We explored this model to visualize NPDS data in BioSense. *Methods:* NPDS developed a secure web service to provide BioSense aggregate clinical effect and case counts by location and time period. CDC developed a browser-based interface (Quicksilver) capable of creating time series charts to detect significant increases from a 28 day moving average and maps using the Google Maps API. *Results:* Quicksilver enables rapid visualization using time series and maps of total call, human exposure, and clinical effect counts by time period, state or ZIP code. In a pilot study, one year of data on nausea was viewed and analyzed by state; 13 significant (>10 SD above moving average) increases were found. *Conclusion:* Leveraging a distributed, standardized, and secure web services approach to federate and manage data provides a shared method for visualizing NPDS data not previously available to CDC or AAPCC. This benefits both the public health and poison center communities by allowing the AAPCC to concentrate on data stewardship and provisioning through NPDS while permitting CDC to access and analyze important data without the responsibility of securing and maintaining third party information, thus decreasing data warehousing and processing costs.

235. Flomax® Ingestion with Hypotension in a 3-Year-Old Child

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Background: Flomax® (Tamsulosin) is a selective antagonist of α_{1A} and α_{2D} adrenoreceptors. It is used to treat benign prostatic hypertrophy by relaxation of smooth muscle in the lower urinary tract to improve the urinary flow rate. Medications in this group (eg, doxazosin, terazosin, prazosin) commonly cause orthostatic BP changes and reflex tachycardia. Reports of ingestion of tamsulosin by toddlers is lacking in the literature. *Case report:* A 3 y.o. girl ingested half of the last remaining tablet of tamsulosin 0.4 mg. The Poison Center was contacted 5 minutes postingestion and the child was referred to an ED for AC and observation. Upon arrival the child received 25 g of AC and was started on IV fluids. Within 2 hours of ingestion, her BP dropped to 64/31 (99/66 = 50%-ile for age group) which responded to a 320 mL bolus of IV fluids. Child remained normotensive therafter and was discharged asymptomatic at 6 hours postingestion. *Discussion:* Tamsulosin is available as a modified-release formulation which provides stable blood levels for up to 24 hours. It does not cross the blood-brain barrier. The drug peaks at 4-8 hours. Tamsulosin has the highest affinity for the α_{1A}-adrenergic receptor of any of the drugs in this class. Due to the absence of α_1-receptors in blood vessels and the drug's high selectivity for α_1-receptors, it has been hypothesized that a therapeutic dose would be less likely to cause orthostatic hypotension. Studies in adults indicate a very low risk of orthostatic hypotension in therapeutic doses of 0.4 and 0.8 mg once daily. A pediatric study (age range 5-16 yrs) evaluated tamsulosin for its use in nonneurogenic dysfunctional voiding and its effect on systemic blood pressure. The initial dose was 0.2 mg followed by an increase to 0.4 mg. During a 10-month treatment period, there were no reports of dizziness, nausea, or rhinitis. *Conclusion:* Based on the lack of reports of ingestion in very young children, we recommend as with other α-adrenergic blockers, referral to an ED. Monitoring of BP and HR for a minimum of 4-6 hours in pediatric patients who ingest any amount of tamsulosin especially in those <5 years of age seems reasonable based on findings from our case report.

236. Coma Following 70% Isopropanol Enema Resulting from Televised Administration

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Background: Ingestion of isopropyl alcohol can produce severe gastroenteritis, CNS depression, and hypotension. Two cases of intoxication, coma, and death from rectal administration were last reported in 1987 and 1998. *Case report:* An 18 year female rectally infused 32 ounces of rubbing alcohol in a store restroom via a douching kit. She informed staff of her actions, rapidly became obtunded, and at the hospital developed respiratory distress requiring intubation. She was hypotensive (89/41 mmHg), tachycardic (111 bpm), and hypothermic (95.5º F). Intravenous fluids (5% dextrose with 0.45% normal saline) at 100 ml/hr, and IV norepinephrine were started. On assisted ventilation without sedation, there was no response to pain. Pupils were 6 mm and unresponsive. She had no recent signs of trauma. Laboratory studies revealed: potassium, 2.5 mEq/L; chloride, 125 mEq/L; bicarbonate, 13 mEq/L; calcium, 5.6 mEq/L; albumin, 2.3 mg/dL; anion gap, 4 mEq/L, osmolar gap, 39 mOsm/Kg; and creatinine kinase, 414 U/L. Arterial blood gas post intubation demonstrated: pH, 7.36; pCO2, 37 mmHg; pO2, 187 mmHg; and calculated HCO3, 21.5 mg/dL. Other studies demonstrated absence of pregnancy, normal liver and thyroid function, and mild anemia. Urinalysis 45 minutes post ingestion had trace ketones that increased to 40 mg/dL six hours later. Initial blood toxicology showed small acetone. Blood volatiles twelve hours post exposure were: acetone, 49 mg/dL and isopropanol, 50 mg/dL. At the potential risk of further hemodynamic instability from conversion of isopropyl to acetone, fomepizole was administered and emergent dialysis was performed. She was extubated the following day and reported only rectal pain with bowel movements that resolved prior to discharge. *Case discussion:* Upon awakening and extubation, the patient admitted she learned this technique from a television program. Streaming video of this and other equally harmful activities are available on line from the same network, and may increase this type of behavior. *Conclusion:* Isopropyl alcohol administered rectally poses a significant risk with rapid absorption and potential development of severe CNS depression and hypotension.

237. Acetaminophen Induced 5-Oxoprolinuria

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Introduction: The organic acid 5-oxoproline (5-OXP) has been reported to induce an anion gap (AG) metabolic acidosis following chronic acetaminophen (APAP) poisoning. However, this has not been reported following a single acute APAP overdose. We report a case of 5-OXP induced metabolic acidosis following acute APAP overdose and describe the analytical methods utilized to detect the 5-OXP. *Case:* A 40 year old female presented after an APAP overdose. Vital signs: T 36.2 C, BP 141/92, P 104 and RR 24. She was somnolent, but arousable to voice. Physical exam was remarkable only for horizontal nystagmus and mild tachycardia. Initial lab values: chloride 104 mmol/L; sodium 141 mmol/L; bicarbonate 14 mmol/L (AG 23 mmol/L); creatinine 0.8 mg/dL; AST 43 U/L; ALT 60 U/L; lactate 2.1 mmol/L; Etoh 118 mg/dL; APAP 430 mcg/mL; salicylate, ethylene glycol, methanol all negative. ECG: unremarkable. N-acetylcysteine (NAC) was initiated; the patient improved over the next 24 hours without sequelae. *Methods:* 5-OXP was analyzed using gas chromatography mass spectroscopy from a urine specimen normalized to creatinine. The extracted fragmented ion chromatograms were analyzed using Agilent MSD ChemStation software and compared to mass spectral libraries. 5-OXP was detected at a retention time 24.39 min using qualitative methods. The observed AUC was approximately 30 times greater than 5-OXP observed in control samples. *Discussion:* In APAP poisoning, acidosis may be caused by the organic acid 5-OXP, an intermediate in the gamma-glutamyl pathway. Diminished supplies of glutathione remove feedback inhibition on gamma-glutamylcysteine synthase causing overproduction of gamma-glutamylcysteine and subsequently 5-OXP. 5-OXP induced acidosis must be considered in patients with a metabolic acidosis after acute APAP overdose and in patients with unexplained metabolic acidosis with history of therapeutic APAP use, particularly those with coexisting conditions such as sepsis, malnutrition, or pregnancy that may lead to glutathione deficiency. Treatment includes discontinuation of APAP along with supportive care. NAC will help to replete glutathione levels by providing cysteine necessary for glutathione synthesis.

238. The Impact of Nuisance Callers on Poison Center Services and Staff Efficacy

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Background: Poison centers (PCs) provide poison information to the general public and health care providers at no direct cost to the caller. Our regional PC receives a significant number of calls from a particular individual who is easily identified by characteristic speech patterns and disconnects that clearly demonstrate misuse of PC services. The interruptions created by this type of caller can delay the delivery of services to callers requiring emergency care. The PC has examined the relationship of the multiple calls placed by this caller and its behavioral impact on PC staff. *Methods:* This study is based on one particular caller labeled "Caller X". We analyzed one year of call data from our database to determine the frequency of calls received from Caller X. All Specialists in Poison Information (SPIs) were interviewed to measure the overall impact of repeated calls and hang ups by Caller X on staff performance and overall perception of the effect of these calls on PC call volume. *Results:* In 2008 we received 961 calls from Caller X. SPIs identified fifteen phone numbers associated with Caller X and determined that all calls originated from pay phones in the same city. Open-ended question staff interviews identified four different self-described responses to these calls; 50% of the staff felt annoyed, 20% felt empathetic, 20% viewed the calls as a break from the call cycle, and 10% felt indifferent. SPI perceived estimates of the number of calls received from Caller X varied, ranging from 300 to 4000 calls per year, with 20% of the staff underestimating and 30% overestimating actual call volume. All SPIs revealed a perception that the nuisance caller is most likely mentally ill. Data analysis revealed that call volume generated by Caller X accounted for 2.5% of information calls reported to our PC during 2008. Peaks in call volume by Caller X correlated with peaks in total call volume to the PC. *Conclusion:* Nuisance calls received by our PC

by one individual potentially delayed the provision of public and professional poison-related advice. Poison centers may benefit from developing call-taking and call volume management strategies that include ones that address nuisance or abusive calls.

239. Poison Specialists with a Sub-Speciality: Managing Lead Poisoning 2007–2008

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Problem: Health care professionals caring for lead-poisoned children frequently call our poison center asking for treatment recommendations. A small percentage of the children need chelation or have persistently elevated blood lead levels (BLLs). At any one time, our poison center is following 12 to 18 pediatric patients with lead poisoning. Without a structure for managing these ongoing cases, health care professionals were receiving a heterogeneous group of recommendations from all of the specialists at our center. *Solution:* In 2007, we created a formal program with which to follow these lead-poisoned children. Two CSPIs staff this lead program and underwent in-depth training on all aspects of lead poisoning: signs and symptoms; interpretation of lab tests; chelation; side effects of chelators; environmental, dietary and public health interventions; developmental assessment; and contact information the Childhood Lead Poisoning Prevention Programs in our state. Guidelines for chelation, medication side effects and non-medical interventions were created for the CSPIs to use, but which also can be faxed to the health care professionals. The two CSPIs perform all outbound follow up phone calls and act as the points of contact for the physicians and nurses who call into the poison center with questions or follow up. If a new case of lead poisoning is called into the poison center when neither CSPI is on duty, the specialist on duty gives recommendations, based on the guidelines, and refers the case to the medical director for quality control. *Results:* During 2007–2008, we were contacted about 178 persons with lead exposures and has managed forty children with persistently elevated BLLs. Of these 40 children, 9 have undergone 15 rounds of parenteral chelation and 12 have undergone 17 rounds of oral chelation. This program has led us to provide uniform recommendations on the management of lead-poisoned children. There has been notable positive feedback from the health care professionals. Physicians and nurses have said that they are more comfortable having known points of contact and have more confidence in the specialists who are well versed in their patients' histories.

240. Pill Identification: Comparison of Two Poison Centers (PC)

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Background: Use of PC for identification of pills has increased significantly in last five years posing an increasing burden on PC resources. Identification of pills (PID) by imprint code for callers without an exposure is not a core service of poison centers. We evaluated the impact of PID on two PCs, one which did PID for the public (PC1) and one which did not (PC2). Pills continued to be identified in both centers for healthcare and police callers. *Method:* evaluation of all calls to two PC from 2001–2008. *Results:* total Call volume over the 8 years period increased by 91,676 (159%) and 6,644 (10%) in PC1 and PC2 respectively. During the same period human exposure volume decreased 3,382 (-9%) and increased 3,397 (+7%) in PC1 and PC2 respectively. The reason for incoming calls to PC1 progressively reversed from 68% exposures and 32% information in 2001 to 24% exposures and 76% information in 2008. The increase in call volume and shift toward information calls experienced by PC1 was exclusively related to increased requests for PID. The reason for incoming calls to PC2 remained unchanged with 71% exposures and 29% information in 2001 and 69% exposures and 31 % information in 2008, respectively. Severe medical outcome (Mod, Maj, death) increased over the 8 years 21% and 5% in PC1 and PC2, respectively. *Discussion:* PID has become the primary reason for a call to a PC that allows public PID and management of exposures has decreased to less than 25% of incoming calls. In this period of budget shortfalls PID for the public may overwhelm the limited resources of a PC to provide core services. Shift of PC resources to PID has not resulted in a decrease in morbidity or mortality from poisoning. *Conclusion:* PID does not support the mission of PCs to reduce morbidity from poisoning. While popular, PID for the public does not appear to offer a public health benefit of reduced morbidity or reduced healthcare costs.

241. Seven Years of High Dose Insulin Therapy for Calcium Channel Antagonist Poisoning

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Background: Our regional poison center (RPC) promotes the use of hyperinsulinemia/euglycemia (HIE) therapy in severe calcium channel antagonist (CCA) poisoning. The objective of this study is to report 7 years of experience recommending HIE. *Methods:* Utilizing our RPC data from January 1, 2002 through December 31, 2008, all cases of CCA poisoning receiving HIE were searched. Primary endpoints were number of HIE cases per year & outcome, in addition to, total CCA deaths each year. Secondary enpoints (if available) included dose of insulin, time of initiation (TOI) & duration of HIE, ages, [glucose], & lowest systolic blood pressure (SBP) recorded. *Results:* Forty-six cases of CCA poisoning were managed with HIE over 7 years. Data revealing cases managed, deaths with HIE, & total CCA deaths (+/- HIE) are represented (table). All patients received standard antidotal therapy (SAT = IVF, calcium salts, glucagon, & pressors). HIE administration followed our RPC recommendations; ie. 1) insulin dosing = bolus 0.5 U/kg - 1.0 U/kg followed by hourly drip at same dose & 2) TOI of HIE was either preceeding or shortly after addition of pressors, 19 times (41%). Only 4 deaths occurred in these 19 patients (21%), with 1 death occurring even though correct HIE dosing was initiated prior to SAT (0.05%). Means (age, highest glucose measured, & lowest SBP measured) were 51 years, 282 mg/dL, & 74 mmHg respectively. *Discussion:* CCA poisoning is challenging to manage. HIE has been advocated based on sound animal studies and clinical experience. Physician comfort with this therapy has increased over the last several years. *Conclusions:* HIE therapy per our RPC recommendations occurred 41% of the time over the last 7 years. These data indicate an increased trend in mortality when HIE dosing is altered from our recommendations and/or TOI of therapy is delayed.

Year	HIE	HIE Mortality	Total # CCA Deaths
2002	5	4 (80%)	6
2003	7	2 (29%)	4
2004	10	0 (0%)	0
2005	1	0 (0%)	0
2006	8	1 (13%)	4
2007	6	0 (0%)	0
2008	9	2 (22%)	2

242. A Novel Approach to the Treatment of Opiate Addiction in Adolescents

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Background: Adolescent addiction to heroin and other opiates is a growing problem in our region. Buprenorphine/naloxone (Suboxone®) has been used successfully to treat opiate addiction and withdrawal in the outpatient setting. We describe a novel approach to the treatment of adolescents who are addicted to opiates, using buprenorphine/naloxone in the inpatient hospital setting. *Methods:* A retrospective chart review of all patients admitted to our adolescent detox service from 2007-2008. *Results:* 86 charts were reviewed and 61 patients met inclusion into the study. There were 33 males and 28 females who were between the ages of 14-21 (Mean: 17.7) years old. The average length of stay in the hospital was 2.8 days (range: 1–7). All patients had resolution of their withdrawal symptoms with buprenorphine /naloxone. The average daily dose of buprenorphine/naloxone was 11.7 mg (range: 4–26). One patient (1.6% ADE) with asthma and pneumonia, had a hypoxic episode while on buprenorphine/naloxone Co-morbid conditions included abscesses, complex regional pain syndrome, hepatitis B and C, psychiatric diseases including depression with suicidal ideation, and asthma. 38% of patients had commercial insurance, 46% had Medicaid, and 16% sere self-pay. *Discussion:* Admitting these patients to the hospital ensured patient safety, allowed patients to be treated for underlying medical conditions associated with their addiction, and provided for a rapid team (physicians, social services, and therapists) evaluation. The use of buprenorphine/naloxone decreased the use of other medications such as clonidine and benzodiazepines to treat withdrawal. All patients were referred to outpatient or residential chemical dependency treatment programs on discharge. *Conclusion:* Buprenorphine/naloxone is safe and effective at treating adolescent patients with opiate addiction in the inpatient setting.

243. Lead Pellet in the Pericardium

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Background: We report a case of a lead pellet in the pericardium resulting in a benign outcome. Lead toxicity from a foreign body lodged in an acidic joint space has been documented previously. No previous case reports are available regarding a lead pellet lodged in the pericardium where lead levels were documented as a possible concern of toxicity. *Case report:* 14 year old male suffered a gunshot wound to the chest. Chest xray revealed one lead pellet lodged in the pericardium. Troponin was elevated to 0.57. Patient had normal blood pressure and pulse rate. Echocardiogram revealed no pericardial effusion or myocardial injury. The pellet appeared to migrate within the pericardium based on review of serial chest xrays. CT scan of the chest did not reveal any evidence of pneumomediastinum or pneumopericardium. The initial lead level on hospital day 2 was 2.0 mcg/dL. Subsequent patient follow-up was done through the primary care physician. Repeat lead levels at one month and six months remained nontoxic at 3mcg/dL and <2mcg/dL respectively. The repeat echocardiogram at one month demonstrated normal cardiac function and no significant pericardial effusion. *Case discussion:* The surgical consultants deemed the pellet too high risk for removal. A previous report demonstrated lead toxicity with numerous bullet fragments in a joint space. The acidity of joint fluid has been found to increase the release of lead resulting in toxic levels from the bullet fragments. The location of the foreign object necessitates a careful risk vs benefit consideration regarding surgical risk of removal versus toxicological risk of future lead toxicity. Pericardial fluid is a transudate of serum and is not known to be acidic. Our patient had only one pellet in a difficult location to

access. Therefore the risk of lead toxicity did not outweigh the risk of a thoracic surgical procedure. *Conclusion:* Removal of a foreign body that contains lead requires a careful consideration of risk due to lead toxicity versus benefit to the patient.

244. Toxicity Following Massive Acute Paliperidone Ingestion

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Background: Paliperidone, 9-hydroxyrisperidone (Invega), used to treat schizophrenia and bipolar disorder antagonizes D_2, 5-HT_{2a}, $\alpha_{1,2}$ and H_1 receptors; and blocks K^+ channels. Adverse effects in therapeutic dosing have been studied, but no reports of overdose toxicity exist. We report the first case of acute paliperidone overdose with levels. *Case report:* A 24-year-old woman reportedly took 270 mg of paliperidone. She presented to the Emergency Department 12 hours later with ataxia, chest pain and "fogginess." Her heart rate was 168 beats per minute and blood pressure was 138/82mmHg. EKG showed sinus tachycardia with a HR of 138, QRS 66ms, and QTc 442ms. She was treated with intravenous metoprolol and transferred to a Regional Toxicology Treatment Center. She was somnolent, but arousable 14 hours after ingestion with dysarthria, ataxia and lightheadedness. Serum ethanol, acetaminophen and salicylate were undetectable; urine drug screen by GC/MS was positive only for diazepam. Diazepam level was 0.45mcg/ml(.02-2). Serial paliperidone levels were obtained by HPLC/Tandem Mass Spectroscopy(LC-MS/MS). Paliperidone levels at 16, 32, 51, and 76 hours were 1200(4.8-16.5), 830, 270, and 73ng/mL, respectively. The patient had increased somnolence over the 24-36 hours following ingestion, but remained arousable. Heart rate ranged from 90's to 160's with movement. Episodes of activity-related tachycardia in the 140-160's continued for 72 hours post-ingestion. Serial EKGs showed sinus tachycardia and QTc intervals of 502, 537, and 477 on days 1, 2 and 3, respectively. She improved with supportive care and IV hydration alone. Upon resolution of toxicity, she was transferred to a psychiatric facility. *Discussion:* This is the first reported case of toxicity following paliperidone overdose. The patient demonstrated prolonged somnolence, orthostatic tachycardia and QTc prolongation with toxicity peaking approximately 36 hours after reported ingestion. *Conclusion:* Patients with paliperidone overdose require prolonged observation and cardiac monitoring due to the extended release formulation and long half-life. Treatment consists of supportive care, IV fluids, and close monitoring with treatment of cardiac arrhythmias.

245. Demographics of Poison Center Educators

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Background: This study reflects the most current and comprehensive data on the demographics of poison center educators using an on-line survey tool. *Objective:* To provide an overview of characteristics of poison center educators through descriptive research. *Methods:* Eighty-eight poison center (pc) educators were invited by e-mail to participate in a confidential, on-line 30 question survey designed to help define the characteristics, functions, roles and tasks of poison center public educators. *Results:* A total of sixty-eight public educators (78%) responded. Of these, 54% (37) indicated they worked 40 hours weekly as a public educator. A vast majority, 68% (46) responded they worked 0 fte's as a spi. Respondents' responsibility distributions include conducting:

Presentations for the general public, n = 61 (90%)
Presentations for healthcare professionals, n = 48 (71%)
Train-the-trainer program, n = 37 (54%)
Programs for older adults, n = 43 (63%)
Inhalant abuse programs, n = 23 (34%)
Critters program, n = 25 (37%)

Related to program development, 53% (n = 36) respondents do not conduct any needs assessment prior to program development while 54% (n = 37) do conduct evaluations of their general presentations. Forty percent (27) indicated they are involved in grant writing, but most (82%) are not responsible for fundraising other than grant writing. Most of these respondents (61%) do not conduct research. *Conclusions:* There is little consistency of activities and responsibilities across programs. This likely reflects the need to individualize each center's program to the demography, financial and political realities and geographies of each local environment.

246. Using NIMS Preparedness To Demonstrate Poison Centers' Value to State and Federal Partners

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Sometimes overlooked and underutilized, poison control centers are a critical component of the country's public health infrastructure. When disasters occur, poison centers need to be prepared to (1) manage the disaster as it affects the poison center, (2) provide support to the responding organizations and (3) manage a large influx of telephone calls.

The National Incident Management System (NIMS) provides a structured framework for all response organizations to follow when preparing for, and responding to, any type of disaster. Our poison center has followed a NIMS-compliant approach to training, exercises and preparedness.

Training Program

Each poison center staff member has received, at a minimum, the training listed in the table:

Exercise Program Every disaster plan needs to be tested to determine what works and what needs improvement. During 2008, our poison center created and ran three HSEEP-compliant, poison center-specific exercises. The first, a table top exercise, dissected the center's disaster plan to see how it would function in a disaster. The second, a functional/full scale exercise, tested the center's ability to handle a flood of phone calls about a known agent. The third exercise, a full scale, tested the center's abilities to handle a flood of phone calls and determine the identity of an unknown agent. Complete after action reports and improvement plans were submitted to both state agencies and www.llis.dhs.gov.

Future exercises include integration with county and state Emergency Operations Centers; conducting a "mid-disaster" exercise which addresses staff transition, finances and logistics; an off-hour exercise (i.e. night or weekend) and participation at the state level in a FEMA Region exercise.

This program demonstrates to state and federal partners another crucial role that poison centers have in protecting our country.

Poison Center Staff	Courses
All Staff	ICS 100 Intro to ICS
	IS 700 NIMS: An Introduction
Medical & Managing Directors, Educator, 1 SPI	ICS 200 Basic ICS
	IS 800 Federal Response Plan
Medical Director & 1 SPI	ICS 300 Intermediate ICS
	ICS 400 Advanced ICS
Educator & Medical Director	Basic and Advanced PIO Training
Medical Director	HSEEP Training
	IS-139 Exercise Design

247. Acetaminophen Toxicity and Intravenous N-acetylcysteine Dosing in the Morbidly Obese

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Pharmacokinetics are altered in the morbidly obese and antidote dosing may need to be adjusted. As regards to acetaminophen (APAP) overdose no specific studies have been conducted to evaluate the necessity of dosing adjustments for intravenous N-acetylcysteine (NAC) in patients over 100kg. There is evidence that NAC should detoxify the toxic metabolite N-acetyl-p-benzo-quinoneimine (NAPQI) on a mole per mole basis. The molecular weight of NAPQI and NAC are similar (149.15 vs. 163.20 grams/mol), therefore 1 gram of NAC should reduce approximately 1 gram of NAPQI. We present a case of a potentially toxic APAP ingestion in a morbidly obese patient who was successfully treated with IV NAC using this equimolar approach.

A 22 year-old, 180kg male presented after an acute ingestion of 160 tabs of 500mg APAP (80 grams.) His four hour APAP concentration was 180mg/dL, with an AST of 27 and ALT of 55 U/L (reference range 0–31 U/L.) Coagulation profile was within normal limits. He was started on IV NAC therapy, with dosing based on an equimolar approach aimed at his maximum possible ingestion. Approximately 4% of APAP is converted to NAPQI in overdose. Using an overestimation of 10% conversion, this would have resulted in approximately 8 grams of NAPQI. If we dosed this patient using the normal protocol for IV NAC dosing, he would have received a loading dose of 27 grams (150mg/kg), phase II of 9 grams (50mg/kg), and phase III of 18 grams (100mg/kg) of NAC. We elected to treat him with a NAC loading dose of 18 grams, phase II of 6 grams over 4 hours, and phase III of 12 grams over 16 hours. Even with a safety margin built in, his total dose of NAC was still less than 2/3 than that based on his ideal weight. The patient was asymptomatic during hospitalization and tolerated therapy well. After completion of his therapy, his repeat APAP level was undetectable with a normal hepatic function.

This case demonstrates successful use of a modified therapeutic regimen of NAC dosing based on an equimolar approach. This approach should be considered when treating morbidly obese individuals with potentially toxic APAP ingestions. Further study is necessary.

248. E-Learning in Clinical Toxicology for Health Professionals: The Experience of Bergamo Poison Center in Italy

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Introduction: The clinical vignette is a well established and widely used educational approach for health professionals.[1] In Italy, the National Drug Agency (AIFA) developed ECCE (Evidence Centered Continuing Education, http://www.aifa.progettoecce.it), a distance-learning tool founded on evidence-based reviews, clinical vignettes, and related multiple-choice questionnaires (more than 300 topics about daily clinical practice). At present, cumulative registrations amount to 150,614 health professionals (doctors, nurses) who performed 5,012,034 courses. A total of 4,709,666 CME credits has been awarded. The aimof our study was to evaluate effectiveness and satisfaction of toxicological clinical cases and to compare them with those in other medical fields. *Methods:* Five clinical reviews and eight vignettes were written on mushroom poisonings, antidepressant treatments in pregnancy and lactation, biguanide lactic acidosis, carbon monoxide poisoning and corrosives ingestion. *Results:* Health professionals faced 52,999 courses in clinical toxicology and performed significantly better than in the other fields (first attempt success rate: 77,9% *vs* 69,0%). Health professionals expressed a positive judgement about toxicological arguments, particularly in terms of relevance of the contents, educational quality, and effectiveness. *Conclusions:* ECCE project

E-learning results.

	Toxicological vignettes (%)	All remaining specialties (%)	Difference (%)
RELEVANCE			
mild/low	27.0	34.5	–7.5
moderate/good	46.9	44.2	+2.7
high	22.8	16.2	+6.6
EDUCATIONAL QUALITY			
mild/low	26.0	33.0	–7.0
moderate/good	51.3	48.9	+2.4
high	20.4	14.3	+6.1
EFFECTIVENESS			
mild/low	25.1	31.7	–6.6
moderate/good	49.9	46.7	+3.2
high	19.4	13.7	+5.7

is one the most widely used learning project worldwide. The results show how high are the learning needs and expectations in medical toxicology and suggest the opportunity for disseminating e-learning projects in Europe and North America. *References:* 1. Naldi L, Manfrini R, Martin L, Deligant C, Dri P. Feasibility of a web-based continuing medical education program in dermatology: the DermoFAD experience in Italy. Dermatology 2006;213:6–11.

249. Seven Years of Cyanide Ingestions in the U.S. – Critically Ill Patients Are Common, but Antidote Use Is Not

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Background: Cyanide is potent, easily obtainable, and requires antidotal therapy. Insufficient literature has been published on the incidence of CN ingestions and the resultant outcomes. Previous reports have not described the incidence of antidotal use or CN-induced cardiac arrest. *Objective:* To describe the incidence of CN ingestions reported, therapies and symptoms recorded, and antidotal therapy used, as reported to all poison centers over 7 years. *Methods:* Our study was a retrospective cohort of all CN exposures (2000–2006) in the U.S. as reported to the National Poison Database (NPDS). We included only acute CN ingestions. We collected the following variables: intent of use, management site, medical outcomes, antidote use, therapies used, and clinical effects. The data abstractor was trained prior to collection and serial meetings were performed. We used a standard data collection form. 10% of a random chart selection were reviewed by a 2nd abstractor blinded to patient outcome and a kappa value was calculated. Our data was completed prior to FDA approval of hydroxocobalamin. *Results:* 435 out of 1741 cases were acute ingestions. 68% were male, 13% were children. The intent for 45% of cases was intentional, misuse, or suicidal. Sodium thiosulfate (ST), sodium nitrite (SN), or both were reported to have been used in 13% (57/435) of cases. Eight and a half percent (36/435) of cases died. 31/36 deaths were intentional. 50% of deaths (18/36) received ST, SN, or both. Cardiac arrest or hypotension were reported in 10% (42/435) of cases. 33/37 (89%) cardiac arrest cases died. 68% of patients with cardiac arrest or hypotension received antidotal therapy. 46/193 (24%) treated at health care facility had cardiac arrest, respiratory arrest, hypotension, or coma. Kappa value was 0.8 (0.72–1.0) and 1.0 for outcomes and antidotal use. *Conclusions:* CN-induced cardiac arrest or hypotension is common; however, CN antidotal therapy use is not. Research aimed at improving CN-induced hypotension and cardiac arrest is needed. Additional research on reducing barriers to antidotal use is also need. This study did not evaluate hydroxocobalamin.

250. Familial Lead Poisoning Including Two Cases of Neonatal Lead Poisoning

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Index Case

A 2 year old boy was found on routine screening to have a venous blood lead level (BLL) of 59 mcg/dL. A course of DMSA was attempted, but because of difficulty in administering the DMSA, a parenteral course of BAL and EDTA was administered. His post chelation BLL was 21 mcg/dL.

Mother: Second Pregnancy In screening the rest of the family, the index case's mother, a 21 year old woman who was 34 weeks pregnant, was found to have a blood lead level of 124 mcg/dL. She was completely asymptomatic (no GI or neurological complaints or symptoms) except for a hemoglobin of 8.7 gm/dL, ZPP 1391 mcg/dL and FPP 203 mcg/dL. She received a five day course of EDTA plus DMSA. Her post chelation BLL was 55.4 mcg/dL.

Second Child

A 7 pound 11 ounce girl was delivered at 38 weeks of gestation. She had APGARs of 8 and 9 and a normal neurological exam. The initial BLL was 107 mcg/dL, and she received a double volume exchange transfusion. Her post-exchange BLL was 9 mcg/dL and rose to 57 mcg/dL by day 2 post-exchange. She was administered a 5 day course of BAL and EDTA. Her post chelation BLL was 35 mcg/dL. The child has since undergone 3 courses of parenteral and 2 courses of oral chelation therapy. Developmental assessment at 9 months of age was unremarkable.

Mother: Third Pregnancy

Approximately one year after the birth of her second child, the mother was approximately 19 weeks pregnant when she was brought to our attention. Her BLL at that time was 42 mcg/dL. Her BLL eventually rose to 70.8 mcg/dL in the third trimester and she underwent chelation with DMSA. Her post chelation BLL was 13.4 mcg/dL.

Third Child

A 7 pound 14 ounce boy was born at 39 weeks of gestation and had a normal neurological exam. His initial BLL was 105 mcg/dL, and received a double volume exchange transfusion. His post-exchange BLL was 13 mcg/dL and it rose to 45 mcg/dL by day 3 post-exchange. He was started on BAL and EDTA and completed a standard 5 day course. The child's post chelation BLL was 26 mcg/dL. The child has had no further chelation.

The mother's elevated BLL was the result of eating a cat-shaped piggy bank. These cases add to the scant literature further information on the management and clinical course of neonatal lead poisoning.

251. A Case Report of Fatal IV Elemental Mercury Poisoning

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Objective: To report a fatal case of IV exposure to elemental mercury (Hg) and summarize reports from the literature of similar exposures. *Case summary:* A 36 y/o previously healthy male presented to the emergency department with a 10 day history of sore throat, fever, cough, headache, arthralgia, diarrhea, insomnia, agitation, and a rash. The patient worked as a welder in a scrap metal recovery business. Exam showed a fine maculopapular rash on his chest and back, fever, diaphoresis, and anxiety. An abnormal CXR resulted in a CT of the chest and a 2-D-Echocardiogram that revealed massive embolization of radio-opaque material in the pulmonary arterial system and the right heart. Initial Hg levels were 244mcg/L in blood and 552mcg/L in his urine. Succimer (DMSA) was initiated. After initiating succimer treatment, symptoms became worse with N/V, increased agitation, emotional lability, weakness of extremities, generalized numbness, and blurred vision. The patient refused further doses of succimer. He continued to worsen clinically and developed evidence of hepatic and renal injury (elevated transaminase levels, proteinuria). Acetylcysteine was initiated IV. Cardiology was consulted for possible catheter removal of elemental Hg from the heart, Sodium 2,3-dimercapto-1-propanesulfonate (DMPS) was obtained and started by IV dosing. Pressors and continuous veno-venous hemodialysis (CVVHD) were initiated. The patient's mental status continued to deteriorate, his blood pressure became progressively more difficult to maintain. He developed respiratory distress, renal failure, and was intubated. He died on admission day 21 of mutiorgan failure. His peak blood Hg level were 1268mcg/L. At autopsy, elemental Hg was noted in his ventricles, lungs, and major vessels. *Discussion:* Literature review of previous cases of IV elemental Hg toxicity presented for various reasons including suicidal intent, presumed anabolic properties, enhanced sexual prowess, and Folk Remedies. Most cases were relatively asymptomatic or with chronic manifestations. Fatalities, such as in our case, were rare. *Conclusion:* DMPS may hold promise in treating severe IV elemental Hg poisonings. Evidence for dose response is lacking. The use of CVVHD should be considered in these cases.

252. Redotex Revisited – Intentional Overdose with an Illegal Weight Loss Product

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Background: Redotex is dietary weight loss supplement not available in the United States. It contains multiple ingredients: d-norpseudoephedrine 50 mg, aloin 16 mg, atropine .36 mg, diazepam .8 mg and triiodothyronine (T_3) .075 mg. The US Food and Drug Administration issued warnings in 1987 about the dangers of this medication, although a review of the medical literature failed to reveal any reports of Redotex intoxications. We report a case of apparent toxicity secondary to a Redotex overdose. *Case report:* A 17 yo previously healthy female arrived at an ED 1 hour after reportedly ingesting 30 Redotex tablets that she purchased in Mexico. Initial examination and vital signs were unremarkable. She received one dose of activated charcoal. Two hours later, remarkable clinical and laboratory finds were: BP 138/78 mm/Hg, HR 120 bpm and serum T_3 concentration 6.09 (1.5 – 2.6). The patient was admitted and observed. Although her blood pressure normalized over the next 8 hours, she continued to have sinus tachycardia (110–120 bpm) for 3 days. No other clinical manifestations of thyroid intoxication developed and no interventions were required. Labs on day 2 revealed a T_3 level >12 and TSH .03 (.4 – .7). The patient was discharged on day 3 and additional follow

up is not available. *Discussion:* Redotex continues to be used by US citizens as evident by our patient as well as multiple chat groups on the internet. While difficult to buy directly in the US, this product can be readily purchased in Mexico. Our patient's initial effects could be attributed to the sympathomimetic activity of d-norpseudoephedrine, while her sustained sinus tachycardia could be attributed to T_3. *Conclusion:* Large ingestions of Redotex can result in clinically significant symptoms. Additional efforts may be warranted to limit access to this potentially dangerous medication.

253. Increased Anion Gap from Sodium Thiosulfate Administration in a Dialysis-Dependent Patient: Case Report and Literature Review

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Introduction: Sodium thiosulfate (STS) is an increasingly popular option for the treatment of calciphylaxis, a syndrome of vascular calcification, thrombosis and skin necrosis seen in patients with end-stage renal disease on hemodialysis. Calciphylaxis causes chronic non-healing wounds and is usually fatal. We report a case of widened anion gap in a patient receiving STS therapy for calciphylaxis. *Case report:* Our poison center received a call from a tertiary hospital regarding an unexplained increased anion gap metabolic acidosis in a 52-year-old hemodialysis dependent patient. The anion gap was 31 and the bicarbonate level measured 21 mEq/L. Four days prior the patient's anion gap had been normal and her bicarbonate level measured between 26-29 mEq/L. At that time the patient was started on an intravenous sodium thiosulfate regimen. She received 5 grams STS once a day after her regular dialysis session for 5 consecutive days. Her lactate level measured 0.6 meq/L. Onset of increased anion gap (AG) coincided with the initiation of STS therapy. Sodium thiosulfate was discontinued upon poison center recommendations and on the day after stopping the therapy, the AG was 16. The anion gap continued stay in the normal range for the rest of her hospital course. *Discussion:* Since 2004, STS has been advocated as an effective therapy for treatment of calciphylaxis, otherwise known as calcific uremic arteriopathy. Cases previously reported in the literature have described high anion gaps of 26.1 and 26.7 respectively in patients receiving STS therapy for calciphylaxis. In animals, acidosis, elevated serum sodium concentrations, hypotension, and hypoxia have occurred. *Conclusion:* Given the temporal association between the patient's widened anion gap and the introduction of STS, we conclude that STS was the causative drug. The treatment for STS induced widened AG is discontinuation of the offending agent. However, STS is highly successful in treating calciphylaxis and may be continued in the setting of increased AG metabolic acidosis if acidosis can be managed effectively utilizing bicarbonate therapy.

254. Buprenorphine Withdrawal in a Toddler

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Background: Buprenorphine (BUP) is a semisynthetic opioid derivative used to treat opioid dependence. Acute withdrawal is described in neonates born to mothers using BUP. To our knowledge, BUP withdrawal has never been described in children who themselves were consuming BUP. We report the first case of BUP withdrawal in a toddler who was being administered BUP. *Case presentation:* A healthy 2-year old, 13.4 kg female was admitted for opioid withdrawal. Two days prior, the patient's mother attempted suicide. In a suicide note, she confessed administering two-thirds of a 2 mg tablet of BUP to the child daily since birth. Twenty-four hrs after the last ingested dose of BUP the child developed insomnia and irritability which worsened over the next 24 hrs. In the ED, her exam was normal except for crying, yawning, piloerection, and 4mm pupils. She was given 1 mg of IV morphine and her symptoms resolved. She was transferred to our hospital, where she was again crying and agitated. BP 113/66 and HR 154. Rhinorrhea, yawning, and piloerection were present. An additional 1 mg of morphine was administered 2.5 hrs after the first dose, with corresponding resolution of the symptoms. She was started on 1 mg oral methadone per day. Routine blood work was normal and urine GCMS didn't reveal any medications or drugs other than what she received in healthcare facilities. She was observed for 3 days and then discharged with a schedule to taper methadone by 20% per week. She tolerated the outpatient taper well. *Discussion:* Opioid withdrawal in a healthy toddler is unexpected but should be considered in the differential diagnosis of agitated children. *Conclusion:* We present a case of opioid withdrawal in a toddler who was receiving BUP since birth. Methadone was used successfully to treat her symptoms and wean her off opioids.

255. A National Perspective of Latrodectus spp. Envenomation: 2004–2006

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Background: Black Widow spiders (*Latrodectus spp*., BWS) are present in every US state except Alaska. The treatment of envenomation varies widely by region and case severity; optimal treatment has not been established. The objective of this study is to describe the demographics, use of antivenom and outcomes of BWS exposures reported to US Poison Centers. *Methods:* All exposures with the generic code for BWS envenomation reported to the American Association of Poison Control Centers between 2004 and 2006 were reviewed. Descriptive statistics were used to present the age, gender, time of year, census region, outcome, and use of antivenom. Proportions were compared with Chi-square. *Results:* During the period of 2004 to 2006, 7,681 BWS exposures were reported in 48 US states. The number of exposures peaks in September (13%) and then falls to a low in February (3%). Exposures were more common in the South (33%) and West (64%) than in the Midwest (2%) or Northeast (0.7%). 41% (n = 3,149) were female and most patients were between 20 and 50 years of age (57%, n = 4,374). The majority of cases (63%, n = 4,849) were not managed in a health care facility. Follow-up information was available for 49% (n = 3,963) of reported cases. While the majority of patients were classified with minor clinical effects (79%, n = 6,040), there were 1,074 cases (14%) with moderate effects and 38 cases with major effects (0.5%). Moderate or major outcomes were more common in the South than in other regions ($p < 0.001$). Antivenom was administered in 147 cases (2%). Only 7% of patients with moderate effects and 20% of patients with major effects received antivenom. Antivenom use did not vary by region ($p = 0.5$). *Conclusions:* BWS exposures are regional and vary over the course of the year. Most effects are minor. Few exposed patients receive antivenom, including those with moderate or major effects. Cases reported to poison centers may differ in severity and treatment from non-reported cases.

256. Adenosine Mediated Cardiovascular Toxicity in Amitriptyline Poisoning Rats

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Background: This study was designed to determine whether amitriptyline could enhance plasma adenosine levels or to examine adenosine-mediated cardiovascular toxicity mechanisms-induced by amitriptyline. *Methods:* Rats (n = 24) were randomized into three groups. First group (control) received 5 % dextrose i.p 1 hour ago before amitriptyline infusion (0.94 mg/kg/min for 60 minutes). Other rats pretreated 1 hour prior to experimental protocol with EHNA (10 mg/kg i.p, an inhibitor of adenosine deaminase) and NBTI (1mg/kg i.p, an inhibitor of facilitated adenosine transport) to increase adenosine availability. After EHNA/NBTI administration, one group of rats received 5 % dextrose, while the other group received amitriptyline. MAP, HR and ECG were recorded. Plasma adenosine concentrations were measured by HPLC. Data were evaluated by Student's t test (paired/un-paired data) and Kaplan-Meier procedure. *Results:* In the control group, amitriptyline infusion caused an inhibition in MAP, HR and prolongation in QT, QRS duration ($p < 0.05$). In EHNA and NBTI administered rats, amitriptyline infusion caused a significant inhibition in MAP at 20.min ($p < 0.05$) and prolongation QRS duration at 10., 20., and 40.min when compared to control group ($p < 0.05$). When we look into the changes in MAP and HR of the EHNA/NBTI administered groups, the reductions in MAP ($p < 0.01$, after 20.min) and HR of the amitriptyline administered groups were more significant than the dextrose administered group ($p < 0.05$, $p < 0.05$, $p < 0.0001$, $p < 0.001$, at 20., 40., 50., 60. min). In EHNA/NBTI administered groups, amitriptyline-induced QT (at 10.min, $p < 0.05$) and QRS prolongations ($p < 0.01$, $p < 0.01$, $p < 0.001$, $p < 0.001$, $p < 0.0001$, $p < 0.01$, after 10.min) were more significant than the dextrose-induced QT and QRS prolongation. In control group, plasma adenosine concentrations did not show any significant change after amitriptyline infusion. In the other groups, plasma adenosine concentrations showed a significant increase ($p < 0.05$). *Conclusions:* These results indicate that amitriptyline does not alter directly plasma adenosine concentration but endogenous adenosine levels contribute amitriptyline-induced cardiovascular toxicity.

257. Oleander Ingestion: A Study of Outcomes and Therapies Required in Pediatric Oleander Ingestions Reported to XXXX Poison Control Centers from 2004-2008. A Case Review

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Objective: Oleander is a common plant used in southern landscaping that contains cardiac glycosides. This study intends to explore the extent of toxicity of pediatric oleander ingestions. *Methods:* This IRB approved study is a retrospective analysis of all pediatric (6m to 6yrs) oleander ingestions reported to the xxxx (masked) Poison Control Center Network in 2004–2008. *Results:* 286 cases met the inclusion criteria of which 274 had follow-up. There were no reported deaths, and no use of digoxin specific antibody. Six patients (2%) were hospitalized with 1 patient placed in the ICU. No patients were hospitalized for over 1 day. No cases were reported as intentional. No dysrhythmias were reported. *Conclusion:* This study contributes evidence that accidental pediatric oleander ingestions rarely cause significant morbidity.

258. Epidemiology and Outcome of Unintentional and Deliberate Acetaminophen Poisoning

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Introduction: Previous US studies have shown a large variation (9–30%) in the proportion of acetaminophen (APAP) poisoning related to un-intentional (UI) compared to deliberate self-poisoning (DSP). Some authors have suggested that UI APAP poisoning is associated with a poorer outcome. APAP poisoning represents 48% of all poisonings in the UK, but there is limited data on the proportion of cases that are UI and DSP in the UK. The aim of this study was to assess the UI:DSP ratio in APAP poisoning and compare outcome in these groups. *Methods:* Data on all patients presenting to our inner-city teaching hospital is prospectively collected on a purpose-designed, approved, clinical toxicology database. We retrospectively extracted data for the 36 month period Mar 2005-Feb 2009 on UI and DSP APAP ingestions and outcome including peak ALT and

INR, proportion of patients requiring extended course NAC, liver ICU transfer and death. *Results:* There were 1223 APAP poisonings, 1101 (90%) were DSP and 122 (10%) UI. 342 (31%) DSP and 44 (36%) UI patients were treated with NAC (p = 0.26). Mean peak ALT in the DSP group was 180iu/l and the UI group 93iu/l; this is statistically but not clinically significant (p = 0.01). There was no difference between the proportion of patients with a peak ALT >1000iu/l in the DSP (2.0%) and UI (1.6%) groups or the peak INR (DSP 1.09, UI 1.11). 33 (3.0%) of patients in the DSP and no patients in the UI group required extended course NAC. There were 3 deaths in the DSP group and none in the UI group. No UI patients required transfer to a liver ICU, all of the 3 DSP patients who were transferred to the liver ICU died. *Conclusions:* Only a small minority of cases of APAP poisoning in this large series were UI. In contrast to previous reports, UI APAP poisoning was not associated with a poorer outcome. There was a trend to poorer outcome with APAP DSP and all of the cases of severe hepatoxicity were in the DSP gourp. Further work is needed to investigate the differences in outcome between these groups including analysis of other factors such as dose ingested, time to presentation and presence of risk factors for APAP toxicity.

259. DOM–An Old Street Drug Making a Resurgence

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Background: DOM (4-methyl-2, 5-dimethoxyamphetamine) is one of many compounds which are derivatives of 2,5-dimethoxyamphetamine. DOM was synthesized in 1964 and introduced to the street drug market. It was known as "STP" (Serenity Tranquility Peace) and became very popular in 1967 in the Haight-Ashbury district. DOM intoxication is characterized by euphoria, perceptual distortion, hallucinations and sympathetic stimulation. *Case series:* Our PCC was contacted regarding three young adults: a 20 y/o man, a 16 y/o woman and a 17 y/o woman who presented to the ED after "doing DOM". They had signs and symptoms of agitation, rigidity, mydriasis, sinus tachycardia (HR 130-160 beats/min) with normal blood pressure, mildly elevated temperature (99.4-99.9 ºF), hypokalemia (serum K 2.8-3.2 mEq/L) and metabolic acidosis (anion gaps ranging from 19-26). In 2 patients the urine toxicology screen was positive for amphetamines, benzodiazepines and marijuana while it was negative in the remaining patient. The man had a leukocytosis of 16,800 cells/mm3. He developed rhabdomyolysis with an initial CPK of 4,857 U/L which peaked at 33,448 U/L on day 2. The 17 y/o woman's temperature increased to 100.2 ºF and she experienced a rise in CPK from 984 U/L to 23,694 U/L on day 3. The 16 y/o woman had a mild elevation of CPK from 63 U/L to 492 U/L on day 1. None of the three patients developed any renal injury. All were treated with IV fluids and potassium correction. Benzodiazepines (lorazepam and diazepam) were given to all patients with improvement of symptoms. The 20 y/o man received propofol for several hours for added sedation. *Discussion:* DOM, along with its chemical cousins DOI, DOB, MDA, PMA and MDMA, are hallucinogenic amphetamines (HA) with a narrow therapeutic index and significant potential for severe toxicity and death. Long-term neuropsychiatric sequelae due to serotonin terminal degeneration and depletion has been reported with HA. *Conclusion:* PCC specialists and ED clinicians should be aware of the resurgence in the abuse of this 1960's era hallucinogen. Efforts to curtail its sale and use should be encouraged by reporting these exposure cases to law enforcement personnel and public health authorities.

260. Outpatient Therapy with Baking Soda for Acute Salicylate Overdsose

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Background: Alkalemia and alkaluria are therapeutic goals in salicylate (ASA) overdoses to decrease blood brain barrier penetration and to enhance elimination of ASA. We present a case in which the patient was treated as an outpatient with baking soda for an acute ASA overdose, and how this altered the management. *Case report:* An 81 yo female acutely ingested an unknown amount of ASA, and her husband called their primary care physician's (PCP) office. The PCP recommended oral baking soda and consumption of fluids. Some form of this therapy was instituted until the she developed hearing loss and confusion. This prompted her husband to bring her to the Emergency Department. On presentation her vital signs were BP 117/62, HR 100 bpm, RR 22 rpm, T 98.3° F, SaO_2 100%. 21.5 hours post ingestion her laboratory testing revealed a serum ASA of 94 mg/dL, pH 7.68, pCO_2 18, pO_2 80, bicarbonate 26 mg/dL, glucose 139 mg/dL, creatinine 1.1 mg/dL, potassium 2.6 mEq/L. Sodium bicarbonate therapy was not initiated secondary to the dangerously elevated alkalemia, but she was given 50 grams of activated charcoal and IV potassium. Five hours later the serum ASA was 87 mg/dL and the serum and urine pH were > 7.5 and 6.0. Because the patient was still delerius, and the next serum ASA was 60 mg/dL with a serum pH of 7.5, hemodialysis (HD) was performed. After HD her mental status returned to baseline and the serum ASA was 17 mg/dL. *Discussion:* The combination of her respiratory alkalosis and baking soda regimen buffered her from ASA toxicity beyond 24 hours from ingestion with a potentially life-threatening serum ASA concentration. This prevented the use of serum alkalinization and HD was required when her clinical status did not improve. *Conclusion:* A home regimen of baking soda is not recommended to treat ASA toxicity. Excessive serum alkalinization can result in dysrhythmias and seizures. However, in this case it, appeared to have buffered her for hours, keeping her serum pH at a such an elevated level hospital alkalinization was not necessary and contraindicated.

261. A Cool Case? – Oral Propylene Glycol Antifreeze Ingestion

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Background: The typical clinical course following massive oral propylene glycol (PG) ingestion remains unclear. Deliberate oral PG overdose is rare, with very few detailed published cases. We present a case with the 2nd highest level following PO exposure. *Case report:* A 55 year-old male with history of hypertension and hypercholesterolemia presented to the emergency department (ED) after drinking ~0.5 gallon Splash® Antifreeze (27.5% PG) along with wine in a suicide attempt. The ingestion occurred 3-4h prior to arrival and there were no other coingestants. On arrival, the patient was awake and alert, with normal vital signs and an unremarkable physical exam. Pertinent initial labs included: Na 138, K 4.4, Cl 100, HCO_3 27, BUN 10 mg/dL, Cr 0.9 mg/dL, Ca 9.5 mg/dL, lactate 2.0 mmol/L. ABG: 7.40/PCO_2 35.3/PO_2 76.4. Salicylates and acetaminophen were undetectable. Serum osmolality was 389 with ethanol 68 mg/dL. The patient was given a single 15 mg/kg dose of fomepizole for possible ethylene glycol (EG) exposure while quantitative serum EG and PG levels were sent using blood drawn on presentation. No further fomepizole doses were given due to undetectable EG. PG was markedly elevated at 440 mg/dL. The patient was cleared for psychiatric placement within 24h and serial basic metabolic panels remained normal during the 7d hospitalization. *Case discussion:* While acidosis, renal dysfunction, elevated lactate and osmolality are well described following IV exposure to high-dose PG, effects following oral exposure are less consistent. The role of alcohol dehydrogenase blockade is also unclear. Although typically thought of as relatively non-toxic following ingestion, acidosis, hyperlactatemia, D-lactic acidosis, and hyperosmolality have been reported. A PG level of 470 mg/dL after acute ingestion is the highest previously reported. *Conclusion:* Detailed reports of acute massive PG ingestion are rare. To our knowledge, this is the 2nd highest PG level due to PO exposure. Our patient's clinical course was nondescript beyond a mildly elevated lactate, supporting previous descriptions of PG ingestion as fairly benign. However, we are unable to comment on potential salutary effects of fomepizole therapy.

262. Managing Neuroparalytic Snake Bite: Evolving Treatment Paradigms

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Introduction: Venomous snakebite continues to exact a tremendous toll in human suffering and mortality in India. The ambiguity regarding the dosage of anti snake venom (ASV)to be used, results in under or over utilization of this costly antidote. We present here our experiences on how we graduated from a higher dose of anti snake venom to a lower dose in neuroparalytic snake bite. *Methodology:* A literature search of all the published article on snake bite management from our institute was done and 3 studies were selected which were conducted over last 10 years. The data was screened for the mean dose of ASV use and the rate of survival in the victims. The results were compared with an observational study of neuroparalytic snake envenomation being treated by using the national snake bite protocol. The results are presented here. *Observations:* The first study was a retrospective analysis of 142 patients admitted in the emergency from 1997-2001. In 86 patients with neuroparalytic snake bite the mean dose of 510 ml of ASV was used with a mortality rate of 3.5%. In a subsequent study conducted in the respiratory intensive care unit (RICU)in 2001 revealed use of 900 ml of mean dose of ASV, in 14 patients with 92.8% survival arte. The mean duration of ventilation was 17 hours. The next study was a retrospective analysis of 55 patients admitted in RICU over 4 years (2001-2005). Out of them 28 patient received mean dose of 150 ml of ASV and 27 received mean dose of 600 ml. The mean duration of ventilation was 44 and 47 hours in high and low dose group. There was 11% mortality noted in this study and all these patients were in high dose group. In this prospective study 73 consecutive patients with neuroparalytic snake bite were included. These patients were treated using the national snake bite protocol. The mean dose of 115 ml of ASV was used. The mean duration of ventilation was 39.5 hours with 2.73% mortality. *Conclusion:* Low dose antisnake venom is a cost effective strategy in managing victims of neuroparalytic snake bite.

263. Successful Use of Intravenous Lipid as Adjunctive Therapy in a Severe Calcium Channel Antagonist Poisoning

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Background: Use of lipid rescue in humans with local anesthetic and antidepressants toxicity has been documented in prior case reports. This case documents successful use of lipid therapy after a presumed extended release diltiazem overdose. *Case report:* A 47 y/o woman with a history of a bipolar disorder and hypertension presented an unknown amount of time after ingestion of approximately 25 diltiazem extended release (120 mg each), lamotragine and citalopram. The patient presented poorly responsive, hypotensive (50-60 mmHg systolic), and bradycardic (50 bpm). She had one generalized seizure. She was intubated and given IV lorazepam, then calcium, atropine, norepinephrine, phenylephrine and high dose insulin/glucose therapy. Glucagon, milrinone, epinephrine, and vasopressin were also initiated. The patient's blood pressure worsened and an intraaortic balloon pump (IABP) and transvenous pacemaker were placed. IV digoxin was given but there the patient remained profoundly hypotensive with a mean arterial blood pressure (MAP) ranging from 30-50. Approximately 9 hours after presentation, a 20% lipid infusion (1mg/kg bolus then 0.05 mg/kg/min) was given. Within 20 minutes the patient's MAP

improved to 58 and her SBP improved and remained greater than 70 mmHg. Electrolytes were unable to be measured for the next 8 hours secondary to lipemia. The remainder of her ICU stay was complicated by acute pancreatitis, liver enzyme elevation and oliguric renal failure. Pressors were weaned and she was extubated on day 4. The patient was alert, oriented and neurologically intact at the time of transfer to inpatient psychiatry on day 14. The patient continued on hemodialysis for persistent renal failure. *Discussion:* This patient with severe CCA poisoning remained hypotensive after aggressive pharmacological management but significantly improvement shortly after initiation of lipid therapy. Adverse effects from the lipid therapy included acute pancreatitis and inability to measure electrolytes due to interference with lab testing. *Conclusion:* Lipid rescue may be an effective adjunctive therapy in CCA poisoning without significant apparent adverse effects.

264. Appalling WA State Poisoning Mortality Trends from 1981 to 2005

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Introduction: The goal of Healthy People 2010 is a poisoning mortality rate (/100,000) of 1.8. Purpose: Determine poisoning trends in WA injury mortality from 1981 to 2005. *Methods:* A retrospective WA population study using Wonder.CDC.Gov leading and underlying cause of death data, which is coded from 1981 to 1998 with ICD9 and from 1999 to 2005 with ICD10. *Results:* In WA for all study years combined there were 73,582 injury deaths with the 5 leading causes: motor vehicle (MV) traffic (26%), firearms (19%), poisoning (16%), falls (11%), and suffocation (7%). While the overall deaths trends for firearms and suffocation remained stable over these years, they fell for MV traffic and increased for poisonings and falls. The poisoning % of all injury deaths increased > 4x. The overall poisoning death rate for males (12.3) was 2x females (6.2). The ages with the highest overall rates of poisoning deaths in 2005 were 35–44 Yrs (24.7), 45–54 Yrs (35.2) and 55–64 Yrs (18.3). The US rates for the latter 2 age groups were 22.9 and 10.3, respectively. Blacks (13.4) had a higher overall rate than Whites (9.4) or Other (5.5) race group and Blacks' rate increased 2.6x from 1991 () to 2005 (15.5). In 2005 unintentional poisoning deaths (74%) were far more prevalent than suicide (21%) and undetermined (5%). There were 46,487 unintentional injury deaths with the 5 leading causes: MV traffic (41%), falls (16%), poisoning (14%), drowning (6%) and suffocation (4%). While the unintentional deaths trends for drowning and suffocation remained stable, it fell for MV traffic and increased for poisonings and falls. The poisoning % of all unintentional injury deaths increased > 7x. The rate of unintentional poisoning deaths increased 5.5x from 2 in 1991 to 10.9 in 2005, which was 36% greater the US rate. The unintentional poisoning death rate for Whites increased 5.9× from 1991 (1.9) to 2005 (11.2). *Conclusions:* Poisoning deaths have increased dramatically in WA since 1991 with unintentional poisonings responsible for most of the increase. Poisoning has become the most prevalent cause of injury deaths in WA since 2002 and should be the major focus of injury prevention programs.

265. Poison Center Data Identifies Increase in Energy Drink Consumption and Teens as Highest At-Risk Group

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Background: Specialists in Poison Information noted an increase in calls regarding energy drink consumption which prompted a statewide database search of Texas regional poison centers (PCs). Since 1985, the popularity of energy drinks has brought with them the idea of increasing mental alertness. The average caffeine content in a soft drink contains ~27 mg/serving whereas the typical energy drink contains ~80 mg/serving. This study aims to identify the at-risk population for negative health effects, risk factors, and medical consequences associated with energy drink consumption. *Methods:* A retrospective statistical analysis of the Texas PC Network's database was performed for 2000–2008 to analyze energy drink cases to determine age, gender, type of drink, exposure reason, exposure site, management site, signs and symptoms, reasons for seeking medical attention, medical outcome, and caller relation. *Results:* Of 428 cases identified, 260 involved males and 168 females. Health care facilities (HCFs) evaluated 113 cases. The largest affected age group was teenagers (114 cases) of which 22 were evaluated by a school nurse (2 cases in 2003, 5 in 2006, 4 in 2007, and 11 in 2008), followed by those in their 20s (103 cases), and 84 exposures in those < 5-years-old. Significant increases were noted between 2000 and 2001 (+100%); 2003–2004 (+87.5%); and 2005–2006 (+85%). A large number of cases classified as intentional misuse or intentional abuse were representative of the age group of 13–29-years-old and that group was deemed the highest at-risk population at 39%. The major complaints of those exposed were rapid heart rate, nervousness/agitation, nausea, vomiting, upset stomach, dizziness, tremors, chest discomfort and headache. Products implicated in the majority of the cases were Red Bull, Red Line, and 5 Hour Energy. *Conclusion:* The documented cases demonstrated that energy drink consumption exposures have risen significantly over the last 6 years along with HCF visits and that teens are the most at-risk group. This study provides strong evidence to suggest that a community-wide educational effort be initiated to target this group.

266. "First Fridays" in the Emergency Department: Chronobiological Implications

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Background: In the ED, many chronobiological anecdotes exist. For example, belief in the power of the full moon to increase ED volume is frequently cited by ED staff. Another belief is that on the "First Friday" of every month, the volume of substance abuse ED visits increases. This observation derives from the fact that public aid payments are dispersed on this day and the belief that recipients use their funding to obtain illicit drugs and alcohol. Several studies have been able to link drug use/abuse and socioeconomic disparity; but directed studies of public aid recipients and drug use have given conflicting results. We sought to determine if the "First Friday" effect truly exists, and to determine if ED staffing levels need to be adjusted accordingly. *Methods:* After obtaining IRB approval, we performed a retrospective comparative analysis of discharge diagnoses recorded on weekend days (Friday-Monday) from the ED at UIC during the calendar year 2007. "First Friday" patients were compared to patients seen on all other weekend days. Our hospital is an academic teaching hospital with over 50,000 annual patient visits situated in an urban environment, and all analyses were completed utilizing the SAS system. *Results:* Overall, 192 total days were analyzed for ED visits related to substance use/abuse/overdose. Of these, 48 days were assigned to the "First Friday" designation. For all weekend days, there was a 2.9 patient/day visit rate attributable to substance use/abuse. On First Friday weekends, this rate increased to 3.2. However, Poisson analysis failed to provide statistical significance for this absolute difference. *Limitations:* Several limitations exist. Our sample size was small, we utilized retrospective data, and this data was based on discharge diagnoses. *Discussion:* "First Fridays" have been implicated in greater visits due to substance abuse and intoxication. Our analysis, while trending toward significance, failed to show a significant increase in visit rate. The inherent limitations in our study may have hampered these results; and our next step is to perform this study prospectively.

267. Permanent Vision Loss after Occupational Methanol Inhalation

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Introduction: Patients who inhale methanol-containing products can have visual impairment. Prior cases with visual impairment had partial to full recovery. We report the first case of methanol vapor exposure from occupational use with both gap acidosis and permanent vision loss. *Case:* 43-year old car painter presented with 2 days of bilateral blurred vision that progressed to vision loss, vomiting, & hyperventilation. He denied PMH or meds. He had replaced his usual cleaning solvent 1-week prior to the start of his symptoms with a cheaper alternative containing 10% - 30% methanol. Between paint applications, he poured the methanol-containing solvent into a spray gun & cleaned it by spraying this solvent in his poorly ventilated garage without a mask. Paint use tripled during the week prior to presentation due to increased business. He denied intentional abuse. On presentation, vitals signs and physical exam were unremarkable except mild respiratory distress & bilateral, 5 mm nonreactive pupils without light perception. Laboratories: ABG pH 7.21, pCO_2 8.8 mmHg; venous CO_2 5 mmol/L, anion gap 22, osmolar gap 25, creatinine 0.8 mg/dL, salicylate 0 mg/dL, methanol 28 mg/dL, and formic acid level 14 g/dL (0-12 g/dL). Pt was given fomepizole, thiamine, & a sodium bicarbonate infusion. At our facility, we continued this plus folate & steroids. Hemodialysis (HD) was done with a repeat methanol of 7 mg/dL. His light perception improved slightly at first but soon worsened to complete vision loss. Repeat methanol & formic acid levels were 0 after second HD. Ophthalmology noted bilateral optic neuropathy consistent with methanol toxicity. Initial & 5-month follow-up brain MRI's were negative. *Discussion:* Carburetor cleaners & lacquer thinners are commonly abused for intoxication; targeting the main component toluene. However, in an analysis of the gas-phase of lacquer thinner, methanol was the main component (60,000 ppm). Its ACGIH TLV is 200 ppm. Our patient had typical symptoms of methanol toxicity after an occupational methanol-containing cleaning solvent exposure. While methanol levels, gap acidosis, & treatment were consistent with prior cases; this is the first case where the patient had permanent vision loss after occupational use of a methanol-containing solvent.

268. An *In Vitro* Study To Determine the Ability of Albumin and Plasma To Scavenge Organophosphate Compounds

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Background: Organophosphate pesticide poisoning is a common method of suicide in the developing world. Treatment with oximes is controversial and might benefit only patients poisoned by specific organophosphates or moderate poisoning. New treatments such as the use of fresh frozen plasma or albumin to scavenge organophosphates have been suggested, and the aim of this study was to determine *in vitro* if components of fresh frozen plasma, especially albumin, bind organophosphate compounds and thus help in scavenging these compounds in poisoned patients. *Study design and methods:* The ability of albumin and components of plasma to bind organophosphates was studied by incubating albumin (16g %) with increasing concentration of monocrotophos (0– 600µM). To evaluate scavenging by plasma components, plasma or albumin free plasma (albumin removed by affinity to Cibacron-Blue Sepharose) was incubated with monocrotophos (200µM) for one hour at 37°C. Free monocrotophos levels were then determined in these samples by inhibition of pure butyrylcholinesterase (Isolated from serum by ion exchange chromatography). *Results:* 12.5µM monocrotophos inhibited pure butyrylcholinesterase 90% and binding to albumin (16g %) was saturated at that concentration of organophosphate. Incubation of

plasma or albumin-free plasma with 200µM monocrotophos inhibited pure butyrylcholinesterase 67% and 58% respectively, indicating the presence of free monocrotophos under these conditions. *Conclusion:* Monocrotophos binds to albumin and also components in albumin-free plasma. However, the low saturation binding of monocrotophos to albumin suggest that neither albumin nor plasma would be clinically effective in scavenging organophosphates in poisoned patients. This is because concentrations of circulating organophosphates in poisoned patients are in the range 21µg/ml in the first two days of poisoning.

269. Clinical Effects and Outcomes Following Unintentional Ingestion of Citalopram (Celexa®) by Young Children

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Background: Citalopram (Celexa®) is a selective serotonin reuptake inhibitor (SSRI) approved by the FDA in 1998 for major depression and general anxiety disorders in adults. Off-label uses include treatment for fibromyalgia and diabetic neuropathy pain control and treatment for some forms of urinary incontinence. There are no large reviews of the clinical effects seen in young children with unintentional citalopram ingestion. *Objective:* To determine the clinical effects of ingestion of citalopram by children under the age of seven years. *Methods:* This was a retrospective, observational study of telephone calls to one state's poison centers from 2000 to 2008. Inclusion criteria were single agent ingestions of citalopram by patients ages six years and younger. *Results:* There were 222 children who met the inclusion criteria. Of the 186 (83.8%) children who had amount ingested recorded, the amount ranged from less than 5 mg to 200 mg. The 185 (83.3%) children who had no symptoms ingested an average of 2.9 mg/kg (range 0.06 to 18.3 mg/kg). The 35 children (15.8%) with mild symptoms ingested 2.3 mg/kg (range 0.7 to 7.0 mg/kg). Their clinical effects included drowsiness (6.8%), vomiting (5.9%), agitation (1.4%), and tachycardia (0.9%). Two children (0.8%) had major clinical effects: one child who ingested an unknown amount had a seizure and another child who ingested 40 mg developed QT prolongation on ECG. There were no deaths (0%; 95% CI: 0 – 1.7%). About half (52.3%) were managed at home with no or minimal effects. Only nine children (4.1%) were admitted to the hospital. *Conclusion:* This is the first large study of citalopram ingestion by young children. These children usually have no or mild clinical effects (99.1%; 95% CI: 96.8 to 99.8%). Most of these children may be safely observed at home, but more research is needed to determine the prudent nontoxic dose.

270. Ibuprofen Ingestion with Delayed Coma, Respiratory Failure, Hypotension and Metabolic Acidosis

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Ibuprofen (IB) poisoning has been reported to cause severe symptoms within four hours of ingestion. We present a case of IB ingestion with severe symptoms 9 hours after ingestion.

A 43 year-old female with history of hypothyroidism presented to the ED 45 minutes after ingesting 159 IB 600 mg tablets. The EMS run sheet documented that the patient was awake and alert and had HR 62, BP 90/70, and RR 16. Initial vital signs included: HR 59, BP 113/74, and RR 16. She had no abnormal physical findings but had paranoid ideation and auditory hallucinations, which she and her husband confirmed had been present for the past 6 months.

Initial BMP: 140/3.9/101/29/10/1.5/103, undetectable ASA and APAP, ECG with NSR, negative UDS, TSH-71.7, and T4-0.03. The patient was given synthroid 200 mcg PO 6 hours after the ingestion. Following 1 liter NS bolus, a 7-hour post ingestion BMP was: 141/3.3/104/25/9/1.5/109. She was awake and alert, with baseline respiratory status 8.5 hours after the ingestion.

Nine hours post ingestion the patient was unresponsive with P-50, BP 40/palp., 88% on RA. She was intubated, given repeated crystalline fluid boluses, norepinephrine, dopamine, dobutamine, neosynephrine, vasopressin, glucagon, hydrocortisone, and broad-spectrum antibiotics. 18 hours post ingestion her arterial pH was 6.81 and HCO_3 12. She was on alkalinized fluids and CVVH to correct acidemia. She was on high-dose insulin therapy due to concern of CCB ingestion. A 32 hour post-ingestion serum IB was 336 mcg/mL and a 142 hour post-ingestion level was 11 mcg/mL. Urine was sent for comprehensive GC/MS and was positive for ibuprofen, nicotine, and caffeine. Serum ethanol, ethylene glycol, methanol, and metoprolol were negative. Urine was negative for verapamil. She was weaned off pressors by day 10 extubated on day 13, and was discharged with complete recovery on day 18.

Possible explanations for the patient's delayed symptoms include: delayed GI absorption due to hypothyroidism, formation of an IB bezoar, undetected co-ingestant, or an unwitnessed second ingestion. This patient had complete recovery due to aggressive critical care.

271. Thrombocytosis Induced by Rosuvastatin

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Background: Adverse hematologic effects associated with statins include thrombocytopenia and hypersensitivity reactions. We report a case of thrombocytosis following rosuvastatin use. *Case report:* A 50 year-old African American male nonsmoker with a PMH of hypertension, pulmonary embolism, gout, diabetes mellitus, peripheral neuropathy, and dyslipidemia presented to his primary care physician with left knee pain. His medications included simvastatin 40mg qday, atenolol 25mg qday, amlodipine 10mg qday, warfarin 5mg qday, allopurinol 100mg qday, metformin 500mg bid, gabapentin 300mg tid, and hydrocodone-acetaminophen 5/500mg as needed. A diagnosis of gout arthritis was made. It was also noted that his serum lipids were not optimally controlled leading to a single change in his medication regimen from simvastatin to rosuvastatin 20mg qday. Cell blood count prior to this change revealed a platelet count of 347 10^9/L. The patient then developed a thrombocytosis and mild anemia with a normal white blood cell count over the following 8 weeks with a peak platelet count of 925 10^9/L. Rosuvastatin was discontinued. One month following the discontinuation of the drug the platelet count normalized at 288 10^9/L (normal range). The hematology service evaluated the patient and excluded other sources of thrombocytosis, attributing it to mild iron deficiency anemia. He had no adverse sequelae from the event and moved out of state. *Discussion:* Thrombocytosis appears to be a rare adverse event associated with rosuvastatin and can be categorized as a probable adverse event on the Naranjo causality scale given the temporal relationship of symptoms with starting and stopping the drug, and lack of a plausible alternative explanation. Statins have been shown to be anti-inflammatory agents and have been associated with thrombocytopenia. We were not able to elucidate the mechanism of thrombocytosis. *Conclusion:* Rosuvastatin may cause thrombocytosis by an unclear etiology. Further research is warranted to investigate the mechanism.

272. Isolated Tramadol Overdose Associated with Brugada Pattern EKG Changes

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Background: Tramadol is a commonly prescribed analgesic with weak μ-receptor agonist activity as well as serotonin and norepinephrine re-uptake inhibition. Toxicity usually manifests as seizures and the usual manifestations of opioid overdose. In humans, EKG changes consistent with sodium-channel blockade have been described with some synthetic opioid agonists but not with tramadol. We report a case of isolated tramadol overdose with EKG changes consistent with Brugada pattern, likely caused by sodium-channel blockade. *Case report:* A 47 year old man with a history of depression was found by his roommate unresponsive with an empty bottle of tramadol. The bottle had contained sixty 50 mg tablets. 4 mg of IV naloxone was given by EMS, after which the patient woke enough to state he ingested the entire bottle in a suicide attempt. His mental status deteriorated again and he was intubated on hospital arrival. An EKG showed pseudo-RBBB pattern with ST elevation in leads V1-V3 with coved type appearance suggestive of Brugada pattern. A troponin I was elevated at 0.13 ng/ml (normal range 0.00–0.09). Emergent coronary angiogram done with suspicion of acute coronary syndrome revealed only mild coronary artery disease without significant lesions. A comprehensive urine drug screen, including liquid chromatography, was negative except for tramadol and its metabolites. A serum tramadol level returned markedly elevated at 8663 ng/ml (therapeutic values 100–1500). Serial EKGs showed gradual resolution of the acute findings. The patient was extubated on hospital day 2 and discharged on hospital day 3. *Discussion:* A review of the literature reveals no human cases of tramadol overdose causing EKG changes consistent with sodium-channel blockade. In vitro blockade of sodium-channels with tramadol has been demonstrated at high concentrations. Sodium-channel blockade is an established way of uncovering Brugada pattern. It is likely the massive concentration of tramadol caused this patient's Brugada pattern. *Conclusion:* Tramadol overdose may cause EKG changes consistent with Brugada pattern. To our knowledge, we report the first case of Brugada pattern with tramadol overdose.

273. Youngest Reported Case of Serotonin Syndrome from Ingestion of Sertraline Alone

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Background: Serotonin Syndrome(SS) is a well known complication of treatment with Selective Serotonin Reuptake Inhibitors (SSRI), particularly in the presence of other serotonergic substances. Symptoms including autonomic instability, neuromuscular dysfunction, and mental status changes typically resolve quickly and without sequelae. We describe the unique clinical findings of an infant with SS after ingestion of a single agent (sertraline). *Case:* An 8 month old girl presented to an ED 3 hours after ingesting as much as 700 mg (approximately 83 mg/kg) of sertraline. She was "jittery" and vomiting with BP 105/65 mmHg, HR 150 bpm, RR 28 rpm, rectal Temp 37.9° C. On exam, she was inconsolable, tremulous, and had moist oral mucosa. She had normal tone and reflexes in her arms, but rigidity and 4+ reflexes in her legs with sustained clonus at the ankles. Pupils were dilated and reactive. Labs revealed: WBC 18000/mm^3, normal electrolytes, BUN 15 mg/dL, Creatinine 0.3 mg/dl, total CK 203 U/L and undetectable acetaminophen, salicylate and ethanol. Urine drug screen by GC/MS was positive only for a large amount of sertraline. Serum sertraline level 16 hours after ingestion was 600 ng/mL (therapeutic doses <200). She received IV hydration and frequent doses of lorazepam. Approximately 40 h after ingestion, her vital signs normalized, but she had continued hyperreflexia and clonus in her legs. Since she was tolerating feedings and all laboratory results normalized, she was discharged home 48 hours after her ingestion. *Discussion:* SS has been reported after ingesting sertraline alone, but never in such a young child. The differential of fever, GI upset, and irritability in infants is broad, but classic exam findings of lower extremity hyperreflexia and laboratory data aided our diagnosis of SS. Symptoms typically resolve over 24 hours, but the few reported cases of SS in children appear to have prolonged symptoms as in our

case. *Conclusion:* From a review of the English literature, this appears to be the youngest reported case of SS. Clinicians should consider drug toxicity in irritable infants. Admission for monitoring and treatment is warranted, as the symptoms may persist longer than is typically reported in older patients.

274. Conflict of Interest (COI) Management among Pharmacy and Therapeutics (P&T) Committees

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Background: P&T committees are responsible for selecting medication to include on the hospital formulary. These decisions should ideally be guided by patient and institution centered factors. We sought to determine the mechanisms by which conflicts of interest are defined and managed by P&T committees at academic medical centers (AMCs) in the US. *Methods:* An anonymous survey tool was developed that inquired about the institutional policy regarding COI pertaining to the P&T committee. Solicitation of participation was sent electronically to members of the University Health Consortium Pharmacy and to medical toxicologists. Responses were gathered and summarized by the online survey tool. Reminders were sent weekly over a one month period. *Results:* 40 individual responses were obtained. The responses are mainly from urban (85%), nonprofit (72%) or publicly funded (11%) hospitals throughout the country. The institutions were mainly academic or highly academic (88%) based on their number of teaching programs and research grants. The P&T committees' functions include formulary (100%), medication use (92%), and medication safety (86%). A COI disclosure form is signed annually (59%), only at the time of joining (6%), biannually (3%), or never (15%). Most responses state that their P&T committees (76%) do not have COI guidelines. When policies are present, the P&T chair adjudicates the COI 61% of the time, according to the responses. Greater than 50% define COI as financial, expert consultation, research or clinical funding, advisory board and or speaker bureau participation. Members are required to withdraw from discussion (68%) and decision-making (81%) of relevant medications. Drug representatives are not allowed to attend P&T meetings according to 97% of responses. *Conclusion:* Explicit guidelines for COI on P&T committees are lacking at most instituitions. The assessment and management of COI is highly variable among AMCs in the US.

275. Unique Lookalike Medication Error Leads to Patient Harm

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Objective: Errors related to lookalike medications are common. We report a unique error due to lookalike prefilled syringes (PFS) of morphine and diazepam. *Case:* A 50 year old man with severe alcohol withdrawal was receiving symptom triggered therapy. He initially required escalating doses of IV diazepam, totaling 280mg over 3–4 hours without adequate control of his withdrawal. His most recent dose of 100mg IV diazepam, one hour earlier, was well tolerated. At this time an additional 100mg IV diazepam and 65mg IV phenobarbital, both as bolus doses, were ordered. The diazepam was administered first, followed immediately by the phenobarbital. Within 5 minutes he became unresponsive with respiratory depression, pinpoint pupils, and rapid oxygen desaturation. He was intubated and placed on mechanical ventilation, after which his saturation normalized. The patient's condition was initially attributed to the simultaneous administration of multiple sedatives. However, at nursing turnover, review of the unit's "narcotic" cabinet, revealed that 100mg of morphine (10 PFS x 10 mg) was unaccountable and an unanticipated 100mg of diazepam (10 PFS x 10 mg) was present. The patient's hospitalization was complicated by a protracted ICU stay due to pneumonia and sinusitis. *Discussion:* This case represents a sentinel lookalike medication error. The boxes of PFS for morphine and diazepam have similar physical characteristics, lettering, and coloring. The PFS of both medications also have similar colors, lettering, and are the same size and dose (10mg). One contributory factor was that the morphine box was placed within the stack of diazepam boxes in the cabinet. Discussion with the nurse suggested that he was likely in "automode" and did not carefully examine the medication label. A checklist completed by the provider or reading the label aloud to another provider is suggested as a means to interrupt automode function. *Conclusion:* Systems must be in place to prevent lookalike medication errors from occurring. Boxes and PFS should be labeled in different colors and text in order to be distinct. They should be physically separated in storage areas.

276. Ethiopian Mountain Viper Strikes in the Texas Hill Country

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Background: An Ethiopian Mountain Viper (Family; Viperidae, Genus; Bitis, Species; Parviocula), a virtually unknown snake which inhabits the forests and grasslands of the Ethiopian Rift Valley, envenomated a veteran herpetologist in the Texas Hill Country. *Case:* a 67 year old man was nicked by the snake on his left index finger causing profuse bleeding from the wound site: he arrived in the Emergency Department within 45 minutes of envenomation. The patient presented with a blanched finger without capillary refill, later developing grayish black blisters and oropharyngeal swelling. Vital signs on admission: blood pressure = 150/90, pulse = 109, and oxygen saturation 98%. The patient developed respiratory distress within 10 minutes of arrival as the oxygen saturations dropped to 71%; he was medicated, intubated and placed on a ventilator. The herpetologist had informed the staff that no antivenin existed but that he thought the Gaboon antivenom might work. The poison center was consulted: after numerous calls to different agencies, the Gaboon antivenom was located. *Discussion:* The crisis was compounded by the lack of information: According to the herpetologist there are only 7 known Ethiopian Mountain vipers in existence, no known antivenom, and no previously recorded envenomation in the United States. Through a series of telephone calls the Gaboon antivenin was located and secured from the zoo to no avail; the patient was allergic to the horse serum, a main component of the antivenin. The patient was successfully treated with supportive measures by a multifaceted medical team. *Conclusion:* When dealing with an unprecedented event all resources are crucial and all lines of communications are critical and must remain open.

277. Tracking Melamine Exposure Calls Via the National Poison Data System

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Background: In late 2008, over 300,000 infants were exposed to high amounts of melamine (a known cause of renal stones) in infant formulas produced in China. This resulted in 50,000 hospital admissions and 6 deaths in China. Scientists from the American Association of Poison Control Centers (AAPCC) and the Centers for Disease Control and Prevention (CDC) were asked by the United States Food and Drug Administration to monitor the National Poison Data System (NPDS) for calls related to possible melamine exposure among infants in the US. *Methods:* We monitored NPDS from Sept 29 to Oct 10, 2008 to identify melamine-associated calls. We then applied the following case definition to each of the melamine exposure calls to identify potential cases of melamine toxicity: any person < 3 years of age and one of the following: 1) living abroad in China within one month of the call; 2) drinking a product that was confirmed to be contaminated by melamine; or 3) clinical evidence of melamine toxicity. *Results:* 384,810 calls were captured by NPDS during the timeframe: 44 were melamine-associated calls from 14 states. Twenty-nine (65.9%) calls came from individuals, 11 (25%) came from healthcare facilities, and 4 (9.1%) were unknown. Call volume peaked on Oct 2 (n = 14) and gradually declined. Most exposures 31 (71%) had no symptoms of toxicity. Three calls had abdominal pain, one oliguria/anuria, and one urinary retention. Eight calls met the case definition of melamine toxicity; however, none of these calls could be definitively confirmed as true cases of melamine-associated illness due to the limited information available in NPDS and from the local PC. *Conclusions:* NPDS was able to track calls related to melamine and identify 8 potential melamine toxicity cases in the US. However, further review of calls is required to confirm case status. This event highlights both the utility and limitations of NPDS.

278. Whole Fentanyl Patch Ingestion: A Multi-Center Case Series

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Background: There are numerous reports describing the abuse of fentanyl transdermal patches via a myriad of routes. However, there are no data describing abuse from the ingestion of patches. A case series of 76 patients with a history of whole patch ingestion is reported. *Methods:* After receiving IRB approval, a retrospective review of all ingestions of intact fentanyl patches reported to three RPIC's from 2000 – 2008 was conducted. Collected data included demographics, the number of patches ingested, symptoms, treatment, level of care and outcome. *Results:* A total of 76 cases were included. There were 31(41%) women and 45 (59%) men. The number of patches ingested ranged from 1 – 5 with 43 (56.5%) ingesting 1. 158 symptoms were documented; the most common were coma 35 (22%), lethargy 30 (19%), respiratory depression 13 (8%) and respiratory arrest 6 (4%). 63 (83%) received naloxone, 12 (16%) required multiple doses of naloxone and 8 (11%) required continuous naloxone infusions. 56 (73.7%) were admitted to a critical care unit, 12 (15.8%) were treated and released, 4 (5.3%) signed out AMA, 2 (2.6%) were admitted to a regular unit and 2 (2.6%) were DOA. 14 (18%), 42 (55%), 14 (18%) experienced a minor, moderate and major effect, respectively. There were 2 (3%) fatalities and 2 (3%) unrelated effects. *Discussion:* Symptoms were consistent with opioid toxicity. The majority of patients experienced a moderate or major effect. Most required naloxone and admission. *Conclusion:* Patients who ingest whole fentanyl patches may exhibit significant toxicity, require naloxone and admission to a critical care unit.

279. Drug ID's or Known Outcomes: Which Do You Prefer?

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Background: Poison Centers can become overwhelmed by requests for drug identifications, taxing often overburdened resources. *Case report:* A management decision was made at the Louisiana Poison Center (LPC) to discontinue public drug identfication requests and utilize the time savings in what were felt to be more advantageous ways. *Case discussion:* Other poison centers have reported the same phenomenon that occured at the LPC. Each year the number of drug identification calls from the general public was increasing dramatically. There were times during the day when

poison exposure callers would hear a busy signal because all lines were tied up, often with drug identification calls. A decision was made to discontinue drug ID calls from the general public. We were responding to over 55,000 ID requests per year at that time. With the time savings realized, efforts were re-directed at efforts to increase the number of human exposure calls followed to a known outcome. At the time ID calls were discontinued we were following approximately 47% of cases to a known outcome. Since discontinuation of ID calls we have been able to increase and sustain the number of cases we follow to over 94%. We feel that an additional encounter related to a call give us an extra opportunity to interact with the caller, providing additional management advice when appropriate, educate where necessary, offer prevention/awareness information to the caller, and improve the quality of the data we collect by being able to code a known outcome on a greater percentage of cases. *Conclusion:* Poison Centers should carefully evaluate the potential benefit derived from providing drug identification services to the general public. Scarce resourece may well be utilized in other areas.

280. Iatrogenic Intralipid Overdose in a Case of Amlodipine Poisoning

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Introduction: Intralipid is a rescue therapy that has been used successfully in overdoses. We present a case of massive iatrogenic intralipid overdose during the treatment of amlodipine toxicity. *Case report:* A 71 yo F c h/o hypertension ingested 27 amlodipine 5mg 2 hours prior to evaluation. Her initial vital signs were a BP 85/44 mmHg, HR 79 bmp. She was alert and asymptomatic and was treated with IV normal saline and calcium gluconate. EKG showed HR 65, no abnormalities. Initial labs showed hyponatremia, but were otherwise normal. She remained hypotensive and oliguric, requiring treatment with dopamine, phenylephrine, vasopressin, 5.5 L crystalloid fluids, calcium boluses and high dose insulin-dextrose. Despite therapy, her mental status waned and she required intubation. She developed rales and ventilation was difficult. 10.5 hours after presentation, the treatment team felt that without rapid improvement there was no chance of meaningful survival. We suggested intralipid rescue therapy. A protocol was faxed describing a bolus of 1.5mL/kg 20% intralipid, followed by a 0.25mL/kg/min infusion to a max of 25 min or 8mL/kg. The infusion, however, ran for 4.5 hours and a total of 3265mL of intralipid was infused. The patient's blood resembled "creamy tomato soup" and "extreme lipemia" prevented blood gasses, metabolic panels and CBC analysis. 3h after the infusion, an ultra-centrifuged blood sample was run as a metabolic panel, with worsened hyponatremia. 23h after the infusion, a CBC was interpretable by the laboratory. There appeared to be a slight improvement in BP after the infusion. The patient's BP and HR stabilized on hospital day #2, but she died 4 days later. An amlodipine level obtained immediately after the lipid infusion was 1500 ng/mL (ref 3–11 ng/mL). *Discussion/ Conclusions:* We report a case of intralipid use in amlodipine overdose and the first reported case and the effects of an intralipid overdose. The treating team was able to obtain chemistry labs via ultracentrifugation. Hematologic tests were unobtainable for 23 hours after the intralipid therapy due to lipemia, except centrifuged hematocrits which appeared to be falsely elevated. Notably, the overdose did not seem to have deleterious hemodynamic effects in our patients.

281. Metformin Associated Lactic Acidosis from a Medication Error

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Background: Sodium phosphate monobasic monohydrate (SPMM) is an intestinal purgative used in preparation for colonoscopy. Oral dosing includes three 1.5 gram tablets every 15 minutes for a total of 20 tablets on the night prior to colonoscopy. This regimen is repeated on the day of colonoscopy. We report a patient who ingested twelve metformin 1000 mg tablets instead of SPMM and subsequently developed metformin-associated lactic acidosis (MALA) in the setting of normal renal function. *Case report:* A 60-year-old diabetic woman presented with vomiting. She had recently filled prescriptions for metformin 1000 mg tablets and SPMM. Both bottles contained white, oval-shaped tablets of similar size. Seventy minutes after beginning the SPMM protocol for colonoscopy, she began vomiting. She realized she had taken 12 metformin 1000 mg tablets instead of SPMM. Upon arrival, she was tachycardic with normal blood pressure. Blood gas revealed: pH = 7.28; lactate = 6.9 mmol/L. Renal function revealed: BUN = 16 mg/dL; creatinine = 0.9 mg/dL. She was given 3 liters of intravenous normal saline. Repeat serum lactate at 3 hours was 4.2 mmol/L. Renal function remained normal. With continued normal saline hydration, the patient's serum lactate improved to 0.9 mmol/L at 7 hours of hospitalization. The patient recovered without sequelae. *Case discussion:* MALA is a potentially fatal consequence of metformin toxicity, usually occurring in the setting of impaired renal function. Intestinal metformin accumulation elevates intestinal and portal lactate concentrations, thereby decreasing liver pH and inhibiting pyruvate carboxylase and lactate metabolism. This patient developed MALA from an unintentional metformin overdose due to similar appearing tablets of metformin and SPMM. Lactic acidosis occurred in the setting of normal renal function. *Conclusion:* Errors may occur at various steps of prescribing, dispensing, and ingesting medications. Efforts at preventing similar mishaps may include special labeling of bottles containing SPMM due to the large number of tablets to be taken over a short period of time. Physicians should also be aware of the potential for MALA in acute metformin overdoses with normal renal function.

282. Encephalopathy after Bladder Irrigation with an Aluminum-Containing Solution

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Introduction: Bladder irrigation with aluminum containing solutions is a common treatment for hemorrhagic cystitis. We report a case of progressive aluminum-induced encephalopathy after continuous bladder irrigation with a 1% aluminum ammonium phosphate solution. *Case report:* An 87 year-old patient was admitted to the hospital with frank hematuria secondary to prostate irradiation, and exacerbated by treatment for a urinary-tract infection. A 1% bladder irrigant solution of alum (aluminum ammonium phosphate solution) was prepared by the pharmacy and administered by continuous infusion, at a variable rate, via a triple lumen urinary catheter. The maximum infusion rate documented was 1 liter an hour. The irrigation was started on the fourth hospital day and continued for 5 days. Initial serum creatinine (SCr) levels were 2.7 mg/dL, dropped to 1.6, and then gradually increased to 4.1 by the tenth hospital day. The patient developed an acute change in mental status starting on the ninth day, going from fully alert and oriented to confused, agitated and unresponsive to questioning. Computerized cranial tomography was negative for any pathological processes. Serum aluminum levels on the sixth hospital day were measured at 8 mcg/L, peaked at 33 mcg/L by hospital day 11, and then dropped to 7 mcg/L by day 16. Mental status gradually improved to baseline by conservative management with IV hydration. *Discussion:* Bladder irrigation with aluminum containing solutions is a standard treatment for hemorrhagic cystitis. Acute encephalopathy and death has been reported in the context of deteriorating renal function, and presentation may be delayed by several days after discontinuation of therapy. We recommend caution, with close monitoring of renal function and aluminum levels, if this treatment is considered.

Renal function and Aluminum levels

Hospital stay (days)	Bladder irrigation	Serum creatinine (mg/dL)	Serum aluminum (mcg/L)
1		2.7	
2		2.5	
3		2.1	
4	*	1.8	
5	*	1.6	
6	*	1.8	8
7	*	2.5	
8	*	2.8	
9		3.1	19
10		4.1	
11		3.7	33
12		2.7	
13		2.2	
14		1.8	13
15		1.7	
16		1.7	7
17		1.7	

283. Methemoglobinemia from Radiator Antifreeze Ingestion: Toxicity from an Additive

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Background: Ingestion of antifreeze can result in ethylene glycol, methanol, or glycol ether toxicity. Toxicity from additives is not well characterized. We report a case of radiator antifreeze ingestion resulting in methemoglobinemia due to nitrites in the additive. *Case report:* 32 year old male presents by ambulance to the ED 1 hour after intentional ingestion of ~375 mls of "Flo-Perm antifreeze/coolant" with dizziness, lethargy, headache and nausea. Initial oxygen saturation (O2sat) was 97%. On arrival to ED, perioral cyanosis was noted with O2sats ranging from 86–90% despite 100% O2. Decreasing level of consciousness and persistent hypoxia necessitated intubation. Arterial blood gas (ABG) showed acidemia (pH 7.31), pCO2 of 44, pO2 of 419 and lactate of 5.5mmol/L. The oxygen saturation on ABG was 100%, whereas the fractional oxyhemoglobin was 80%, methemoglobin (MetHb) 19.6% and carboxyhemoglobin 0.3%. Methylene blue was administered. A repeat MetHb level was 1.3%. Ethylene glycol level was 55 mmol/L with a glycolic acid level of 12 mmol/L. The patient was hemodialyzed, extubated, and medically cleared within 2 days. There was no recurrence of methemoglobinemia. *Case discussion:* Methemoglobinemia is not an expected complication of antifreeze ingestion. Micromedex search results for antifreeze do not identify any methemoglobinemia-inducing agents. If "radiator antifreeze" is searched, corrosion inhibitor ingredients are listed, but the concentration is not. Examples of these inhibitors are borates, triethanolamine, potassium hydroxide, and sodium nitrites. The Material Safety Data Sheet may lack this information: for the product in this case only monoethylene glycol and diethylene glycol were listed. Multiple phone calls to the manufacturing company revealed that the product contained an inhibitor package with sodium nitrite at 0.44% by weight, which would mean a maximum of 1.65 G of sodium nitrite if 375 mls were ingested. For comparison, 600 mg of sodium nitrite, when used in treatment of cyanide poisoning, induces a MetHb level of ~17 %. *Conclusion:* We present a case of methemoglobinemia induced by an additive in antifreeze.

284. Impact of Mandatory Carbon Monoxide (CO) Detectors on CO Exposure and Severity

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Introduction: In New York City, CO detectors became mandatory in homes and businesses on 11/1/04. The purpose of this study was to determine if implementation

of this legislation changed the incidence or severity of CO poisoning reported the PCC. *Methods:* The PCC database was searched for all CO calls between 1/1/00 and 8/31/08. The results were divided into 46 month pre-implementation and 46 month post-implementation mandatory CO monitoring periods. Exposures were classified dichotomously as either minor effect (AAPCC definitions no effect, minor effect, not followed minimal clinical effects possible), or major effect (definitions moderate effect, major effect or death). Unrelated effects, cases not followed, and confirmed nonexposures were excluded. Chi square analyses were performed. *Results:* In 46 preregulatory months there were 4,137 CO exposure calls and in 46 postregulartory months there were 4,054 (p = .16). There was no significant difference in the number of deaths, 8 in the preregulatory and 15 in the postregulatory period (p = 0.13). There was a significant decrease in the percentage of major effect calls in the postregulatory period (0.08%) compared to the preregulatory period (0.11%, p < .0001). *Discussion:* Mandatory CO monitoring decreased the incidence of consequential outcomes without increasing the number of calls related to CO exposure. This study is subject to all the limitations of a retrospective review such as unstandardized coding of severity and lack of confirmation of exposure. Notably the data may not reflect the true incidence of CO exposure. Additionally, in this analysis we excluded cases that could not be followed. *Conclusion:* The number of carbon monoxide exposures reported to the PCC was unchanged after the institution of mandatory CO detector use. However the proportion of reported cases with major effects decreased after the implementation of this legislation. Mandatory CO detection appears to be a useful intervention to decrease the severity of CO poisoning.

285. Seizure Following Kratom Exposure

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Background: Kratom, *Mitragyna speciosa Korth,* a tree native to south Asia, has a long history of use as a traditional medication. It may be gaining popularity as a drug of abuse in western countries. Mitragynine, the primary alkaloid found in Kratom, binds with high affinity at human adrenergic, serotonergic and adenosine receptors, and opioid receptors. Reports of toxicity secondary to Kratom are rare and lack of diagnostic testing in human specimens has prevented confirmation of observed clinical effects. We present a case of human toxicity following ingestion of Kratom confirmed by quantitative analysis of urine using high performance liquid chromatography coupled to electrospray tandem mass spectrometry (HPLC-ESI/MS/MS). *Case report:* A 64 year old male was brought to hospital after a seizure at home. Past history included chronic abdominal pain and depression treated with amitriptyline and oxycodone. On arrival to the emergency department the patient was awake and gave a history of Kratom ingestion for chronic pain. Vital signs were blood pressure 143/70, pulse 110, respiratory rate 14 and temperature 98.1. Finger stick glucose was 118. Physical exam was unrevealing. Electrocardiogram showed sinus tachycardia with narrow complexes Electrolytes were normal. Drug screening was positive for cannabinoids, tricyclic antidepressants and oxycodone. While in the ED, the patient sustained a second seizure leading to intubation. He was extubated 30 hours later and had an uneventful recovery. A urine specimen collected on presentation was submitted to the Wadsworth Center, New York State Department of Health. A methodology was developed for Kratom detection in human urine using HPLC-ESI/MS/MS. The mitragynine concentration in the urine was 50.2 ± 4.1 ng/ml. *Discussion:* We present a case of seizures temporally related to the use of Kratom. The pathogensis of this is unclear but may include adenosine antagonism or stimulation of adrenergic and/or serotonergic receptors similar to tramadol. Our observation is limited by the lack of any recognized causality between Kratom use and seizures. *Conclusion:* Kratom abuse may rarely be associated with seizures

286. The Addition of an Alpha-Agonist to High-Dose Insulin in the Rescue of Swine Poisoned with a Dihydropyridine Does Not Improve Outcome

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Purpose: To compare rescue with high dose insulin (HDI) alone versus HDI plus an alpha-adrenergic agent in treatment of overdose due to a dihydropyridine calcium channel blocker. Given the vasodilating properties of the dihydropyridines, our hypothesis was that the addition of an alpha-adrenergic agent would improve survival, cardiac index (CI), mean arterial pressure (MAP), and systemic vascular resistance (SVR). *Methods:* There were three arms with five pigs in each of the following: control (C), insulin/glucose (IN) only, and phenylephrine plus insulin (PE/IN). Pigs were anesthetized with isoflourane and nitrous oxide, underwent tracheostomy, placement of a Swan-Ganz catheter and an arterial line. All pigs received a nifedipine (N) infusion of 0.0125mcg/kg/min until a point of toxicity was reached, defined as a 25% decrease in the baseline product of MAP x cardiac output. A 20ml/kg bolus of saline (NS) was infused over 10 minutes and the N infusion continued over a 4-hour resuscitation phase, with NS at 2 ml/kg/hr. The C arm received NS only. The IN arm received an insulin infusion begun at 2 units/kg/hr and increased q10 minutes by 2 units to a maximum of 10 units/kg/hr. The PE/IN arm was given a PE infusion at 2.4 mcg/kg/min titrated to 3.6 mcg/kg/min after full titration of IN. The above parameters were recorded. *Results:* No baseline differences among the groups, including time to toxicity, were found. One pig survived in the C arm, four in the IN arm and 5 in the IN/PE arm (p = .32 for IN/PE to IN). When comparing IN (n = 5) to the PE/IN (n = 5) arms by two-tailed t-test at the conclusion of the resuscitation no differences were found for CI (p = .05), SVR (p = .34), heart rate (p = .95), MAP (p = .99), PVR (p = .07) or base excess (p = .36). *Conclusion:* Survival was not different between the IN and IN/PE arms. No differences were found for cardiovascular parameters at the end of the resuscitation. *Implications for Translation into Practice:* The addition of phenylephrine to high-dose insulin does not improve the treatment of toxicity due to dihydropyridine calcium-channel blockers.

287. Neonatal Triglyceride Levels after Massive Lipid Bolus – Implications for Lipid Rescue

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Background: Lipid emulsion therapy has been used for parenteral nutrition as well as therapy for intoxication from lipophilic drugs. Prior to this use it has been used for premature infants for both nutrition as well as an aide in lung maturity. Reported complications include pulmonary fat emboli, peripheral ischemia from capillary occlusion, and seizures. We report a case of a more than 10x overdose in a premature infant. *Case report:* A six day-old 1.5 kg ex-30 week premature infant received 100 mL of a 20% lipid emulsion over 1 hour instead of the ordered 7.5 mL daily. Her triglycerides were 4804 mg/dL (54.7 mmol/L) within 2 hours after she received the bolus. She was noted to have no respiratory distress. She received levocarnitine 60 mg in her IV solution starting 10 hours post lipid infusion to aide in metabolism. Subsequently her BUN rose from 7 mg/dL immediately after infusion up to 28 mg/dL 4 days later and subsequently declined. There were no changes in her creatinine, urine output, or other labs. *Discussion:* Little is known about the effects of sudden massive infusions of lipid emulsions. With an estimation of 90mL per kilogram of circulating blood volume, this patient received ~75% of her blood volume as a bolus. Repeated measurements of her triglycerides showed first order kinetic elimination with a half-life of 1.6 hours. Levocarnitine is added routinely to the parenteral nutrition of premature infants and is a cofactor involved in long-chain fatty acid transport and breakdown as well as with acetyl CoA transport within mitochondria. Little is known about the effects of sudden massive infusions of lipid emulsion or its effects on levocarnitine levels. *Conclusion:* This is the largest reported bolus of lipid emulsion as a percentage of the patient's blood volume. We calculated an elimination half-life for the patient's triglycerides at 1.6 hours which is longer than the half-lives commonly reported in the literature with lipid infusion. As intravenous fat emulsion for lipid rescue of lipophilic cardioactive drugs increasingly demonstrates efficacy, levocarnitine supplementation may be a useful adjuvent. More research is needed.

288. Failure of Standard Octreotide Dosing To Prevent Recurrent Hypoglycemia Following Sulfonylyurea Exposure in a Child

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Background: Octreotide is an effective treatment for refractory hypoglycemia caused by sulfonylurea exposure. The current dosing recommendation for pediatric patients is 1-1.25 mcg/kg subcutaneous every 6 hours. *Case report:* A 12 month-old boy (10.3 kg) was found by his mother playing with an open bottle of her glimepiride. About an hour later the child became minimally responsive. EMS arrived and the child's blood glucose (BG) was 49 mg/dL, for which a bolus of IV dextrose ($D_{10}W$) was administered. The child immediately responded, arriving to the ED with normal vital signs, normal physical exam, and a BG of 67 mg/dL. Thirty minutes later he became lethargic again, and had a BG of 47 mg/dL. The child was given a repeat bolus of $D_{10}W$, octreotide 10 mcg subcutaneously, and was admitted to the PICU. Despite a second dose octreotide 10 mcg 6 hours later, repeated bouts of hypoglycemia developed requiring an increase to 12.5 mcg of octreotide SQ, which still did not consistently improve BG. The fourth scheduled dose was increased to 15 mcg subcutaneously, which along with IV dextrose and oral feedings finally eliminated hypoglycemia. It took approximately 16 hours from arrival in the ED to stabilize his BG. *Case discussion:* The case reminds us that the dosing of octreotide is empiric and failures may occur. It may be necessary to increase the dose, increase the frequency, or even consider continuous intravenous dosing of octreotide in patients who have refractory hypoglycemia despite IV dextrose and oral feedings following ingestion of a sulfonylurea. Short-term adverse events of high dose octreotide are minimal, and most commonly are local or gastrointestinal. It may be difficult to assess younger patients for symptomatic hypoglycemia. Aggressive therapy is needed given that hypoglycemia in infants and children have been associated with neurological damage and developmental delay. *Conclusion:* Octreotide failures may occur with empiric dosing and meticulous clinical and BG monitoring is warranted.

289. Do NPDS Opioid Related Human Exposure Calls Reflect Opioid Sales?

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Do NPDS opioid related human exposure calls reflect opioid sales? *Background:* Poison centers have experienced a rise in opioid cases. Do these reflect availability or an increase in abuse? *Methods:* All de-identified data on all cases in the AAPCC NPDS database for 2000–2007 involving exposures to one of the

Opioid	Calls-'00–'07	Incr. in Calls (%)	% of Sales	Incr. % Sales
Codeine	62620	–21	23	–24
Fentanyl	9094	193	<1	222
Hydrocodone	187728	63	26	159
Hydromorphone	4202	280	<1	234
Methadone	25193	240	5	559
Morphine	18600	96	14	159
Oxycodone	83710	90	31	182
Tramadol	42138	156	*ND	*ND
Total	433294	43	100	100.12

following opioids: hydrocodone, oxycodone, codeine, tramadol, methadone, morphine, fentanyl, hydromorphone were obtained. Data was entered into a sequel SQL database with a multidimensional analytic architecture. Sales data for specific scheduled prescription opioids were obtained from the US DOJ website (ARCOS--as grams equivalent to grams morphine). Trends and changes are reported based on the best fit trend line (least squares). *Results:* There were 433,294 unique human cases (including exposures to 473,081 opioids and 337,059 non opioid substances). Further analysis was done by first named opioid. Thus numbers represent unique human opioid exposed cases, not total opioid exposures. Four categories constituted 86% of cases (31% suicide, 16 % abuse/int. misuse, 19% unint. gen. and 20% therap. error). Although therap. errors are a large part of the dataset, < 1% were from an HCF. Scenario codes alone did not provide insight into causation. Abuse/Int. misuse, as a portion of all opioid cases, rose during the period but not dramatically (from 13% to 17%). 71627 patients had an outcome including major or moderate effect (16.5%) and 1957 died (0.5%). During the 8 year period changes in opioid call volume and sales were all statistically significant (and greater than the rise in human pharmaceutical exposures in NPDS—30%). *Conclusions:* Calls to poison centers about humans exposed to opioids have changed in parallel with but not to the exact extent that these drugs are more or less available. Adverse events following abuse does not explain the increase.

290. A Cocaine Death with Concomitant Adulterant-Induced Toxicity

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Background: Cocaine is often adulterated with substances that decrease the amount of cocaine per weight. These adulterants can increase the clinical effect of the drug, or mask the absence of pure cocaine. When evaluating a patient with known or suspected cocaine toxicity, the clinical effects of the adulterants should also be considered. *Case report:* We present a patient with methemoglobinemia and hyperthermia, possibly secondary to adulterated cocaine. A 24 year-old female was found down at home after using cocaine and ethanol the previous night. She was in cardiac arrest and was successfully resuscitated in the field. She presented to the hospital with profound acidemia (pH < 7.0 despite multiple doses of sodium bicarbonate), a wide-complex rhythm, and hypotension requiring vasopressor support. She was found to have a methemoglobin concentration of 24% on her initial ABG, at which point she received 90 mg of methylene blue intravenously. Thirty minutes later, her serum pH was 7.49; no repeat methemoglobin concentration was available. She later developed hyperthermia with a temperature of 109.8ºF, and rhabdomyolysis. She expired on hospital day two. Blood toxicology testing at autopsy found the presence of cocaine (24 mg/L), and benzoylecgonine (4.9 mg/L), as well as benzocaine, lidocaine, levamisole and phenacetin (1.5 ug/mL), which are common cocaine adulterants. *Discussion:* Street cocaine is rarely pure, and it often contains adulterants which may cause clinical effects. We present the case of a patient found to have methemoglobinemia, which has been previously reported with benzocaine and phenacetin. The patient also developed hyperthermia, which is associated with cocaine use, but has also been reported with levamisole exposure. It is possible that the effects of the cocaine adulterants contributed to the clinical picture. *Conclusion:* In a cocaine-toxic patient, unusual clinical signs may be the result of adulterants. There are very few case reports in which the clinical effects of adulterants have been documented.

291. Child Abuse with Cough/Cold Medications

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Background: Published reports on pediatric deaths associated with cough/cold medicines suggest malicious intent was a contributing factor in some cases. *Objective:* Describe reports of malicious use of cough/cold medicine in children as detected through ongoing safety surveillance. *Methods:* Cases with adverse outcomes associated with the use of cough/cold medications reported in 2008 were collected from English language literature, National Poison Data System, manufacturer safety records, FDA AERS and media reports. An independent expert panel reviewed all cases to determine causal relationship between each reported drug and event using predetermined definitions and then judged exposure dose, intent of administration and potential contributing factors. *Results:* 387 cases of children age 0–12 yrs were reviewed. Cases were detected in 2008 but actual events may have occurred in prior years. Data to specify/exclude malicious intent were not always present. Of 35 fatalities, 6 reported child abuse and/or homicide. All but 1 child was <2 yrs (range 7 wks-5 yrs). In 3 cases overt signs of physical abuse were noted: 1) rib fractures/cranial bruising, 2) rib fractures, 3) skull fracture, burns, ligature marks. Diphenhydramine was implicated in 5 cases and dextromethorphan in 1. In all cases the dose administered was judged supratherapeutic with elevated drug levels present in 3 cases. In at least 3 cases the intent of drug administration was sedation. Non-fatal cases involving clearly malicious use of these medications may have occurred, but were not detected in this system. *Discussion:* Malicious use of cough/cold medicine was associated with 6 pediatric deaths. Physical abuse was evident in half the cases suggesting that intentional poisoning may be a component of physical abuse or conversely that using drugs as a weapon of child abuse may go unsuspected if signs of physical abuse are absent. It is likely that this also occurs in non-fatal cases but is not as easily assessed. *Conclusion:* Cough/cold medicines are used in children for malicious purposes. These cases are often, but not always, associated with evidence of physical abuse.

292. Minimal Sequelae after Large Ingestion of Arsenical Herbicide

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We describe a case of a patient with a large ingestion of a methanearsonate-containing herbicide with minimal consequence. A 27-year-old man presented to the ED after an intentional ingestion of methanearsonate (MA)-containing herbicide. His initial symptoms consisted of vomiting as well as intermittent abdominal pain. Vital signs on arrival were HR-140 bpm,BP-130/80 mm Hg,afebrile,and O2 sat of 100%. Physical examination was otherwise unremarkable. ECG revealed a sinus tachycardia at 140 bpm with a QTc-300 ms and a QRS of 90 ms. Initial arterial blood gas showed a pH of 7.35,paCO2 of 35 mmHg,and paO2 of 73 mmHg. Serum lactate was 3.2 mmol/L with an anion gap of 20. Serum creatine phosphokinase was measured at 796 IU/L and BUN/creatinine was 9/1 mg/dL. Acetaminophen concentration was negative. AST and ALT were 62 and 134 IU/L respectively. Abdominal and chest radiographs were unremarkable. BAL therapy was initiated intramuscularly at 2.5 mg/kg every 6 hours along with urinary alkalinization with sodium bicarbonate. Gastrointestinal symptoms resolved after 6 hours with normalization in vital signs. Whole blood arsenic was initially 3226 mcg/L (<23 mcg/L). After 24 hours of chelation, the whole blood arsenic was 101 mcg/L. A 24-hour urinary arsenic was 55,685 mcg/L (<80 mcg/L)with speciation revealing an organic concentration of 15,560 mcg/L and an inorganic concentration of 42,002 mcg/L about 12 hours after initiation of chelation. After 5 days of chelation,a repeat 24-hour urine collection revealed an arsenic concentration of 577 mcg/L. The patient remained asymptomatic throughout his 1 week hospital stay with transition to succimer. The patient's CPK peaked on day 3 at 2100 IU/L. After hospital discharge,the patient was lost to follow-up. Prior reports of human exposure to MA reveal various sequelae including transaminitis and ototoxicity. However,very few reports of arsenical herbicide ingestions are reported in the medical literature. This may be the highest level reported without consequential sequelae after chelation and urinary alkalinization.

293. Where Do Calls Come From? Analysis of RADARS® System Opioid and Stimulant Poison Center (PC) Mentions by Caller Site and Intent

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Background: Some researchers draw inappropriate conclusions when comparing PC data to other data sources due to lack of understanding of PC data. Publications describing PC data would enhance understanding of the dataset and allow for appropriate comparisons to other data sources. The study objective is to characterize the population calling PCs participating in the RADARS System. *Methods:* 47 US PCs participate in the RADARS System and submit quality reviewed data weekly on prescription opioids and stimulants. Using exposures from 3Q2007 to 4Q2008, analyses were performed on caller site, drug type and exposure reason. Data were analyzed based on differences in caller site by drug type (opioid v. stimulant) and by intent (intentional or withdrawal v. unintentional). *Results:* For all drugs, the majority (65%) of intentional or withdrawal mentions came from "healthcare facilities" (Table). In contrast, the majority of unintentional mentions came from "residences" (65%; ($p < .0001$). Opioid mentions differed significantly in the caller site when intentional and unintentional exposures were compared, as did stimulants (both $p < .0001$). *Conclusion:* According to AAPCC, most PC calls originate from the home and the majority (73%) are managed in a non-healthcare facility. This suggests that PCs capture data on a different population than other datasets. DAWN focuses exclusively on emergency departments and NSDUH collects drug use data that is not involved in an acute health care event. PC calls referred to or from a healthcare facility often provide data from earlier in the course of exposure than DAWN. PC data are unique, yet subsets (e.g. intentional exposures) may be appropriate comparisons for hospital data.

Table. Proportion of opioid and stimulant mentions by caller site and intent

		Caller Site Category (%)			
		Residence	Healthcare	Other	Chi Square
	All Exposures	70	10	11	
All Drugs	Intentional	27	65	7	p < .0001
	Unintentional	65	5	10	
	All Exposures	70	9	11	
Opioids	Intentional	27	65	6	p < .0001
	Unintentional	64	4	10	
	All Exposures	63	17	14	
Stimulants	Intentional	28	62	8	p < .0001
	Unintentional	69	12	11	

294. Munchausen Syndrome from High Dose Caffeine Presenting with Ventricular Dysrhythmias

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Introduction: Xenobiotics are sometimes used to create a factitious disorder in patients who seek secondary gain. Available agents include over the counter products that are taken in excess. *Case:* A 34 year old female emergency medical technician with a history of hypertension was admitted to the hospital for a wide complex tachycardia. She had a history of palpitations for which she had received an extensive cardiology outpatient workup and had been started on sotalol. Other medications included esomeprazole, sertraline, triamterene/hydrochlorothiazide, gabapentin and albuterol. She was scheduled for an implanted loop recorder to definitively exclude organic disease. In the pre-operative area, she was agitated, tremulous and had nausea with episodes of emesis. She had a wide pulse pressure and developed runs of stable ventricular tachycardia. She refused to answer questions regarding use of dietary supplements or complementary agents. Laboratory studies revealed a leukocytosis of 13.6 K/microL, serum bicarbonate of 15 mmol/L with an anion gap of 25. Her serum potassium was 1.9 mEq/L. Salicylate level was 0.9 mg/dL. Because her clinical presentation mimicked a methylxanthine poisoning, a theophylline level was measured and was 4.7 mg/L. Comprehensive urine drug screen confirmed presence of sertraline, metoprolol, cyclobenzaprine, and diphenhydramine. A caffeine level of 128 mg/L later returned and confirmed excessive use (normal level <20 mg/L). Patient was treated supportively and her dysrhythmias self-resolved. Documentation by the primary care provider at follow-up noted that the patient stated she had taken "diet pills". *Discussion:* Caffeine is a methylxanthine with a wide therapeutic index; however, large ingestions may produce clinical manifestations that are similar to theophylline poisoning. 7-Demethylation of caffeine produces a small amount of theophylline as measured in this adult patient. *Conclusions:* We report the use of high dose caffeine to induce an illness that included stable ventricular tachycardia.

295. Transient Diabetes from the Administration of Human Growth Hormone for Performance Enhancement

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Introduction: Exogenous human growth hormone (HGH) is being administered illicitly by a variety of athletes with the intent of performance enhancement. Although known to induce insulin resistance, only one previous report details transient diabetes associated with its use for this purpose. *Case report:* A 43-yr-old previously healthy male without a family history of diabetes presented to the emergency department (ED) with a one week history of progressive polyuria, polydipsia, and weight loss. Over the preceding 7 months he had been administering subcutaneously the illicitly acquired HGH somatropin (Serostim®) in "cycles", with the goal of athletic enhancement. He denied the use of any other medications, including anabolic steroids. Vitals and physical exam were normal other than the presence of a dry mouth. Lab testing revealed: glucose 554 mg/dL, sodium 129 mmol/L, bicarbonate 25 mmol/L, normal renal function, normal ast, and the absence of urinary ketones. He was treated with IV normal saline and insulin in the ED. He was instructed to stop any further use of the HGH, and was discharged on metformin. Blood glucose was subsequently checked daily. A low dose of glyburide was temporarily added in addition to metformin to control his blood glucose. Four weeks after presentation, his blood glucose remained in the normal range despite removal of both oral diabetic medications. *Discussion:* Although the scientific literature currently does not support the claim that exogenous HGH administration enhances physical performance, a wide range of athletes are known to use it for this purpose. Exogenous HGH administration is known to induce insulin resistance at the hepatic and muscular level. However, only one previous report details the association of exogenous use for performance enhancement with diabetes. That case was complicated by the use of various other anabolic agents, and at presentation by the presence of an acute hepatitis. In that case the hyperglycemia was also transient and resolved by six weeks. *Conclusion:* Exogenous HGH administration is used by a variety of athletes in hopes of improving performance and is known to induce insulin resistance. The case presented is one of only two that associates this use with transient symptomatic diabetes.

296. Medical Toxicologist Attitudes on Compensation for Services Provided to Poison Control Center

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Background: Little is known regarding medical toxicologists' financial compensation by poison control centers (PCCs) or about their attitudes regarding compensation. Our aim was to survey and describe the attitudes of American College of Medical Toxicology (ACMT) member toxicologists regarding compensation by PCCs. *Methods:* This is a survey of physician members of ACMT performed by the ACMT practice committee. All ACMT members were contacted by e-mail and asked to fill out an on-line survey questionnaire. An additional attempt was made to collect survey responses at the ACMT national meeting. No compensation was provided for participation. *Results:* 152 ACMT members provided survey responses (27.6% response rate). 40 (26.2%) respondents described themselves as poison center directors, 24 (15.8%) as associate/assistant directors, and 51 (33.6%) as poison center consultants. 20 (13.2%) respondents reported having no poison center involvement. All respondents felt that toxicologist consultations are useful (100%). Only 34 respondents (22.5%) felt that toxicologists are fairly compensated for their work. 148 (97.4%) agreed that medical toxicologists should be compensated for their time. Only 2 respondents (1.3%) disagreed. Of PCC directors, 31 (77.5%) reported "always" being compensated for their work. Only 2 (5%) reported "never" being compensated for their work. 16 (40%) PCC directors felt that toxicologists are fairly compensated. This is opposed to non-PCC director toxicologists of whom 20 (29.4%) reported that they are "always" compensated for their work. 33 (48.5%) reported "never" getting compensation. Only 13 (18.8%) non-PCC director toxicologists felt that toxicologists are fairly compensated for their work. *Conclusion:* Medical toxicologists feel that they provide a useful service and that they should be compensated for their work. The majority of respondents do not feel that medical toxicologists are fairly compensated. Most PCC directors are compensated by PCCs, however many non-director toxicologists are not.

297. Reversal of Ventricular Tachycardia (VT) from Lidocaine with Amiodarone

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Introduction: Treatment of medication induced dysrhythmia's can be approached from different aspects. One treatment approach which has not been described in the literature is the use of amiodarone for lidocaine induced arrhythmias. *Case Presentation:* A 78 year old female who was diagnosed with small-cell lung cancer presented to the hospital for Port-A-Cath placement. The patient also has a past medical history of hypertension, asthma, and CAD. The patient has chronic hyponatremia with serum sodium of 122 secondary to SIADH. The patient received the Port-A-Cath placement and was transferred to the general medical floor. Shortly after the patient arrived she had developed shortness of breath. Upon reviewing the chest x-ray it was discovered the patient had developed a pneumothorax. The patient was then prepped for chest-tube placement. The patients' shortness of breath was relieved; however she then began to have mental status changes. Upon arrival to the ICU the patient begin to develop EKG changes. The patient had a heart rate that increased from 80's to 170's with a VT rhythm. After further review of the patients' recent procedures it was determined that the new mental status changes and EKG alterations could be secondary to lidocaine toxicity. The patient had received lidocaine 1% (50 ml vial) of which 17 ml was used during the Port-A-Cath placement. In addition, during the chest-tube placement lidocaine 2% (30 ml vial) of which 15 ml was used. A lidocaine level requested from the laboratory and demonstrated a blood level of 8.2 mcg/ml. The patient was then given amiodarone 300mg intravenous bolus for treatment of VT. The patients EKG changes resolved. After 36 hours the lidocaine blood level was 1.5 mcg/ml and the patient returned to her normal baseline mental status. *Discussion:* Lidocaine cardiotoxicity is difficult to treat often requiring multimodal therapeutic interventions (i.e. cardiopulmonary bypass, lipid emulsion therapy). While case reports have previously described suppression of ventricular arrhythmia secondary to sotalol and flecanide, it has not been described to reverse Lidocaine-Induced VT as a sole agent.

298. Long Term Outcome from Selenosis Due to Nutritional Supplementation

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Background: Selenosis is an uncommon disease, occasionally associated with nutritional supplement use. We present a case of selenosis in a young man taking a nutritional supplement later found to contain elevated selenium and chromium levels due to an error in

formulation. *Case report:* A 29 y/o male began taking Total Body Mega Formula nutritional supplement for chronic fatigue. After taking two doses, the patient developed recurrent emesis, for which he was reportedly diagnosed with gastroenteritis. He continued taking 1 ounce daily as indicated by the manufacturer. Within 2 weeks he experienced intermittent nausea, diffuse lower extremity myalgias and arthralgias, and onycholysis of the finger and toenails. He thereafter developed mild alopecia and loss of most toe and fingernails. After taking approximately 30 doses, the patient became aware of a product recall of the supplement. He subsequently was seen in our clinic for concerns of selenium toxicity. Physical examination findings were largely improved, but diffuse transverse onycholysis of the fingernails persisted. No rash was evident, and neurological examination was normal. Laboratory testing performed 1 month after supplement cessation confirmed an elevated serum selenium level of 228 mcg/L, with continued elevations slowly decreasing upon subsequent testing. A normal level was finally achieved 4 months after supplement cessation, with symptom resolution by 7 months. Serum chromium testing revealed no abnormalities, nor did the patient exhibit clinical evidence of chromium toxicity. *Case discussion:* Although serum selenium levels do not necessarily correlate with chronic toxicity, a diagnosis of selenosis was made based on this patient's serum elevations and clinical history and exam. Subsequent FDA testing showed this formulation to contain 40,800 mcg/dose, or more than 200 times the stated dose on the packaging. It is estimated that our patient ingested more than 100 times the daily tolerable upper limit, for a cumulative total of 1224 mg selenium. Despite this large ingestion, complete symptom resolution occurred by 7 months of supplement cessation. *Conclusion:* We report a case of selenosis with complete resolution after 7 months despite massive selenium ingestion.

299. Fatal Pediatric Exposure to Household Glass Etching Cream

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Background: Hydrofluoric acid (HF) is an ingredient in some household products including rust removers, wheel cleaners and glass etching products. Pediatric exposures are rare, and cases of severe toxicity from household sources result from ingestion with evidence of corrosive effect. We present a fatal case in an infant following brief contact to a small amount of glass etching cream. *Case report:* A small bottle of Armour Etch Glass Etching Cream (30-60% fluoride compounds) spilled onto the tray of a healthy 12-month-old girl in her walker. The mother noticed the child splashing her hands in the substance and placing her hands in her mouth. The family induced vomiting at home, and the child became sleepy. Within one hour of exposure, the child was in the ED in no acute distress, was crying and acting age appropriate. Vital signs were BP 92/38, HR 188, RR 38, afebrile with 100% O_2 saturation. The rest of the physical exam was unremarkable, with no evidence of oral or skin lesions. Initial therapy included oral calcium carbonate and dermal decontamination. The ionized calcium level was 0.96mmol/L (1.16-1.32mmol/L) and CO_2 was 15mmol/L (21–33mmol/L). All other electrolytes were normal. EKG demonstrated sinus tachycardia at a rate of 175 with normal intervals. A calcium gluconate 1gm infusion was started. About 3.5 hours after exposure, the child appeared to posture and stopped breathing, and cardiac rhythm was torsades de pointe. Immediate resuscitation with ACLS protocol and multiple doses of magnesium (total 6gms) and calcium (total 6gms) was unsuccessful. *Discussion:* Severe HF poisoning usually occurs after exposure to industrial (concentrated) products, or intentional ingestions of household products (<15% HF). This child was exposed to a reportedly small volume of glass etching cream, with immediate GI upset, and delayed fatal hypocalcemia and ventricular dyrhythmias. There was no evidence of tissue damage on the skin, oral mucosa or GI tract. Education of the public on the potency of products containing hydrofluoric acid is crucial. Health care providers must understand the serious toxicity of HF and aggressively treat patients with relatively mild symptoms.

300. Use of Dexmedetomidine in the Treatment of Scorpion Envenomations

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Introduction: Centruroides sculpturatus envenomation causes release of multiple neurotransmitters. Severe envenomation is characterized by diffuse motor involvement, cranial nerve dysfunction, and a hyperdynamic state. We report the first case of dexmedetomidine (DEX) in the treatment of scorpion envenomation. *Case report:* A 9 month old (9.6 kg) female began crying inconsolably. She developed hypersalivation and vomiting. At the outside hospital, hypersalivation, opsoclonus, agitation, tachycardia and diffuse motor hyperactivity were noted. She received 9 mcg of fentanyl. Intubation was performed due to hypoxia and she was transferred to our facility. On arrival, her exam was consistent with a grade IV scorpion envenomation. DEX infusion was initiated and titrated with a rate between 0.2–0.5 mcg/kg/hr. Control of symptoms was achieved and the drip was continued for 8 hrs before symptoms of envenomation resolved and extubation was performed. No hypotension or bradycardia developed. The patient was discharged home later that day. *Discussion:* DEX is an alpha 2 agonist that results in decreased sympathetic outflow from the CNS. It has sedative and analgesic properties but no respiratory depression. Mechanistically it would be expected to effectively control the symptoms resulting from scorpion envenomation. We present a case of a grade IV scorpion envenomation in which DEX successfully treated the patient's symptoms while avoiding prolonged sedation from titration of benzodiazepines and analgesics. Its short duration of action allowed for timely determination of resolution of envenomation. Additionally, the absence of respiratory depression may make it a useful option in the treatment of patients not requiring intubation. To our knowledge, the use of DEX has not been previously described in this setting. *Conclusion:* DEX resulted in control of the symptoms of grade IV scorpion envenomation and allowed for prompt extubation. DEX is an ideal agent in the treatment of scorpion envenomations due to its ability to decrease sympathetic outflow, its short duration of action and its lack of respiratory depression.

301. Know Your Pet – How Important Is It To Know the Snake You Own?

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Background: In the UK there is only one native snake known to be venomous, the Vipera berus or European viper (adder). Not all bites result in envenomation and fatal cases are extremely rare with only 14 deaths in the UK since 1876 - the last in 1975. Reports of bites from snakes not identified as adders are infrequent but comparatively more difficult to manage. *Methods:* All enquiries over a 5 year period (2004 to 2008) to the NPIS Cardiff unit regarding snake bites were identified retrospectively and analysed. *Results:* Of the 180 enquiries, 104(57.8%) related to adders. Of the remaining 76 enquiries, the species of snake was unknown in 26 cases(34%). Cases where the species was known included: Boas(12), Pythons(14), Corn snakes(10), Grass snakes(4), Rat snakes(4), King snakes(2), Garter snakes(1), Milk snakes(1), Hognose snakes(1) and the Gaboon viper(1). Of those enquiries not relating to adder bites, 15(20%) occurred in a public area, all of which involved grass snakes or an unidentified species. Three cases occurred at work, all involving pythons and 58(76%) occurred in the home. 47(62%) of the non-adder bites remained asymptomatic and in the others features included swelling(13), pain(7), redness(5), numbness(2), tingling(1), discolouration(1), itching(1) bruising(1), vomiting(1), abdominal pain(1), diarrhoea(1), hypotension(2), tachycardia(1), wheeze(1), dyspnoea(2) and unconsciousness(1). Of the 58 cases that occurred in the home, 38 were considered non venomous, 6 mildly venomous, 1 highly venomous and 13 involved unidentified snakes. In those patients who suffered the most serious symptoms, the species of snake was known i.e. the Rat snake and the Gaboon viper. Where the species of snake was unknown, 6 cases reported symptoms including swelling, pain, erythema, malaise and paraesthesia. *Conclusion:* This study reports no cases of fatality from snake bites. Exposure to unknown toxins can be problematic with treatment decisions difficult to justify. Snake-handlers should know the species they handle, so that management information can be identified and if necessary the appropriate antivenom obtained.

302. Inhalant Online Education: Any Time. Any Place

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Background: It can be difficult to encourage parents to attend in-person inhalant abuse prevention education sessions. Internet technologies, such as web-based trainings, may be effective ways to disseminate prevention education. *Methods:* A fifteen-minute web-based inhalant abuse training was launched in December 2006 and promoted at outreach events and to key agencies using email lists and postcard mailings. The goal of this project is to decrease inhalant abuse among youth by increasing awareness about inhalant abuse among parents and adults who interact with youth. The training includes prevention strategies, teaching guidelines, and local, regional and national data and resources. The registrant evaluation consists primarily of closed-ended questions. A certificate of completion is available upon submitting the evaluation. Evaluation and zip code data are compiled quarterly. *Results:* There were 284 registrants in 2007–2008. Zip code analysis revealed that registrants were from throughout the state, including many small towns where outreaches had never been conducted. A total of 74 participants completed the evaluation. Of these, 92% (n = 68) stated they had greater confidence in talking to a child about inhalant abuse and 97% (n = 72) planned to talk to a child about it. *Conclusion:* The web-based inhalant abuse training is cost-effective and has reached adults throughout the state. Those that completed the evaluation were satisfied with this training and plan to take preventive actions to help reduce inhalant abuse. *Discussion:* In order to get the most out of this effective web-based training, continuous targeted promotion of the website needs to be done. The zip code analysis will help target areas for promotion. Limited access to computers potentially restricts use of this education tool. In addition, a one time 15-minute online training cannot guarantee retention of the information provided. Future research is needed to assess the impact of this tool on youth inhalant abuse trends.

303. Colchicine Kinetics in Non-Fatal Overdose

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Colchicine is an uncommon drug but deadly in overdose. It inhibits microtubule formation leading to multisystem organ failure. We report a colchicine overdose with multiple blood levels in a patient with renal and hepatic failure.

A 51 year-old 113 kg man with a PMHx of depression, hepatitis C, prior suicide attempts and newly diagnosed gout presented short of breath with abdominal pain. He reported taking 3 g of aspirin as a sleep aide

and had multiple episodes of emesis and diarrhea. His initial vitals were BP 90/60, P 70, R 20, T 36.7C. On exam he was guiac negative, had delayed capillary refill of 3 sec, no abdominal tenderness and was appropriately alert and oriented. Labs were K^+6.6, Cl^-90, HCO_3^- 12, anion gap 35, BUN 26, Cr 4.0, pH 7.31, pCO_2 21, lactate 6.6 mmol/L, WBC 41.7 and salicylates 32.3 mg/dL. Ten days prior his labs were normal. Upon further questioning, he admitted taking all of his colchicine 2 days ago. His pharmacy confirmed filling 90 tabs of 0.6 mg colchicine 2 days prior to presentation. He was admitted to the ICU, developed altered mental status, bronchorrhea, and hypoxia resulting in intubation. He also developed thrombocytopenia, a GI bleed, anemia resulting in transfusions, and had several rounds of dialysis. He survived a stormy course and was discharged with a creatinine of 0.6.

Our patient ingested a maximum dose of 0.48 mg/kg of colchicine and given his delayed presentation and severity of illness was thought unlikely to survive despite having a dose less than 0.6 mg/kg. Colchicine is thought to have 20-40% unchanged renal elimination and 1st order hepatic metabolism with enterohepatic recirculation. Kinetics data in colchicine overdose are rare. We calculated elimination T½ of 70.3 h, longer than the 40–60 h reported in normal dosing. Due to the enterohepatic recirculation and lack of alternate therapies, colchicine may benefit from multiple dose activated charcoal. This was not done in this patient because of his GI bleed.

Colchicine toxicity is potentially deadly without a good antidote. We documented a prolonged elimination half-life in this non-lethal overdose. The decreased GI motility and hepatic and renal damage from colchicine toxicity may contribute to its prolonged half-life in overdose.

304. Role of Poison Control Centers in a Public Water Contamination Warning and Response System

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Background: In 2007, the Cincinnati Drug and Poison Information Center (DPIC) was invited to participate in the public health component of the Environmental Protection Agency's Water Security Initiative. One component of this partnership involved methodology for real time surveillance of poison center (PC) calls to identify possible water contamination (WC) events. *Method:* We sought to evaluate surveillance of PC calls for WC by incorporating both machine analysis and 'astute clinician' models for anomaly detection. Three primary alerting mechanisms specific to the geographical boundaries of the water utility were developed, 1. National Poison Data System (NPDS) human exposure and clinical effect count definitions are used to identify unusual deviations from expected baseline counts, 2. Single cases involving environmental or malicious intent and substances of interest trigger NPDS case-based alerts, and 3. PC specialists are trained to use clinical judgment to identify cases possibly related to a WC threat. The Tucson Poison and Drug Information Center is collaborating with DPIC to validate the design. Final analysis will be performed in July, 2009. *Results:* Our design is associated with an average of 1.4 notifications per 100 human exposure cases (range 0.5-2.5). Although no confirmed WC events have been reported within the study period (June 2007-present), 32 cases of interest have been identified. The only event associated with a trigger from all three alerting mechanisms involved a gastrointestinal syndrome impacting numerous students sharing a single drinking fountain. Ongoing analysis indicates that PCs are more sensitive to detecting acute chemical threats than biological threats. Additionally, PC data has proved to be more specific for WC than other public health data streams including 911 calls, EMS run reports and ED chief complaint data. *Conclusions:* Poison centers play an important role in the early detection of potential public drinking water contamination events.

305. Adverse Drug Effects of Therapeutic Psychotropic Medication in Young Children

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Introduction: Increasing prescription of atypical antipsychotic medications for children has been reported in recent studies. The ramifications of this increasing use with respect to patient safety and adverse drug events remain incompletely understood. *Objective:* To evaluate both the frequency of calls to our poison center reporting adverse drug effects, and the level of medical attention required in children who are given their own or a family member's psychotropic medications. *Methods:* Retrospective review of 715,701 human exposure poison center records from 2000–2008, for cases of psychotropic medication ingestions in children less than 12 years of age. *Results:* A total of 1639 calls over this time period involved psychotropic medications in children under 12 years of age for any reason. Of these, 613 occurred when the child was given their usual dose of medication, more medication than prescribed or a family member's medication. A 20% sample of these cases was reviewed in detail; of the 125, 11 were found not to fully fit the inclusion criteria. Drugs involved were 46 risperidone, 29 clonidine, 20 quetiapine, 8 aripiprazole, 7 olanzapine, 5 ziprasidone, and 1 buspirone. Ten cases involved 2 agents, and 1 involved 3. As the reason for exposure, therapeutic error/ intentional misuse (excessive amount given) was most common, 75/114 (66%); unintended misuse (child received medication intended for another member of the family), in 19/114 (17%); intentional abuse (dose given for increased effect), 5/114 (4%); adverse drug effects at the intended dose were reported in 16/114 (14%). Moderate adverse effects (such as dystonic reaction) occurred in 8 patients at their usual dose (7% of the 114) and in 5 at excessive doses (4% of the 114). 23 cases (20%) were evaluated in an ED, of which 4 (4% of the 114) were admitted. *Conclusion:* There is a paucity of data on the safety of psychotropic medication prescribed to children despite the increased use. Additional information about the correct dose and safe use of psychotropic medications in children is needed to guide appropriate use.

306. Hydrofluoric Acid as an Agent for Self-Mutilation

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Self-mutilation is a serious but incompletely understood phenomenon. We report a case of a 34-year-old female who had applied hydrofluoric acid to her right hand over the course of seven days. It has been hypothesized that liberation of endogenous opioids either before or during the injury is associated with the feelings of release associated with the painful cutting, burning, or other mutilation. Chemicals that produce immediate pain have been used for self-mutilation, but hydrofluoric acid applied to the skin may be painless initially. This case represents the first documented use of hydrofluoric acid for self-mutilation and raises questions about the theory of psychophysical arousal associated with immediate pain or bleeding. It also underscores the importance of maintaining a high index of suspicion for self-mutilation when hydrofluoric-acid exposure occurs in unusual settings and the importance of investigating potentially serious systemic effects from this kind of exposure.

307. Kinetics of Zinc Elimination with and without Chelation

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There are several case reports of zinc toxicity resulting from ingestion of pennies in the literature with recommended therapies ranging from surgical removal to chelation with $CaNa_2EDTA$ to whole bowel irrigation or combinations of these. There are at least two reports that state preoperative chelation should be done to reduce the zinc levels. We report a case of recidivism in zinc toxicity where the same patient allowed us to compare zinc kinetics with and without chelation. *Case report:* A 55 y/o male with a history of schizophrenia and HIV presented with abdominal pain and vomiting. His vitals were BP 122/45, P 97, R18, T 36.3C. An abdominal X-ray showed numerous radioopaque foreign bodies. His initial labs included a hemoglobin 4.6 g/dL, WBC 1100, zinc 1050 mcg/dL, and a copper <2 mcg/dL. The patient received intermittent whole bowel irrigation, copper supplementation and granulocyte colony-stimulating factor which resulted in the passage of coins, a reduction in the zinc level, and resolution of his neutropenia. *Discussion:* This patient presented to our hospital 8 years earlier with a similar presentation and underlying pathology. On the first admission, he was treated with early chelation and surgical removal of coins by gastrotomy with those pennies that could not be removed advanced into the colon, past the site of zinc absorption in the jejunum. On this admission, he was treated only with whole bowel irrigation. Multiple zinc levels were obtained on both admissions and elimination rates were determined. The half-life with surgery and chelation was 111.6 hours and with whole bowel irrigation it was 103.4 hours. Additionally, $CaNa_2EDTA$ binds and eliminates copper as well as zinc. This is a potentially dangerous therapy in zinc toxicity as the copper deficiency causes the life-threatening anemia and neutropenia. *Conclusion:* Elimination half-lives were essentially equivalent for treatment with and without chelation. Chelation with $CaNa_2EDTA$ will decrease the copper level and potentially worsen the patient's condition. Removal of the coins through irrigation, bulk forming laxatives, and dietary maintenance is far safer and should be the mainstay of decontamination if surgical removal is felt to be unwarranted.

308. Incidence of Actual Toxic Alcohol Exposure in Patients Given Fomepizole Therapy

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Background: Since the FDA approval of Fomepizole (4MP) in 1997, it is often administered in cases of reported or suspected toxic alcohol exposures [methanol

Table 1. The number of cases of detectable toxic alcohol levels and clinical toxicities likely related to a toxic alcohol exposure

	Reported Exposure (RE)	Detectable Level (DL)	AGMA + RE (no DL of EG or M)	Reported Visual Disturbances in M exposure	C > 1.2 + AGMA in EG exposure (no DL of EG)
EG	38	19	10	Not applicable (NA)	2
M	4	4	1		NA
Total	42	23	11		2

(M) and/or ethylene glycol (EG)]. *Purpose:* Among the patients who received 4MP, we investigated the percentage (%) of those who had detectable levels (> 0) and/or clinical toxicity likely related to M or EG exposure. Clinical toxicity is defined as 1) anion gap metabolic acidosis (AGMA); AGMA is defined as anion gap > 12, 2) new visual disturbances in the presence of an AGMA in M exposure, or 3) renal failure [serum creatinine (C) > 1.2 mg/dl] in the presence of an AGMA in EG exposure. *Methods:* We searched two hospital pharmacy databases on patients who received 4MP between 1-1-98 and 7-31-08. A chart review was performed and a case report form (CRF) was used for data collection. The data were extracted by three data abstractors who were blinded to the purpose of the study and trained in data abstraction. Inclusion criteria: Patients who received 4MP during our study period. Exclusion criteria: Patients who did not meet the inclusion criteria. *Results:* There are total of 93 cases. See Table 1. Out of 93 patients treated with 4 MP, 36 of them had a detectable toxic alcohol level or clinical toxicities likely related to a toxic alcohol exposure. *Discussion:* The major limitation in our study is errors which may have occurred during data abstraction or entry. *Conclusion:* Our study suggests that only 36/93 (39%) of the patients who receive 4MP have an actual M or EG exposure and 57/93 (61%) do not.