ABSTRACTS

NACCT 2010 Abstracts

1. Aluminum Testing in Children: What Do Results and Reference Ranges Mean?
Zaeager MA,1 Woolf AD,1 Goldman RH,2
1Children’s Hospital Boston, Boston, MA, USA; 2Cambridge Health Alliance, Cambridge, MA, USA
Background: Some parents of children with developmental issues are raising concerns about their child’s aluminum exposure and requesting biological testing from health care providers. Aluminum can be measured in plasma, serum, or urine, but there is scant scientific information about the normal range of aluminum concentrations in the general population, let alone age-related norms. Yet commercial laboratories offering aluminum testing provide reference ranges when reporting results. In this study, we sought to determine what scientific literature has been used to support the reference ranges provided, whether such literature sources specifically studied aluminum levels in otherwise normal infants and children, and how to interpret results of such testing. Methods: We obtained the names of 11 commercial laboratories in the United States that perform aluminum testing from texts, published lists, and Internet sources. Either telephone or emailed surveys were conducted with laboratory personnel or Internet searches were performed seeking current information regarding reference ranges and methods of testing for aluminum in biological samples. For a subset of seven laboratories, the published scientific reports cited in determining the reference ranges were reviewed for details regarding the ages and health of the population sampled. Results: For laboratories using the AAS method, serum aluminum references ranged from 0–15 mcg/L, plasma from <7 to 0–10 mcg/L, and urine from 0–5 to 5–30 mcg/L. Laboratories relied upon studies of small populations of healthy adults, adult dialysis patients, sick children or aluminum-containing parenteral therapy, hospitalized patients, or analogous studies of other metals. Conclusions: Commercial laboratories provide normal reference ranges for tissue aluminum assay results that show large variability. These reference ranges are based upon studies that may not be appropriate for either the general population or children. Consequently aluminum testing results are difficult to interpret clinically. Further study of blood and urine aluminum concentrations in healthy populations, which include children, is warranted.

2. Subclinical Nerve Fiber Dysfunction Following Acute Organophosphate (OP) Poisoning
Jayasinghe SS, Pathirana KD,1 Sri Lanka
1Faculty of Medicine, University of Ruhuna, Galle, Sri Lanka
Background: Following acute OP poisoning patients complain of numbness without objective sensory or features of OP induced delayed polyneuropathy. While animal studies have shown demyelination and axonal degeneration there have been no clinical correlates of this characterized in humans. The aim of this study was to measure nerve conduction after acute exposure to OP. Methods: A prospective case-control study was conducted to assess motor nerve conduction velocity (MCV), amplitude and area of motor complexes, sensory nerve conduction velocity (SCV) and F waves following OP poisoning. Assessment was performed around 1 and 6 weeks after the exposure in 70 cases and age, sex and occupation matched controls. Fifty-three of seventy attended the 6 week assessment. Results: All patients received atropine, 54 patients received pralidoxime. The mean (SD) of neurophysiological findings in Table 1 show evidence of statistically significant reductions of SCV, MCV, amplitude, area of motor complexes and F waves. Conclusion: Function of sensory and motor nerve fibers were affected by the single episode of acute exposure to OP. Slowing of nerve conduction velocity may reflect demyelination. The reduction of amplitude in motor complexes and F waves suggests axonal damage.

3. A Study Assessing the Content of Legal Highs Purchased from the Internet
Dargan PI,1 Davies S,2 Smith G,2 Button J,2 Ramsey J,2 Ho,3 O’Connor AD,1 Ruha A-M.2
1Guy’s and St Thomas’ NHS Foundation Trust, London, UK; 2St George’s, University of London, London, UK; 3Pharmaceuticals Unit, School of Biological Sciences, University of Manchester, Manchester, UK
Background: There has been a significant increase in the use of legal highs and this has been associated with increased health problems and deaths. Methods: A multicentre study was conducted to determine the drug content of products sold online. The aim of the study was to determine the drug content of products sold from Internet sites and whether this remained stable over time. Results: A total of 175 suspicious products were selected from 20 websites for analysis. The majority of products contained multiple psychoactive substances. Fourteen products were found to contain an active compound with known toxicity. Conclusion: There is a need for regulation of online sales of psychoactive substances and for legislation to drafter to prevent the sale of illegal psychoactive substances online.

4. Clinical Course of Bark Scorpion Envenomation When Antivenom is Unavailable
O’Connor AD,1 Ruha A-M,2
1Banner Good Samaritan Medical Center, Phoenix, AZ, USA; 2Phoenix Children’s Hospital, Phoenix, AZ, USA
Background: Bark scorpion envenomation is a potentially life-threatening condition in children, traditionally treated with antivenom (AV) in Arizona. In 2004 AV became unavailable. Due to the historic widespread use of AV, there are few reports describing severe scorpion toxicity with recreational use. The actual drug content cannot be predicted from the name of the product and there is variation in content of the products over time. There was a change towards the sale of legal compounds post-legislation, but one product still contained controlled compounds.

Table 1.

<table>
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<tr>
<th></th>
<th>First assessment</th>
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<tr>
<td>SCV (m/s)</td>
<td></td>
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</tr>
<tr>
<td>Median</td>
<td>53.7 (8.1)</td>
<td>52.8 (8.3)*</td>
<td>56.0 (5.9)</td>
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<td>Ulnar</td>
<td>55.2 (7.0)*</td>
<td>55.9 (6.7)</td>
<td>59.6 (5.2)</td>
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<tr>
<td>MCV (m/s)</td>
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</tr>
<tr>
<td>Median</td>
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<td>55.5 (4.5)</td>
<td>56.6 (3.6)</td>
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<tr>
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<td>53.9 (4.8)*</td>
<td>54.8 (5.1)</td>
<td>56.2 (4.4)</td>
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<td>48.2 (4.7)</td>
<td>49.4 (5.1)</td>
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<td>Amplitude of distal motor nerve conduction complex (μV)</td>
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<tr>
<td>Median</td>
<td>13.4 (3.6)</td>
<td>14.2 (4.6)</td>
<td>14.3 (4.2)</td>
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<td>9.4 (2.5)*</td>
<td>10.0 (2.4)</td>
<td>10.4 (2.1)</td>
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<td>8.6 (3.4)</td>
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<td>Area of distal motor nerve conduction complex (μV/m)</td>
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<tr>
<td>Median</td>
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<td>30.9 (9.8)</td>
<td>33.6 (10.0)</td>
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<td>15.3 (6.8)</td>
<td>13.1 (4.9)</td>
<td>16.1 (6.7)</td>
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<td>F wave occurrence (%)</td>
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<tr>
<td>Median</td>
<td>81.9 (17.2)*</td>
<td>78.4 (22.3)*</td>
<td>90.3 (10.5)</td>
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<td>82.8 (20.5)*</td>
<td>83.4 (16.6)</td>
<td>92.6 (8.8)</td>
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<td>Tibial</td>
<td>89.1 (16.3)</td>
<td>91.5 (11.7)</td>
<td>92.8 (11.9)</td>
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*p < 0.05; controls vs. first assessment, $p < 0.05; controls vs. second assessment (unpaired t-test), @p < 0.05; first vs. second assessment (paired t-test), #p < 0.05; controls vs. first assessment, *p < 0.05; controls vs. second assessment (Mann–Whitney test).
envenomation without AV treatment. We sought to describe the clinical course, management, complications, and outcome of children with severe cobra envenomation requiring supportive care. Methods: A retrospective chart review was performed after obtaining IRB approval. All children presenting to a metropolitan tertiary care children’s hospital between September 1, 2004 and July 31, 2006 with severe cobra envenomation, who did not receive AV, were included in the study. Two reviewers performed a chart review using a standardized data abstraction form. Outcomes of interest included demographics, time to healthcare facility (HCF), clinical findings, treatment, complications, and length of stay (LOS). Results: Eighty-eight patients were included with a mean age of 3.7 years (range 0.33–12 years). Mean time to symptom onset was 20 min (range 0–130 min) and mean time to HCF was 79 min (range 10–240 min). Incidence of clinical manifestations was as follows: neuromuscular agitation 100%, opsoconulosis 97%, hypersalivation 81%, tachycardia 82%, hypertension 49%, vomiting 38%, fever 28%, respiratory distress 33%, and hypoxia 18%. Most episodes of vomiting were early and self-limited, 21 of 33 (64%) resolving prior to arrival at a HCF. Complications included CPE > 1,000 IU/L in 18 (20%) patients. CRX was obtained in 61/88 patients (70%). CRX was obtained in 12 (13%) patients. Intubation was required in 24% of patients. The most frequently used agents to control symptoms were benzodiazepines (98%), followed by opioids (94%) and IVFs were given to 84%. Mean LOS was 29 h (range 6–73 h). There were no deaths, renal failure, or permanent disability. Conclusion: This study describes the clinical course of paediatric cobra envenomation without AV. In addition to direct venom effects, children experienced relatively high rates of respiratory failure, rhabdomyolysis, and aspiration. Despite these complications, all children had a good outcome with supportive care alone.

5. Rapid Diagnosis of Poisonous Snakebites
Hung D-Z.
Toxicology Center, China Medical University Hospital, Taichung City, Taiwan
Background: The clinical diagnosis of snakebite is critical and necessary in the world where poisonous snakebites are important for public health such as in Southeastern Asia. It is difficult to define a poisonous snakebite only by over 12,000 people. Rates of severe envenomation are high, and the combination of symptoms, time to healthcare facility (HCF), clinical findings, treatment, complications, and length of stay (LOS). Results: Eighty-eight patients were included with a mean age of 3.7 years (range 0.33–12 years). Mean time to symptom onset was 20 min (range 0–130 min) and mean time to HCF was 79 min (range 10–240 min). Incidence of clinical manifestations was as follows: neuromuscular agitation 100%, opsoconulosis 97%, hypersalivation 81%, tachycardia 82%, hypertension 49%, vomiting 38%, fever 28%, respiratory distress 33%, and hypoxia 18%. Most episodes of vomiting were early and self-limited, 21 of 33 (64%) resolving prior to arrival at a HCF. Complications included CPE > 1,000 IU/L in 18 (20%) patients. CRX was obtained in 61/88 patients (70%). CRX was obtained in 12 (13%) patients. Intubation was required in 24% of patients. The most frequently used agents to control symptoms were benzodiazepines (98%), followed by opioids (94%) and IVFs were given to 84%. Mean LOS was 29 h (range 6–73 h). There were no deaths, renal failure, or permanent disability. Conclusion: This study describes the clinical course of paediatric cobra envenomation without AV. In addition to direct venom effects, children experienced relatively high rates of respiratory failure, rhabdomyolysis, and aspiration. Despite these complications, all children had a good outcome with supportive care alone.

Laing WJ, Lupton DJ, Venraah A, Bateman DN.
NPIIS, Edinburgh, Royal Infirmary of Edinburgh, Edinburgh, UK
exam. Genetic testing showed her to be a poor CYP2D6 metabolizer, homozygous for the CYP2D6*4 allele. Discussion: In pts with large TCA overdoses, neurologic & cardiac toxicity generally develop rapidly (within the first 2 h). Total TCA levels peak within the first 24 h in most cases.1 However, peak levels may be delayed if co-ingestants which delay gastric emptying are present, or in slow hydroxylators. CYP2D6 is partly responsible for metabolism of AMI & NOR. The most common allele responsible for reduced CYP2D6 activity in Caucasians is CYP2D6*4, with homozygotes often lacking CYP2D6 activity. Pts taking TCAs who are homozygous for the CYP2D6*4 genotype have a concentration-time curve AUCs & prolonged elimination half-lives. Deficiency of CYP2D6 likely contributed to prolonged elevation of plasma TCA levels in our pt. While CYP2D6-deficient pts have been described who developed toxicity after therapeutic dosing, we couldn’t find previous reports describing toxicityokinetics after overdose in a deficient in pt. Conclusion: CYP2D6-deficient pts may have prolonged elimination of TCAs & prolonged intoxication. References: 1. Spiker DG, Biggs JT, Tricyclic antidepressants: prolonged plasma levels after overdose. JAMA 1976; 236(15):1711–2.

10. Infant Gamma-Hydroxy Butyrate Intoxication: A Case Report
Rodriguez AM, McCreight A.
University of Texas Southwestern, Dallas, TX, USA
Background: Gamma-hydroxybutyrate (GHB) is a well-known recreational drug that has also been used for illegal acts of drug-facilitated sexual assault and chemical submission. Unintentional ingestion of GHB has been documented in older children, but intentional GHB poisoning in young infants has not been reported in the literature. We report a case of child abuse in a 2-month-old infant with an elevated serum GHB concentration due to intentional GHB poisoning.

11. Diethyle Glycol: A Poison Center Review of 10 Years of Pediatric Exposures
Stellpflug SJ, Cole JB, Lintner CP, Kwon SK, Roberts DJ.
Hennepin Regional Poison Center, Minneapolis, MN, USA
Introduction: Diethyle glycol (DEG), in brake fluid, can cause life threatening renal failure. Less is known about management of DEG as compared to the more commonly encountered toxic alcohols. In 2008, there were 1,292 DEG-related calls to poison centers. One issue that plagues providers is what to recommend for children who ingest small amounts. We report a 10-year poison center review of pediatric DEG exposures.

12. Critical Valproate Toxicity Reversed with Hemodialysis in a Toddler
Kosti MA,1 Pan CG,2 Leinkin JB,1 Guinnn DM,1
1Wisconsin Poison Center, Milwaukee, WI, USA; 2Medical College of Wisconsin, Milwaukee, WI, USA
Background: Teaching is that valproic acid (VPA) is not amenable to extracorporeal removal by hemodialysis (HD). It has a pKa of 5.5 which would suggest that HD would suffer no adverse outcomes. A large prospective cohort study would strengthen this conclusion. Conclusion: This 80 patient series indicates that children exposed to DEG-related cases of DEG will not have major adverse effects.

13. Overdose of Rivastigmine Patches Producing DUMBELS Toxicity Treated with Atropine
Reedy SJD,1 Schwartz MD.2
1Emory University, Atlanta, GA, USA; 2Georgia Poison Center, Atlanta, GA, USA
Background: Rivastigmine (Exelon®) is a non-competitive, reversible cholinesterase inhibitor approved in patch formulation for the treatment of Alzheimer’s and dementia due to Parkinson’s disease. The transdermal patch is thought to cause fewer muscarinic side effects and is the first patch treatment approved for dementia. It is a partial agonist at muscarinic receptors, blocks reuptake of 5HT, DA, and NE, inhibits MAO, and may have other effects. Rivastigmine (Exelon™) is a non-com-
14. Massive, Unintentional Pediatric Lamotrigine Overdose Resulting in Seizures

Lapoint J, Sullivan R,2 Rey L, Nelsen J.3
1Univ of Missouri, Columbia, MO, USA; 2Missouri Poison Center, Columbia, MO, USA; 3Missouri Poison Center, Saint Louis, MO, USA

Abstract: A 13-month-old female was brought to the ED following a 30 s seizure at home, after ingesting four of her father’s 200 mg LTG tablets. Approximately 10 min later she became lethargic requiring respiratory intervention. Her medical history was noncontributory. On arrival the BP 92/47, RR 24; O2 sat of 100%. Physical exam was notable only for nystagmus. Shortly after arrival to the ED, approximately 1.25 h post-ingestion, she was noted lying seizure disorder. Although the 3-day-old neonate underwent an initial sleep study and was characterized as hypoplastic left heart syndrome. He was restarted on zidovudine po q12 h since birth (12 mg/day). Instead, he received a total of 120 mg of zidovudine during the 24 h prior to admission. Initial vital signs were: HR, 161/mm; T, 99 irrespective. Both parents provided informed consent. This is the highest level reported following an unintentional exposure in a pediatric patient.

15. Hypertensive Emergency from Guanfacine Overdose

Scalzo AJ,1 Tochtrop RM,2 Weber JA.1
1Missouri Poison Center, Saint Louis, MO, USA; 2University of Missouri, Columbia, MO, USA

Abstract: Guanfacine is a centrally acting, presynaptic α2 agonist that produces decreased central sympathetic outflow. In overdose, guanfacine and drugs in this class usually result in hypotension. In very high doses, all of the centrally acting α2 agonists may also act at peripheral, postsynaptic α2 receptors on vascular smooth muscle, which can result in transient paradoxi- cal hypertension (HTN). Case report: A 15-year-old, 72 kg male with ADHD and mild developmental delay ingested 70 tablets of his own medication 5 mg guan- facine but was not suicidal. He had no past history of hypertension. His BP 170–180/95 mmHg in the ED. Nitroprusside was restarted at 0.5 mcg/kg/min with BP returning to 144/75 mmHg but this was changed to nicardipine at 0.5 mcg/kg/min in the ICU. On nicardipine his BP was 117/55 mmHg, HR 61 for these 157 cases. His CK peaked at 4,057 IU/L; creatinine remained normal at 0.82 mg/dL. The nicardipine infusion ranging from 0.5 to 1.5 mcg/kg/min was used in place of nitroprusside and was required for 17 h for persistent HTN. It was diffi- cult to find a US laboratory to assay for serum guan- facine. A new GC/MS column has been developed; patient samples are being assayed at this time. Case discussion: Guanfacine was originally developed as an antihypertensive agent and only rare overdoses have been described. There is an isolated case report of 2- year-old who ingested 4 mg guanfacine and devel- oped hypotension (88 mmHg systolic) with a serum level of 39.5 μg/mL. No cases of documented hyperten- sion to this degree have been reported in children. Conclusions: Guanfacine in massive over- dose may result in significant hypertensive urgency or emergency. Nitroprusside or nicardipine are effective in controlling the hypertension in this setting.

16. Management and Analysis of Insulin Thera- peutic Errors Reported to a Poison Center

Elko CJ,1 Akamine S,2 Robertson WO.1
1Washington State Poison Center, WA, USA; 2University of Washington School of Pharmacy, Seattle, WA, USA

Abstract: Patients with diabetes mellitus now achieve euglycemia with long, short and rapidly acting insulin and home-glucometers. This retrospective study describes Poison Center management and outcomes following therapeutic errors with short/rapid-acting (S/R) insulin. Method: Therapeutic insulin errors reported to this Poison Center between January 2000 and September 2009 numbered 718. Of these insulin errors, 404 cases (56%) involved S/R insulin and 216 were identified with adequate documentation. A significant response to insulin in these cases was defined as follows: BG < 70 (N = 39) or a drop of BG > 50 mg/dL (N = 41) or a drop of BG > 58% (N = 77). One hundred and fifty-seven cases met at least one of these criteria. Cases were matched by the initial BG and by the amount of insulin taken, creating seven groups with matching characteristics (22 in each group). The groups were statistically analyzed for dose-response relationships using Excel. Results: The following table summarizes the S/R insulin doses and blood glucose changes for each of the seven groups. Data includes averages with standard deviation (SD) and r = correlation coefficient (test for linearity). Outcomes for the groups included 39 (25%) with BG < 70 (range 32–68 mg/dL), nine with BG < 50 and none with coma or seizures. One hundred and thirty-six (87%) were managed at home, usually with food as needed. In 33 cases (21%) other side effects were noted such as irritability, drowsiness, diaphoresis, and nausea. Discussion: The linear regression analysis found the best correlation coefficient (r) for the dose of insulin and the magnitude of the BG drop. If this correlation is confirmed in a prospective analysis, the data in this table could be used to estimate the drop of BG from a given S/R insulin dosing error. Conclusion: In this series of insulin errors with S/R insulin, the poison center successfully managed 87% at home with minimal adverse events, interventions and costs. In this series, dose was linearly related to the absolute drop in blood glucose.

17. Zidovudine-Associated Elevated Lactate Concentration in a Neonate Following a Dosing Error

Livshits Z, Hoffman RS, Nelson LS.
New York City Poison Control Center, New York, NY, USA

Abstract: A 3-day-old, 3 kg, formula-fed, boy presented from home to the ED 10 h after the most recent of 12 10- fold errors in zidovudine administered by his mother. The neonate was born to an HIV-positive mother who had been receiving zidovudine for 9 weeks prior to birth. He was supplemented with 0.2 mg/kg zidovudine po q12 h since birth (12 mg/day). Instead, he received a total of 120 mg of zidovudine during the 24 h prior to admission. Initial vital signs were: HR, 161/mm; T, 99 irrespective. Both parents provided informed consent. This is the highest level reported following an unintentional exposure in a pediatric patient.

18. Death and Liver Injury Following Repeated Acetaminophen (APAP) Ingestions by Children

Heard KJ,1 Bond RF,2 Clark RF,3 Dart RC,1 Green JL,1 Koell RC,1 Kozer E.1
1Rochester Regional Poison Control Center, Rochester, NY, USA; 2Department of Emergency Medicine, Zerifin, Israel

Abstract: While death from therapeutic APAP doses has not been reported in prospective studies there are retrospective reports describing fatalities following APAP administration with therapeutic intent, but not necessarily at therapeutic doses. This has resulted in confusion related to the safety of APAP in children. We characterized cases of clinically significant hepatic events following accidental APAP doses. Methods: Retrospective cohort study of children <6 years with ALT >100 IU/L or death follow- ing >1 APAP dose. We excluded cases with insufficient information to determine (serum ALT, reported liver failure or death). Data sources were NPDS, FDA/AERS, medical literature and manufacturer
internal safety reports. Cases were abstracted and reviewed by a five-member expert panel to determine relationship of the hepatic event or death to APAP, the estimated APAP dose based on the reported dose and assessment of objective support for the dosing history (e.g. serum APAP concentration). Results: A total of 2,531 cases were reviewed and 146 unique cases met inclusion criteria with sufficient information. One hundred and two (70%) were rats as at least potentially related to APAP; 60 (40%) were <1 year and 37 (36%) were male. There were 26 deaths; 10 (38%) were <1 year and 9 (35%) male. Dose was theophylline (<75 mg/kg/day) in 6 (6%) cases. Age range for therapeutic cases was 3 months to 4.5 years. The reported range of therapeutic doses was 23 mg/kg/day × 2 days to 60 mg/kg/day × 11 days. The lowest fatal dose where the dose history was consistent with other clinical information was 100 mg/kg/day. Conclusions: This study was limited to reported cases with sufficient information and dosing information and may be subject to recall bias. Given the vast experience with APAP in children, reported ALT elevation in children given doses of <75 mg/kg/day of APAP is an extremely rare event. No deaths were attributed to therapeutic APAP doses. While our methodology may fail to detect some cases with asymptomatic ALT elevation, it is unlikely to miss deaths. Safety efforts should be directed at preventing inadvertent APAP overdose in children.

19. Status Epilepticus in a Child Secondary to Ingestion of Skin-Lightening Cream
Burns JM, Marino AW, Ryhee SH, Linden CH. University of Massachusetts Medical School, Worcester, MA, USA

Introduction: Hydroquinone (HQ) toxicity has been described most commonly following exposure to photo development chemicals. In this report we describe a rare case of pediatric HQ poisoning after ingestion of a cosmetic product. Case report: A 19-month-old African American male was witnessed by his parents drinking from a small container of a skin lightening lotion (active ingredient hydroquinone 2%). Volume ingested was unknown but the 500 mL bottle had minimal contents remaining. Within 15 min the patient exhibited tremors, left gaze deviation and tonic-clonic seizure activity per witnesses. EMS gave 2.5 mg IV diazepam on arrival at the scene. At presentation to the local ED, the child had continuous seizures with a respiratory rate of 80 bpm. A rapid sequence intubation was performed and given 20 mg/kg of IV fentanyl. He was then transferred to the pediatric ED of a regional, tertiary care center. Immediately after arrival, the patient had an additional tonic-clonic seizure and was given 0.5 mg IV lorazepam. Seizures were successfully terminated following a loading dose of 20 mg/kg IV phenobarbital. Initial labs were unremarkable except for metabolic acidosis and mild transaminis. A non-contrast head CT was normal. The child was admitted to the pediatric ICU for further management. On hospital day 2, the patient’s EEG showed generalized slowing but no seizure activity, and he was extubated. Mental status continued to improve with no further seizures; anticonvulsants were discontinued. Metabolic acidosis and transaminis resolved and he was transferred to the pediatrics ward on hospital day 3. He was discharged on hospital day 4 with residual incoordination and ataxia. Discussion: HQ poisoning is associated with tremor, seizures and coma. Headache, vomiting and tachycardia are also reported. There are no reports of HQ toxicity from cosmetic product ingestion. Clinicians should be aware of both the potential toxicity following exposure and the need for aggressive treatment in symptomatic patients.

20. Has One Pill Killed? A Review of AAPCC Pediatric Fatality Data
Monte AA, Yin S, Heard KJ, Bronstein AC. Rocky Mountain Poison & Drug Center, Denver Health, Denver, CO, USA

Background: According to the 2009 American Association of Poison Control Centers (AAPCC) annual report, 51.8% of all exposures are in children <6 years of age.

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<td>Minor</td>
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<td>Moderate</td>
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<td>Death</td>
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<td>Other</td>
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</table>

21. What Do You Mean I’m Not Supposed to Swallow SPIRIVA?
Ryan ML, Arnold TC, Ryan CC. 1Louisiana Poison Center, Shreveport, LA, USA; 2LSU Health Sciences Center, Shreveport, LA, USA

Introduction: SPIRIVA HandiHaler (tiotropium bromide inhalation powder) is indicated for the long-term, maintenance treatment of chronic obstructive pulmonary disease (COPD), including chronic bronchitis and emphysema. SPIRIVA HandiHaler consists of a capsule dosage form containing a dry powder formulation of tiotropium bromide delivered via a small, handheld device. Each light green hard gelatin SPIRIVA capsule contains 18 mg tiotropium. The dry powder formulation within the SPIRIVA capsule is intended for oral inhalation only. SPIRIVA was FDA approved for use in February 2004. In 2008 the FDA issued a public health advisory recommending thorough education for patients prescribed SPIRIVA as a result of reports of the capsules being ingested. Five years of Louisiana Poison Center data from 2005 to 2009 were analyzed to determine the number of cases where SPIRIVA capsules were ingested. Cases involving the correct route of administration were excluded. Results: Four hundred and eleven cases were identified during the period 2005–2009. In 334 cases the caller stated they knew how to use the medication correctly but had become confused or distracted and ingested the capsule, often at the same time as their other medications. In the remaining 77 cases the caller stated that they thought the medication was intended to be ingested. The average age in these cases was 62. In 392 cases there were no effects noted. In 19 cases minor effects were noted including nausea, vomiting, tachycardia, agitation, dry mouth, abdominal pain, and anxiety. No effects were coded as lasting longer than 8 h. Conclusion: The number of cases of ingestion of SPIRIVA capsules reported to the Louisiana Poison Center has increased each year since it was approved for use. While ingestion of a SPIRIVA capsule is of minor consequence, healthcare providers need to provide education to patients to make sure that they understand and can demonstrate proper use of SPIRIVA capsules and the HandiHaler delivery device. The makers of SPIRIVA capsules might consider designing the capsule to make it much more conspicuous, possibly alerting the patient that the capsule is unique and should not be ingested.

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1Rocky Mountain Poison & Drug Center, Denver Health, Denver, CO, USA; 2Uniformed Services, University of the Health Sciences, Bethesda, MD, USA

Background: Tobacco exposures in the pediatric population pose a poison center (PC) management dilemma. These highly accessible adult products often come in attractive non-child resistant packaging. Little data is available on outcomes of children exposed to chewing tobacco or snuff. We sought to characterize the frequency of these exposures and the associated morbidity.

Introduction: We accessed National Poison Data System (NPDS) aggregate data human single substance exposures by year from 2000 to 2009 using AAPCC Generic Codes 0201057 (chewing tobacco) and 0201058 (snuff). Case counts for all human exposures and for children <6 years were obtained. Further descriptive data for children <6 years were examined (route, reason, healthcare facility management, and medical outcomes). Calls over time for each measure were examined using regression (versus time) for linear and logarithmic (proportional) models to calculate % increase/year and 95% confidence intervals using SAS JMP v 6.0.6. Results: Ten thousand eight hundred and thirteen human exposures were identified and 9,610 (88.9%) of these were children <6 years old. Ingestion was the most common exposure route for both substances in all years (99.2%). Almost all exposures (99.8%) were unintentional. Over a quarter of cases (26.9%) were managed in a healthcare facility. There were no deaths. The most common reported outcome was “No Effect” (34.9%). Chewing tobacco exposures are increasing at ~5%/year and account for most of the 3.48%/year increase in the total.
23. Amoxicillin Renal Toxicity: How Often Does It Occur?

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Background: Although considered a relatively safe antibiotic when taken in supratherapeutic amounts, there are isolated pediatric overdose cases associated with renal complications. Reported symptoms include anuria, hematuria and dysuria. To determine the incidence of renal symptoms associated with amoxicillin, a retrospective review of exposures to amoxicillin in children less than 6 years of age as reported to National Poison Data System (NPDS) over a 5 year period was done. Methods: Pediatric exposures involving amoxicillin without co-ingestants in humans less than 6 years of age reported to the NPDS from 2004 to 2008 were analyzed. Data included age, gender, management site, outcome, symptoms (including certainty of amount, chronicity, weight and therapy. The study was IRB approved. Descriptive statistics were used to characterize the data. Results: Fourteen thousand seven hundred and seventeen amoxicillin cases were identified. Ages ranged from 2 days to 5 years. Related renal symptoms occurred in five patients (0.03%). These included urinal color change in four patients, oxalate crystals in one, and an increased serum creatinine in one. Significant laboratory abnormalities included azotemia, hypoglycemia, and an asymptomatic aspirin overdose with substantially increased serum creatinine. Absorption of amoxicillin is usually complete in the gastrointestinal tract, and this suggests that renal absorption is more likely to be related to serum creatinine.

Conclusion: The belief that an ingestion has been excluded or is “negligible” are not always repeated due to erratic absorption, a rise in serum concentration may be delayed following negligible initial ASA levels. Repeated monitoring is recommended.

24. Asymptomatic Acute Aspirin Overdose

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Background: Acute aspirin overdose presents initially often with diaphoresis, nausea, vomiting, hyperventilation, and tinnitus and may progress towards lethargy and coma.1 Hyperpyrexia, cardiovascular collapse, renal failure and respiratory failure can occur in severe cases. Methanol and ethylene glycol are metabolized to toxic intermediary products, ketoacidosis, and hypoglycemia.2 Case summary: We present a case of an asymptomatic aspirin overdose with substantially elevated salicylate level. A 71-year-old man ingesting 100 tablets of 325 mg of aspirin intentionally. About 3 h after ingestion, his salicylate level was 38.8 mg/dL. At 5 h post-ingestion, his peak salicylate level was 59.5 mg/dL. The salicylate level remained supratherapeutic for 13 h post-ingestion. During that time, the patient did not develop diaphoresis, nausea, vomiting, tachyphoea, or tinnitus. The patient did not develop laboratory abnormalities consistent with salicylate toxicity. He was treated with a sodium bicarbonate infusion and subsequently transferred to inpatient psychiatric care.

Results: This case exemplifies the need to perform serial salicylate levels in cases of intentional overdose of aspirin. Clinical symptoms may not correlate with salicylate levels. Our patient did not exhibit any clinical or laboratory signs of toxicity. Aspirin also may have delayed absorption by the development of bezoar. Salicylate levels that do not trend downward after peak, such as the levels in our patient, may reflect ongoing absorption from a bezoar. For these reasons, serial salicylate levels should be followed in cases of intentional overdose with aspirin until the levels are therapeutic and the patient is not exhibiting signs of toxicity.


25. Negligible Initial Salicylate Concentrations: Are They Inconsequential?

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Background: Patients with salicylate (ASA) poisoning require serial concentrations to determine ongoing absorption and monitor toxicity. Initial ASA levels which are “negligible” are not always repeated due to the belief that an ingestion has been excluded or is unlikely to become clinically relevant. We report 13 cases where initial (ASA) concentrations of 10 mg/dL or less (considered “undetectable” in many institutions) eventually rose to levels necessitating toxicologic attention. Methods: Illinois Poison Center charts for the period July 1, 2004 through December 31, 2009 were reviewed to identify cases with ASA concentrations greater than 30 mg/dL at any time. Cases with initial ASA concentrations of 10 mg/dL or less were further examined to determine the highest ASA concentration recorded, coingestions, treatments [activated charcoal (AC), urinary alkalinization (HCO3), and/or hemodialysis (HD)], and outcome. Results: Of 351 total ASA cases, 13 cases had an initial ASA concentration of 10 mg/dL or less which increased to >30 mg/dL during the hospital course. One patient with two negative ASA levels on hospital day 3 showed a subsequent transfer to the psychiatric ward and had an ASA level of 54.8 mg/dL. Two were hemodialyzed, one of whom was intubated and died. Characteristics of the remaining 10 cases are shown in Table. Discussion: Conclusions: Due to erratic absorption, a rise in serum concentration may be delayed following negligible initial ASA levels. Repeated measurements may be necessary, depending on presentation time, history and suspicion for poisoning, and coingestions. Salicylate poisoning, like carbamazepine and valproic acid, warrants timely reassessment including repeat laboratory analyses to assess ongoing absorption. Although uncommon, “negligible” initial levels have the potential to rise to concentrations high enough to require intervention and to even result in mortality.

26. Baclofen Overdose Mimicking Brain Death

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Background: Guidelines for the determination of brain death have been promulgated. Their use in patients with coma from drug overdose must be done cautiously. We report two cases of baclofen overdose and vomiting after the apparent fulfillment of criteria for brain death and who subsequently aroused as organ procurement plans were in progress. Case report: A 40-year-old female was found by her family unresponsive after a reported overdose of baclofen. After no response to naloxone she was intubated. Upon hospital arrival vital signs were: BP 113/85, P 68, no spontaneous respirations, and T 94.1°F rectally. Glasgow Coma Scale was 3 with fixed dilated pupils, absent corneal and ocular reflexes and flaccid extremities. Cardiac, lung and abdominal examination was normal. Laboratory testing showed no anion gap, a normal glucose and no ethanol or acetonemia. Urine toxicology screening was positive for opioids and benzodiazepines. EEG was sinus. CT of the brain was normal. The patient was rewarmed with a Bair Hugger. An EEG on hospital day (HD) 3 showed occasional disorganized activity on an otherwise flat background. On HD 4 the patient remained comatose and neurology consultation found the patient to have weak inspiratory effort after 5 min of apnea. Although brain death criteria were met, a Do Not Resuscitate (DNR) order was not offered.

Table for Abstract 25

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MDAC, multiple dose AC.
were not met, the prognosis was felt poor and plans were made for withdrawal of support and organ donation. The next day, with organ procurement imminent, the patient spontaneously opened her eyes. There was pro-
gressive improvement and her recovery was uncom-
pli ed other than a period of delirium. Case discussion: This case highlights the perils of brain death deter-
mination after drug overdose. In overdose, uncomplicated by cardiorespiratory arrest, the potential for recovery despite (near) full ilitization of brain death criteria is high-
lighted by this case. Baclofen, a γ-amino butyric acid agonist, mimics muscarinic M3 receptors and has previ-
ously been reported to mimic brain death. Additionally, strict adherence to brain death guidelines were not fol-
lowed with this patient and she perished promptly to org.

27. Large APAP OD with Fixed Pupils, Optic Pallor, Massive Lactic Acidosis, Elevated Lactate/Pyruvate Ratio, and Hyperalaninemia with Full Recovery and Minimal Hypertransaminasemia

Truitt CA;1,2 Castle, CA;1,3 Brown, PE;1,3 French R;1,3
Banner Good Samaritan Medical Center, Phoenix, AZ, USA

Background: Massive APAP overdoses cause early lactic acidosis and coma that are poorly understood. We present a large APAP ingestion with early fixed, dilated pupils, optic pallor, and refractory acidosis in a 19-year-old male. Conclusions: Prior to admission, the patient had ingested 70 APAP tablets (1800 mg) 1 hour before being brought in, BP 105/50, R 33, T 33°C, RR 18, Sat 98% on 100% NRB, GCS 3, fixed mydriasis. Glucose 350 mg/dL; anion gap >45; Cr 1.5 mg/dL; ETOH 0.148%; APAP 600 μg/mL (8 h post ingestion); & after admission, NaHCO3 drips were begun before transfer to us, and hypertension was treated with a NE drip. On arrival she became acutely confused and diaphoretic. Vital signs: temp – 100.6°F; ′′13/min; RR – 65/41 mmHg; and respiratory rate – 33 bpm. Repeat APAP 24 h PI was 95.1 mg/dL. Blood gas showed a mixed acid-base disorder (pH – 7.49; PaCO2 – 19 mmHg; and bicarbonate – 15 mmHg). This patient was never intubated and had no dysrhythmias. Her symptoms fully continued to decrease and was undetectable at 70 h PI. Mortal


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Background: Hydrogen sulfide (H2S) is a somewhat rare but well recognized occupational and industrial hazard and is a cause of substantial morbidity and mortality. Typical occupational scenarios involve expo-
ure to high concentrations of H2S gas released from petrochemical plants, sewers, volcanoes, or manure pits. Fatalities of workers and rescuers involved in these inci-
dents have been reported. Fatal intentional exposures have not been described in the US, however, suicides utilizing H2S have been described in Japan since 2007. These suicides have been dubbed “detergent suicides” by the media because they are carried out by mixing household chemicals (often toilet bowl cleaner as a source of hydrogen and toxicides as a sulfur source) to produce toxic concentrations of H2S gas. We report the first two cases of suicide by inhalation of H2S gas in the US. Case series: The first case was a 23-year-old medical history was significant for depression. He was wearing goggles and left a note on the window warning first responders of a chemical suicide within the vehicle. Two buckets of yellow substances were found on the rear seat and later identified as household products (muriatic acid and lime sulfur spray) that when mixed produced fatal concentrations of H2S gas. Autopsy revealed no signs of foul play, but noted that the victim’s brain was discolored dark green. The second case was a 22-year-old male found deceased in his car December 15, 2009. A note on the window warned rescuers not to enter. Conclusions: After poisoning with hydrogen sulfide, patients may exhibit signs of a delayed effect of the ingestion.

29. A Case Report of Intentional Cevimeline Ingestion

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Background: Cevimeline (Evoxac) is an oral mucocaria agent recently approved for the treatment of xerostomia in Sjogren’s syndrome. Its toxicity in overdose has not been previously reported. We describe a patient who intentionally ingested 20 mg of cevimeline. Case description: A 47-year-old female presented to the ED nauseous and vomiting. Her past medical history was significant for hypertension and hyperglycemia. She had never exhibited any dysrhythmias. Her symptoms fully

30. Delayed Peak Salicylate Level Following Intentional Overdose

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1Carolina Poison Center, Charlotte, NC, USA;2Carolina Medical Center, Charlotte, NC, USA

Background: Because of potential delayed absorption after aspirin ingestion, it is common to obtain more than one screening blood level to rule out significant overdose. We report a case with peak salicylate level 28 h post-ingestion (PI) and delayed, severe toxicity despite two initial sub-toxic levels. Case report: A 44-year-old male ingested unknown amounts of 81 mg enteric-coated aspirin, ibuprofen-diphenhydramine combination and salicylate level 28 h PI was 6.7 mg/dL. Acid-base status was normal. Vasopressors were weaned rapidly and he was extubated 15 h PI. After extubation, vital signs were normal and he was oriented and ambulatory, allowing transfer to a ward bed with regular diet. Twenty-four hours PI, he became acutely confused and diaphoretic. Vital signs: temp – 100.6°F; ′′13/min; RR – 65/41 mmHg; and respiratory rate – 33 bpm. Repeat salicylate 24 h PI was 95.1 mg/dL. Blood gas showed a mixed acid-base disorder (pH – 7.49; PaCO2 – 19 mmHg; and bicarbonate – 15 mmHg). This patient was never intubated and had no dysrhythmias. Her symptoms fully

31. QTc Interval Prolongation After Atomoxetine Overdose

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Background: Atomoxetine overdose has been associ-
ated with QTc prolongation, but all prior cases involved possible co-ingestants known to have this effect. Our patient developed dynamic ECG changes with revers-
able QTc interval prolongation after atomoxetine overdose. Case report: A 49-year-old woman with history of anxiety presented to the ED with nausea 2 h after ingestion of 1,600 mg of her son’s atomoxetine in a suicald gesture. Her prescribed medications were zolpidem and alprazolam, but she denied any co-inges-
tants other than alcohol. Her vitals were normal and she was awake, alert, oriented, with a resting tremor and other signs of mild withdrawal. On physical exam. Her initial ECG, showed sinus tachycardia and QTc of 495 ms. Her serum potassium, calcium and magnesium were normal. A serum ethanol concentration was 216 mg/dL. During
the first 24 h of observation in the CCU, serial ECGs revealed gradually increasing QTC intervals: 495, 510, 537 ms, peaking at 555 ms. Subsequent ECGs at 48, 72, 96 h showed rapidly progressive QT prolongation, ending at 519, 486 and 471 ms respectively. During this period no dysrhythmias occurred. The patient was then transferred to psychiatry. Discussion: Two prior reports have sug-
gested a correlation between atoxomotone overdose and QTC prolongation, however the possible co-ingestion of other medications like quetiapine, risperidone and bupropion confounded any conclusions. In our patient, despite an initial elevation in ethanol concentration, all ethanol would have been metabolized before the observed QTC peak. Although serum concentrations of prescribed and ingested medications were not obtained, no other medica-
tions known to prolong the QTC interval were recorded in the patient. Supra-therapeutic concentrations of atoxo-
etine have recently been shown to block hERG channels, thus eliciting the mechanism by which atoxomotone may prolong QTC intervals. Conclusion: Atoxomotone overdose may cause QTC prolongation. Since this can cause torsades des points, serial ECG and telemetry monitoring after atoxomotive overdose are reasonable precautions against potentially lethal dysrhythmias.

32. Recurrent Seizures Due to Tramadol Intoxication: A Review of 100 Cases

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1Lohman Hakim Hospital Poison Center, Faculty of Medicine, University of Tehran, Tehran, Iran; 2School of Medicine, University of Colorado Denver, Denver, CO, USA; 3Emergency Department, Faculty of Medicine, Iran University of Medical Sciences, Tehran, Iran; 4Department of Forensic Toxicology, Legal Medicine Research Center, Legal Medicine Organization of Iran, Tehran, Iran

Abstract: Tramadol is an atypical opioid with anal-
egenic effects used in the treatment of mild to moderate pain. Seizures are one of the indications of tramadol use, both therapeutically and in overdose. Objective: The rate of tramadol poisoning is increasing in Iran. We studied the frequency of recurrent seizures in tramadol intoxicated cases admitted to the Lohman Hakim Hospital Poison Center (LHHPC). Methods: This is a case series of patients admitted to LHHPC from March to June 2008 with a tramadol-induced seizure. Age, sex, number of tablets, time to peak acetaminophen, and administration of activated charcoal were recorded and extracted from the patients’ files. Patients were excluded if they
met the above criteria. The majority of cases were single
from the patients files. Patients were excluded if they
other signs and symptoms, number of seizures, admission
to June 2008 with a tramadol-induced seizure. Age, sex,
number of tablets, time to peak acetaminophen, and
administration of activated charcoal were recorded and
extracted from the patients’ files. Patients were excluded if they

34. Delayed Time to Peak Atenolol & Death Despite Early Treatment in a Massive Tylenol PM Exposure

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1UT Southwestern Medical Center, Dallas, TX, USA; 2Denton Regional Medical Center, Denton, TX, USA; 3Riyadh Military Hospital, Riyadh, Saudi Arabia

Abstract: A healthy 25-year-old female presented 1.5 h after ingesting 100 tablets of Tylenol PM + ethanol. Upon arrival, her Hct was 42% and a RR of 18/min, BP 121/56 mmHg, & HR 87/min. Her skin was warm and dry and her mouth was dry. Her HR was 122/min by 3-
hours after exposure. The EKG was normal. Her initial acetaminophen (APAP) level at 3.5 h after exposure was 368 mcg/mL. Salicylate was not detectable & eth-
nol level was 49 mg/dL. Her initial liver function tests, coagulation testing, and electrolytes were normal & a UDS was negative. She was given activated char-
coal 30 g & acetadote was started 3.25 h after expo-
sure. Repeated APAP levels included 610 mcg/mL at 18 h, 42 mcg/mL at 3.5 h. Urine was 388 mcg/mL at 38 h & peaked at 1,305 at 83 h. Her total bilirubin was 1.8 mg/dL at 38 h & continued to rise. Her INR was 7.3 at 62 h & peaked at 89 h. Serum bicarbonate was 16 mmol/L at 14 h with a nadir of 6 at 38 h. Her creati-
nine peaked at 1.7 mg/dL. Her mental status waxed & waned during the first 24 h, she became obtunded by the 3rd day, & she died on the 5th day due to liver failure. A necropsy, discussed elsewhere, revealed a perfusion

36. Severe Metformin Toxicity: Role of Methylene Blue and CVVHD as Therapeutic Adjuncts

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1New York City Poison Control Center, New York, New York, USA; 2St. John’s University College of Pharmacy, New York, New York, USA

Abstract: Metformin toxicity carries a significant mortality. The lactic acidemia may contribute to vasodilation, cardio-

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improved hemodynamics in patients with sepsis, postcardiac surgery vasoplegia, and anaphylactic shock. We report the case of a man with metformin-associated lactic acidosis (MAA) and concomitant clostridial myonecrosis with methylene blue. A 60-year-old man, with a history of DM, HTN, and depression, was found unresponsive at home. He had persistent hypotension necessitating maximum of four vasopressor agents, acidaemia with serum pH 6.08; serum lactate concentrations, >15 mg/dL; and acute renal failure with oliguria. The bedside echocardiogram showed a hyperdynamic left ventricle. After trials of glucagon and high dose insulin euglycemia therapy with minimal improvement, a methylene blue bolus of ~2 mg/kg resulted in an improvement in MAP by 10 mmHg. This was followed by a methylene blue infusion of 0.1 mg/kg/h. CVVHHD was initiated. The patient’s initial serum metformin concentration was 80 μg/mL (therapeutic: 1–2 μg/mL), and the urine metformin concentration was 760 μg/mL. Total estimated amount of metformin removed via CVVHHD was 305 mg in 15,000 mL of dialysate fluid. Despite maximal efforts, the patient expired on Day 4 of hospitalization. Although CVVHHD removed a small amount of metformin, and methylene blue transiently increased the MAP, it is challenging to ascribe a therapeutic benefit due to the patient’s degree of severity (lactic acidosis, hypotension), and rapid infusion of 24 h, CVVH HD extraction could potentially remove 960 mg of metformin. Methylene blue may be considered as an adjunct in patients with refractory vasodilatory shock unresponsive to conventional therapy. Further studies are needed to assess clinical efficacy.

37. Randomized Controlled Study on the Use of Multiple-Dose Activated Charcoal in Patients with Supratherapeutic Phenytoin Levels

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1Madigan Army Medical Center, Tacoma, WA, USA; 2Emory University, Atlanta, GA, USA; 3Georgia Poison Center, Atlanta, GA, USA

Background: We conducted a prospective randomized controlled study on the influence of multiple doses of activated charcoal (MDAC) in patients with supratherapeutic phenytoin levels.

Methods: Patients were recruited from three urban teaching hospitals that had serum phenytoin levels greater than 30 mg/mL upon presentation. When the charcoal was administered within 4 h of the last dose of phenytoin, a second dose of activated charcoal was administered every 6 h initially then every 24 h after the first day. The presence of gabapentin abnormalities and nystagmus was recorded and mini/mental status exam (MMSE) scores were collected from each patient enrolled. Half-lives were calculated using regression-time analysis. Student’s t-test was used to compare means between controls and MDAC groups.

Results: Seventeen total patients were enrolled in the study. Seven patients received MDAC, eight patients served as controls, and two patients who were initially enrolled as controls inadvertently received one dose of activated charcoal and were excluded from the analysis. Both groups were comparable in mean age, gender, and weight, except for one female in the single-dose charcoal group. The mean serum half life was (mean ± SD) 31.8 ± 13.3 h in the charcoal group and 95.2 ± 75.8 h in the control group (p-value = 0.049). The mean peak serum level for phenytoin was 40.7 and 36.0 (p = 0.054) in the control and charcoal groups, respectively. Patients with steady, unsteady, and ataxic gait were 11.8, 29.4, and 52.9%, respectively. All patients had horizontal and vertical nystagmus and 11.7% had horizontal and vertical nystagmus. The mean MMSE score was 21.9 in the 15 patients who completed the exam. Conclusions: MDAC appears to decrease supratherapeutic phenytoin levels with supratherapeutic phenytoin levels. This may have an impact on patient time in hospital and length of symptoms from toxicity.

38. Overdose of Diltiazem, Metoprolol, and Amiodarone Treated Successfully with Intravenous Fat Emulsion and High Dose Insulin in an Awake Patient

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Regions Hospital, St Paul, MN, USA; 2United Hospital, St Paul, MN, USA

Introduction: Intravenous fat emulsion (IFE) and high dose insulin (HDI) have been reported in treatment of overdoses, although rarely in combination. We report a life-threatening overdose of diltiazem, metoprolol and amiodarone, successfully treated with IFE and HDI.

Case report: A 30-year-old woman presented to the ED for abdominal pain. Medical history included hypothyroid cardiomyopathy (HCM) with CHF and an AICD. Initial vital signs were BP 89/46 and HR 73. Over 3 h the BP and HR dropped to 64/41 and 70, respectively, and she became confused. ECG showed a paced rhythm. Normal saline (NS) was given (2 L IV) during a negative workup for her pain. She then admitted to taking all of her diltiazem, metoprolol, and amiodarone 6 h prior to arrival, and that she never had abdominal pain. She was given another 2 L NS, 25 mEq IV Ca2+100 mL of 5% dextrose as an HDI infusion escalated over an hour to 10 U/kg/h. She remained hypotensive, confused, and anuric. The CVP was 20 and an Echo showed low EF. IFE (20%) was given (500 mL over 2 h) and subsequent drug treatment was continued for 3 days, and successfully extubated on day 6 without apparent toxicity and continued his outpatient clinic visits. He missed one cycle of his chemotherapy, returning to his scheduled regimen one month post 5-FU overdose, with no major hematologic sequelae. Discussion: Diltiazem is an oral prodrug of uridine. Upon converting to uridine triphosphate, it competes with the incorporation of 5-FU into RNA. Hemodilution may be beneficial early in 5-FU toxicity, however there is no literature on IFE and HDI in overdose alone affects survival. The 5-FU dose in this case predicted mortality, which supports the importance of survival with triacetyluridine in prior overdoses. Conclusion: We report a case of severe TCA toxicity managed through a poison center and associated consult service that were inadequately responsive to conventional therapy and stablished with IFE therapy. Results: Case #1: A 52-year-old female ingested 8,000 mg of imipramine and developed pronounced cardiotoxicity. Her initial QRS was 140 ms. She was treated with endotracheal intubation, somnolent baclofen, vasopressors, and 200 mL of hypertonic saline (3%). Despite this, she developed seizures, ventricular tachycardia and complete heart block. When her serum sodium reached 166 mmol/L, she was comatose. IFE (20%) was administered over 3 h and subsequently extubated at 0.25 mL/kg/min and stabilized over the next 6 h. She had complete neurological recovery following 17-day hospital stay. Case #2: A 44-year-old female with a reported ingestion of doxepin presented with frequent ventricular activity. Her initial QRS was 166 mmol/L. She was treated with endotracheal intubation, 28 amps of sodium bicarbonate, multiple rounds of benzodiazepines, and 100 mL of hypertonic saline (3%). She continued to have frequent seizures and a QRS persistently greater than 120 ms. When her serum sodium reached 166 mmol/L and serum pH reached 7.68, she was given two boluses of 100 mL IFE (20%) followed by an infusion at 0.25 mL/kg/min. Over the next 4 h, her QRS interval narrowed and her seizure activity stopped. Intralipid was continued for 6 h, bicarbonate infusion was continued for 3 days, and successfully extubated on day 8 with complete neurological recovery. Her initial doxepin and N-desmethyldoxepin concentrations were 757 and 81 mcg/mL (upper range of therapeutic is 250 mcg/L, respectively). Conclusion: Intravenous fat emulsion (IFE) was a successful rescue therapy in two cases of severe TCA toxicity. Further systematic study of IFE for lipidic drug toxicity is warranted.

40. Case Series of Severe TCA Toxicity Treated with Intravenous Fat Emulsion

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Background: Intravenous fat emulsion (IFE) is accepted therapy for severe cardiac toxicity from bupivacaine and has been successful in animal models of tricyclic antidepressant (TCA) toxicity. The use of IFE for lipophilic drug intoxication has been suggested, but human reports are scarce. The proposed IFE mechanism is transient relief of the toxin burden through intravascular sequestration. Methods: We describe a series of two cases of severe TCA toxicity managed through a poison center and associated consult service that were inadequately responsive to conventional therapy and stablished with IFE therapy. Results: Case #1: A 52-year-old female with a reported ingestion of doxepin presented with frequent ventricular activity. Her initial QRS was 166 mmol/L. She was treated with endotracheal intubation, 28 amps of sodium bicarbonate, multiple rounds of benzodiazepines, and 100 mL of hypertonic saline (3%). She continued to have frequent seizures and a QRS persistently greater than 120 ms. When her serum sodium reached 166 mmol/L and serum pH reached 7.68, she was given two boluses of 100 mL IFE (20%) followed by an infusion at 0.25 mL/kg/min. Over the next 4 h, her QRS interval narrowed and her seizure activity stopped. Intralipid was continued for 6 h, bicarbonate infusion was continued for 3 days, and successfully extubated on day 8 with complete neurological recovery. Her initial doxepin and N-desmethyldoxepin concentrations were 757 and 81 mcg/mL (upper range of therapeutic is 250 mcg/L, respectively). Conclusion: Intravenous fat emulsion (IFE) was a successful rescue therapy in two cases of severe TCA intoxication. Further systematic study of IFE for lipophilic drug toxicity is warranted.

41. Life-Threatening Fasciculation Overdose Treated with Intravenous Fat Emulsion

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Introduction: Fascicile, a class Ic antiarrhythmic, is used to treat supraventricular tachycardias. Sodium
bicarbonate (bicarb) is used in overdose (OD) treatment. Intravenous fat emulsion (IFE) is an uncommon/unreported treatment for flecainide OD. We report a case of a life-threatening, flecainide OD, treated with IFE, with serum drug levels pre/post IFE administration. Case report: A 51-year-old man ingested 2 g of flecainide, and presented to the ED 90 min post-ingestion (PI). He had HR 44 and BP 140 systolic (SBP). ECG showed sinus rhythm, QRS 162 ms and QTc 427 ms. Within 45 min his HR was 40 and SBP 60 μg/mL. He received a 1 L infusion with QRS 150 ms and QTc 524 ms. He had already received 1 L normal saline (NS), 100 mL bicarb and activated charcoal. Over the next hour in the ED he received another 1 L NS, 100 mL bicarb, 1 mg atropine, 2 mg Mg, and a 100 mL bolus of 20% IFE. He was admitted to the ICU with HR 55 and SBP 90. Five hours into his ICU stay the bicarb infusion was stopped, he had received a 1 L infusion of 20% IFE, and his HR/BP/QRS/QTc had all normalized. He went to psychiatry on day 3 with no end-organ effects. Flecainide levels were 1.8 μg/mL (tul(0.2–1.0) 100 min PI (pre-IFE), 2.76 μg/mL 7 h PI (post-IFE)), and 0.27 μg/mL 3.5 days PI. Discussion: This case is unique in that the patient received IFE for a flecainide OD, and drug levels are reported. The AV block, JHF, BP, and QT/RS/QTc are all classical signs of flecainide toxicity; however, this case highlights both the lack of NS-channel blockade, but also K+-channel blockade. The bicarb, NS, and Mg are standard, but the IFE is not. Flecainide has a similar profile to drugs for which IFE has been used successfully. It has a high lipophilic (L/kG) and a high log P octanol/water coefficient (3.8). The standard therapy and IFE helped normalize the patient’s hemodynamics and cardiac conduction. No conclusion can be made from the serum levels, other than they were high. The initial level may have been before the serum peak, which can occur as late as 6 h PI. The first post-IFE level is not interpreted easily because not enough is known about drug levels after IFE administration. Conclusion: We present a case of a life-threatening flecainide overdose successfully treated with standard therapy and intravenous fat emulsion bolus and infusion.

42. Prolonged Resuscitation for Massive Amiodole Overdose with Maximal Vasopressors, Intraplidal and Yeno-Arterial-Extracorporeal Membrane Oxygenation (VA ECMO)

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Background: Calcium Channel Blocker (CCB) overdoses remain among the most lethal ingestions. We report a case of massive amiodole overdose with quantitative confirmation, refractory to maximum pressors and various salvage therapies, ultimately requiring 9 days of veno-arterial extracorporeal membrane oxygenation (VA ECMO) for hemodynamic support. Case report: A 50-year-old man with depression, HTN and ETOH abuse was brought to the ED 4 h following a single ingestion but received less than 20 h of IV NAC for acute APAP overdose. He was admitted to the ICU with HR 44 and BP 140/60 mmHg, with serum drug levels pre/post IFE 1.2–14.0. Anaphylactoid reactions were reported in 18 (29%) patients, of which 83% were cutaneous (facial flushing, urticaria, or pruritus). There were no deaths. Conclusions: In this cohort of patients receiving less than 20 h of IV NAC for acute APAP poisoning, hepatotoxicity was infrequent. Anaphylactoid reactions were common and may have been a reason for discontinuation of IV NAC in some patients. Further research is required to identify patients at low-risk of hepatotoxicity who may benefit from a shortened course of IV NAC.

44. Lipid Emulsion in the Treatment of Diphenhydramine Toxicity

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Background: Lipid emulsion therapy after cardiovascular and vasopressor failure has been documented in multiple case reports with lipophilic drugs. We present a case of diphenhydramine cardiotoxicity in which a patient, refractory to standard ACLS, resumed effective circulation after IV lipid emulsion. Case report: A 42-year-old female presented in PEA after taking 50–100 acetaminophen 500 mg/diphenhydramine 25 mg tablets in the last 24 h. The acetaminophen was found by the patient to be what appeared to be the combination of acetaminophen 28 mg/dL. EMS started ACLS and the patient received 50 mL of 50% dextrose, epinephrine 2 mg, atropine 1 mg and sodium bicarbonate 30 meq IV en route to the ED. In the ED the patient was intubated and the bedside cardiac ultrasound showed no cardiac motion so ACLS was continued. One hour after EMS scene arrival, 60 mL of a 20% lipid emulsion IV was given. Within 1 min of the bolus, the patient had a palpable pulse and a repeat cardiac ultrasound showed cardiac valve and wall motion activity. The patient was then started on dopamine and the subsequent blood pressure was 107/83 with a marked increase in cardiac output. We concluded that the lipid infusion was started and intravenous n-acetylcysteine was initiated for the acetaminophen overdose. Two hours after the lipid emulsion was started, the patient was able to maintain a blood pressure off of dopamine and the lipid emulsion was stopped. In the ICU, the patient was changed to a “Do Not Resuscitate” status by her family and she went back into PEA and died approximately 7 h after the lipid emulsion was started. The post-mortem subclavian blood sample showed a diphenhydramine level of 0.80 μg/mL and an acetyli- mophane level of 28 μg/mL. The patient had a return of pulse, blood pressure and cardiac activity shortly after administration of lipid emulsion, in addition to standard ACLS protocols. Multiple case reports have described intravenous lipid emulsion (IV LE) to treats cardiotoxicity from lipophilic drugs. This is the first case to describe its use in toxicity from diphenhydramine overdose. Lipid emulsion may be an effective therapy in diphenhydramine overdose with cardiotoxicity.
46. Fomepizole for Severe Disulfiram-Ethanol Reactions

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Background: When ethanol (EtOH) is consumed with disulfiram (DSM), acetaldehyde accumulates and an unpleasant histamine-like reaction occurs. Severe DSM-EtOH reactions result in hypotension, tachycardia and angioedema. Fomepizole (4-MP), an inhibitor of aldehyde dehydrogenase, may halt progression of this reaction by blocking EtOH metabolism to acetaldehyde. Methods: We present two cases of DSM and EtOH overdose leading to severe reactions unresponsive to fluid resuscitation and treated with 4-MP. Serial blood ethanol concentrations (BAC) were used to determine kinetics of EtOH elimination following 4-MP blockade.

Results: Case 1: A 20-year-old female presented after ingestion of DSM. Presenting HR was 125 bpm and BP 119/83 mmHg. BAC was 448 mg/dL, drugs of abuse screen and laboratory tests were otherwise normal. After 11 h of observation and 2 L of normal saline, she was tachycardic and had low swing apnea (166 bpm) and hypotension; systolic blood pressure (SBP) 88 mmHg. Antihistamines, steroids and an additional 2 L of normal saline were given without improvement of hypotension or tachycardia. One dose of 4-MP 15 mg/kg was given with improvement within 1.5 h; BP 117/44 mmHg and HR 98 bpm. No additional doses of 4-MP were given and there was no recurrence of tachycardia or hypotension. Mental status normalized over 16 h and she was discharged with no clinical sequelae. Serial BACs demonstrated first order elimination kinetics, even after blockade. Case 2: A 47-year-old female presented after overdose of vodka and 6,250 mg DSM. She was tachycardic and hypotensive upon presentation. After administration of 3 L normal saline, she remained hypotensive and tachycardic. BAC was 221 mg/dL, drug of abuse screen and laboratory tests were within normal limits. One dose of 4-MP 15 mg/kg was given with improvement within 1 h: blood pressure and heart rate normalized. There was no recurrence of hypotension and her mental status cleared over 12 h. As in Case 1, BACs declined rapidly and appeared to follow first order elimination kinetics. Conclusions: 4-MP is effective in blocking DSM-4EtOH reactions. Analysis of BACs following blockade with 4-MP in both cases demonstrated first order elimination kinetics.

47. Severe Metformin-Associated Lactic Acidosis From Acute Ingestion Without Renal Failure

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Introduction: Metformin-associated lactic acidosis (MALA) is a rare but serious complication of biguanide therapy. MALA from acute intoxication is rare; it usually occurs when a precipitant induces renal failure (RF) in the setting of metformin use. Hemodialysis (HD) is occasionally required to treat severe acidemia. We describe a case of severe MALA from acute ingestion without RF treated with HD. Case: Our patient was a 27-year-old female prescribed metformin for polycystic ovarian syndrome who presented to our ED complaining of a chronic pelvic pain exacerbation. She stated that she ingested metformin (20 g by history) 2 h prior and denied congesants. Initially her vitals were normal. Arterial Blood Gas (ABG) displayed pH 7.40, pCO2 28, HCO3 - 17, and BE -6. Initial creatinine was 1.3 mg/dL. Lactate was 78 mmol/L. She was aggressively hydrated and admitted. Six hours post-admission, she was acutely and severely hypoxic. She was confused and complained of worsening abdominal pain. Repeat ABG revealed pH 6.74, pCO2 14, and HCO3 - 2. Lactate was 37 mmol/L and creatinine was 1.7 mg/dL. Metformin concentration was 90 μg/mL. Toxic alcohol panel and urine GC/MS were otherwise negative. One hundred and fifty milliequivalent sodium bicarbonate was administered, followed by continuous inspiratory bicarbonate infusion with minimal response (pH 7.12, pCO2 21, bicarbonate 6). She underwent emergent HD for 5 h, which was complicated by norepinephrine-responsive hypotension. Her mental status cleared and acidemia improved 2 h after HD initiation. During HD, metformin clearance was 10.6 L/h (hematocrit 30%) and extraction ratio was 92% based upon pre- and post-HD cartridge concentrations of 7.6 and 5 μg/mL. Metformin concentration was 14 μg/mL upon cessation of HD. Vasopressors were rapidly weaned. She was discharged after psychiatric evaluation.

Discussion/conclusion: The presentation of MALA is variable. It occurs when a precipitant induces renal failure (RF) in the setting of metformin use. MALA from acute ingestion without RF is rare; it usually occurs when a precipitant induces renal failure (RF) in the setting of metformin use. Hemodialysis (HD) is occasionally required to treat severe acidemia. We describe a case of severe MALA from acute ingestion without RF treated with HD. MALA occurs almost exclusively in patients who are at high risk for developing lactate-associated acidosis apart from metformin therapy. Our patient developed severe MALA while having no other risk factors for its development or significant RF. Our experience is that while severe MALA resulting from acute ingestion is rarely reported, it can be effectively treated with hemodialysis.

48. Emergency-Department Preparedness for the Evaluation and Management of Mass Casualties from Anticholinesterase Compounds

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Background: Anticholinesterases include carbamates and organophosphates (OP) insectsides and nerve agents. The terrorist use of sarin (a G-series nerve agent) in Tokyo in 1994 and 1995 demonstrated the ability of these compounds to flood emergency departments (EDs) with a large number of patients with acute cholinergic symptoms and worried individuals. However, no recent study has examined ED preparedness for mass-casualty incidents (MCIs) involving these compounds. Methods: We created a secure 30-item online survey for the physician directors of the 220 continuously staffed EDs in the 12 most populous incorporated cities in the United States to allow the directors to report their perceptions of the preparedness of their individual EDs for MCIs from anticholinesterases. Results: One hundred and ten directors responded, for a 50% response rate. Two-thirds had received training in anticholinesterase agents in the past 3 years, but fewer than 20% were very confident in the effectiveness of their training. Only 40% had participated in an anticholinesterase drill in the past 3 years, and only 6% were very confident that these drills had given them the preparation that they needed. One-third of respondents could not estimate how many severely exposed casualties could be treated from existing hospital supplies of antidoties, and 20% and 36% of physician directors had never heard of the Division of Strategic National Stockpile (DSN) or of the CHEMPACK program, respectively. Fewer than half of reporting hospitals had a board-certified medical toxicologist to help in such an emergency. Nearly half of respondents had never heard of the online Radiation Event Medical Management (REMM) module from the National Library of Medicine and the National Institutes of Health, but the same proportion thought that a chemical counterpart (Chemical Hazard Emergency Medical Management, or CHEMM) to REMM would be either moderately or very helpful for REMM would be either moderately or very helpful for EDs involved in MCIs involving anticholinesterases. Conclusions: This study demonstrates that physician ED directors perceive marked deficiencies in their abilities to respond to this kind of toxicological emergency and suggests critical directions for remediation of these deficiencies.

49. Forensic Analysis of Potassium Cyanide Stored in Gelatin Capsules

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Background: Cases of surreptitious criminal poisoning utilizing cyanide are rare, yet continue to be reported. The potential and rapid toxic effects of cyanide ingestion are desired characteristics for use as a poisoning agent. Although the clinical symptoms and metabolic effects of cyanide have been well documented, the stability of cyanide salts utilized in criminal poisonings has not been well documented. The present study describes stability studies performed on potassium cyanide (KCN) when stored with gelatin (garden peas). Results: Gel capsules were purchased from CapsuleLabs. The gel capsules were filled with 200 mg KCN, assemled into capsules, then stored in humidity (64.5 ± 2.3%) and temperature (21.2 ± 0.7°C) controlled environments of: 1) open-air exchange, or 2) capped plastic bottle. The capsule weight, appearance were monitored weekly for 6 weeks. The amount of cyanide was determined by Cold Medication Safety Surveillance Team. PhysChem determined the KCN salts and gel capsules demonstrated hydroscopic changes after as little as 1 week when stored in open-air environment within the temperature and humidity controlled environment. The changes in appearance were accompanied by decreased CN recovery, 77% week 1. After 6 weeks CN recovery was 52%. Gel capsules stored in a capped plastic bottle at a temperature and humidity controlled environment were more resistant to degradation. No obvious changes in the KCN salt or gel capsule were apparent after 6 weeks. Conclusions: These data demonstrate that the dry capsules will significantly affect the recovery of lethal concentrations of cyanide.

50. Accidental Unsupervised Ingestions (AUI) Most Common Type of Exposures Detected During Surveillance of Pediatric Exposures to Cough and Cold Medications

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Background: Safety concerns surrounding the use of cough/cold medications in children prompted the development of ongoing surveillance for AUI adverse events (AE) associated with these drugs. Methods: Using established methods, pediatrician (age <12 years) cases with AE associated with the use of cough/cold medications were collected from the Pediatric Cough/Cold Medication Safety Surveillance Team. Results: A total of 1,208 cases were reviewed by the Team, of which 916 were judged to have AEs at least potentially related to a cough/cold ingredient. Of the related cases, 552 (60%) were accidental unsupervised ingestions (AUI), 24% related to administration with therapeutic intent, 6% non-therapeutic intent and 10% unknown intent. Supertherapeutic doses were estimated in 88% of cases, with 15% of these having no alternative medical indication. Age distribution of AUIs: 16% <2 years, 60% 2 to <4 years, 17% 4 to <6 years, 7% 6 to <12 years. Diphenhydramine was involved in 355 reports, including 3 deaths, with 64% of all AUIs (13% involved more than one product). Single substance exposures to single-ingredient diphenhydramine products accounted for 46% of all AUIs followed by products containing diphenhydramine, with 5% of cases. Conclusions: AUIs account for the majority (60%) of all AE cases associated with cough/cold medication pediatric exposures detected in our surveillance. Adequate exposure surveillance will improve the nature of the largest data source NPDPS. These exposures primarily involve diphenhydramine products, likely because these products are widely used and available in

Abstracts

Clinical Toxicology vol. 48 no. 6 2010

614

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homes throughout the US. Targeted interventions, such as proper storage of medication immediately after thera-
peutic use, are needed to reduce these preventable expo-
sures that result in AEs in children.

51. School Evacuations in the United States Due to Hazardous Chemical Incidents

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Background: Every year, unintentional and intentional releases of chemicals, or related fires or explosions, occur in schools, causing injuries, costly cleanups, and lost school days. Methods: Data from the Hazardous Substances Emergency Events Surveillance (HSEES) system for 2002–2008 was used to conduct a secondary analysis to identify school-related hazardous incidents and elucidate their causes and consequences to highlight the need for intervention. Information about acute events involving hazardous substances was collected, including the substance(s) released, number of victims, number and types of injuries, and number of school evacuations. Descriptive statistics (frequency tables, confidence intervals) were used to summarize the data. Results: During 2002–2008, a total of 50,018 incidents involving a chemical incident were reported to HSEES by 15 participating states. Of these, 488 occurred in elementary and secondary schools. Among these 488 chemical incidents, 33% resulted in at least one acute injury and 53% resulted in an evacuation. Of the 83 incidents caused by intentional acts, 45% were associated with an injury. Overall, 64% of reported chemical incidents at elementary and secondary schools resulted from human error (i.e., mistakes in the use or handling of a substance), and 31% of incidents resulted in at least one acute injury. A total of 1,032 persons were injured in the 488 school-related incidents. No injuries were fatal, but 15 persons were admitted to a hospital. Most (84%) HSEES school incidents involved the release of only one chemical. Although mercury was the most common hazardous substance released (29%), only 3% of mercury-related incidents caused an injury.

Conversely, although 5% of releases were mace or pepper spray by students, these incidents were associated with a high rate of injury (86%) and evacuation (90%). Releasing (usually spills) of hydrochloric acid, commonly found in chemistry classrooms, also resulted in a significant rate of injuries (14%). Conclusions: Most school-related chemical incidents are the result of the mishandling of chemicals. These data suggest that school staff members might benefit from additional training on how to use and handle hazardous chemicals to reduce injuries occurring at schools.

52. Illicit Drug Exposures in Children

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Background: The epidemiology of illicit drug exposures in children is largely unknown. We sought to describe illicit drug exposures in children reported to US poison centers. Methods: The National Poison Data System was queried for all cases of illicit drug exposures in children <13 years of age from January 1, 2000 to July 31, 2004. We excluded the following categories of the American Association of Poison Control Centers major categories: amyl nitrate, cocaine, gamma-hydroxybutyric acid (GHB), heroin, ketamine, methamphetamine, marijuana, hallucinogens, lysergic acid diethylamide (LSD), phenylcyclohexylepiperidine (PCP), other street drugs, unknown hallucinogens, other hallucinogens, unknown stimulants or street drugs. Cases were excluded if the exposure was designated as a health care facility. Logistic regression was used to determine risk factors for a poor outcome (defined as death or major). Risk factors were exposure to each substance, exposure to >1 substance, age, gender, race, and adjusted against each other. Results: We identified 5,545 cases reporting 5,483 illicit drug mentions. The annual average was 552 cases (range 507–629). Median age was 2 years (IQR 1.1, 5). Exposures primarily occurred at a residence (93%) and were coded as unintentional (78%). Marijuana (32%), methamphetamine of exposures reported to the American Association of Poison Control Centers (AAPCC) database between 2001 and 2007 and coded with a related renal effect (RRE). AKI was defined as elevated serum creatinine, or comparison cases were moderate exposure to all illicit drugs. The table shows factors significantly associated with death or major outcomes.

Discussion: Abundant evidence exists to suggest children with drug exposure are at risk for future drug use and psychological disorders. Since these exposures were largely unintentional and occurred in residences, this provides further evidence of an environment that is conducive to illicit drug exposure. In conclusion, reducing exposures to illicit drugs are needed.

53. Characterization of Acute Kidney Injury in Toxic Exposures

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Background: Exposure-associated acute kidney injury (AKI) has not been systematically characterized. Methods: This was a retrospective, case-control study of poisoning data from the American Association of Poison Control Centers (AAPCC) database between 2001 and 2007. Comparing cases with RRE to the overall 14% of cases were moderate exposure to all illicit drugs. The table shows factors significantly associated with death or major outcomes.

Conclusions: The incidence of a RRE being coded in an exposure is less than 1%. However, the demographics, management, and outcomes of such cases were different. For this poor outcome, and the RRE case-fatality rate was 11 vs. 0.05% for all human exposures. The highest mortality rate (13%) was in those <75 years old. Hemodialysis was performed in 12% of cases and a peritoneal dialysis catheter was placed in 1%. Conclusions: AKI as a result of toxic exposures.

54. Comparison of Perimortem Blood Alcohol Levels with Postmortem Blood Alcohol Levels: A Retrospective Cohort Study

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Background: The measurement of postmortem alcohol (ethanol) levels in blood (BAL) and vitreous humour (VAL) is often used as evidence in legal cases. Unfortunately, the intrinsic properties of a corpse, along with its progressing state of decay, may impede obtaining accurate measurements. For this reason a perimortem BAL drawn near, but before, time of death could be preferred. Methods: This is a retrospective cohort study based on chart review. Our subjects are patients who died in the Emergency Department (ED) from August 2002 to August 2009, who had a perimortem BAL (PMBAL) recorded. We compared the 24-hour postmortem BAL or VAL drawn. We identified 21 subjects who met inclusion criteria. Two groups were identified: those presenting to the ED with a measurable perimortem BAL and those without. Perimortem BAL was extrapolated to a presumed BAL at time of death based on a metabolism rate of 20 mg/dL/h. Assay results were assessed by Pearson correlation coefficient (r) with derivation of a regression equation. Results: In patients presenting to the ED with a measurable BAL, perimortem BAL correlated extremely well with both postmortem BAL (r = 0.99, p < 0.001) and postmortem VAL (r = 0.99, p < 0.001). When those patients who had an unmeasurable perimortem BAL, correlation was perfect for both postmortem BAL and VAL (r = 1.0, p < 0.001). Postmortem BAL also correlated well with postmortem VAL with r = 0.97 (p < 0.001). Conclusions: In general, our study demonstrates excellent correlation between perimortem and postmortem alcohol levels. We chose not to convert plasma perimortem BAL values to whole blood postmortem BAL values, as we wanted a simple comparison in this study. Importantly, no patient that died with a perimortem BAL < 5 mg/dL had a measurable postmortem level. A single subject had a significant discrepancy between obtained levels, with a perimortem BAL of 66 mg/dL compared to a postmortem BAL of 28 mg/dL and VAL of 99 mg/dL. In this subject, significant legal implications could be raised, as many states consider a BAL > 0.8 mg/dL to imply intoxication. This offers a unique perspective on toxic nephropathies. Overall, 6.5% of exposures (84%) HSEES school incidents involved the release of only one chemical. Although mercury was the most common hazardous substance released (29%), only 3% of mercury-related incidents caused an injury.

Conversely, although 5% of releases were mace or pepper spray by students, these incidents were associated with a high rate of injury (86%) and evacuation (90%). Releasing (usually spills) of hydrochloric acid, commonly found in chemistry classrooms, also resulted in a significant rate of injuries (14%). Conclusions: Most school-related chemical incidents are the result of the mishandling of chemicals. These data suggest that school staff members might benefit from additional training on how to use and handle hazardous chemicals to reduce injuries occurring at schools.

55. Counterterrorism Planning Using the Michigan Hazardous Substances Events Surveillance System (HSEES)

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Background: The Agency for Toxic Substance and Disease Registry (ATSDR) has worked since 2005 with several states to collect and synthesize information about releases of hazardous substances. Data is entered into the Hazardous Substances Emergencies Surveillance (HSEES) system and is intended to assist federal, state, and local public health agencies to develop strategies to prepare and respond to activities involving hazardous substances. Methods: Over a 4-year period (2005–2008), we analyzed HSEES data collected by the Michigan Department of Health (MDCH). Information about acute events involving hazardous substances is collected, including the substance(s) released, number of victims, number and types of injuries, and number of evacuations. Descriptive statistics (frequency tables, confidence intervals) were used to summarize the data. Results: Data on the 1,372 non-petroleum...
56. The Impact of Federal Pseudoephedrine Regulations on Methamphetamine Exposures

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Background: Methamphetamine abuse is a nationwide public health epidemic and is believed to be due to the inexpensive manufacturing process which requires only household chemicals and the readily accessible key ingredient, pseudoephedrine. Effective September 30, 2006, under the Combat Methamphetamine Act of 2005, all products containing the ingredient pseudoephedrine are required to be kept behind the pharmacy counter and can only be sold in limited quantities after identification is verified and a logbook is signed.

Results: To date, there is no information as to what impact this major drug enforcement policy has had on the number of methamphetamine exposures reported to poison control centers nationwide. Using an RBP approved IRB approved retrospective review of all methamphetamine exposures that were reported to the AAPCC National Poison Data System from October 1, 2006 to September 30, 2009, compared to those reported from October 1, 2003 to September 30, 2006 was conducted. Data collected included date of report, patient age, gender, substances ingested, formulation, route, reason for exposure, management, and patients outcomes. Baseline statistical analysis used the profile data. Results: From October 1, 2003 through September 30, 2006 there were 8,001 methamphetamine exposures reported to poison centers compared to 4,703 reported in the subsequent 3-year period. This is a 20.1% decrease in reported methamphetamine exposures.

57. Acute Toxicity by Hair Dye in Upper Egypt

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Background: Hair-dye containing paraphenylenediamine is widely used in Middle East and some Asian countries. Many cases of toxicity and mortality either due to accidental or deliberate ingestion of hair dyes were reported. The aim of the present work was the chemical analysis of the black hair dye, to analyze the various aspects of acute poisoning through a retrospective study of fatalities reported in seven governorates in Upper Egypt as a result of its ingestion and if there is dose-effect relationship. Methods: The records of acute poisoning cases of seven governorates in Upper Egypt investigated by Assiut Forensic Chemical Laboratory in the period from January 2002 to December 2009 were examined for type of poison, pattern, incidence, age, sex, geographical distribution and mode of poisoning. The studying of the systemic effects on ingestion of hair dye was conducted by oral administration of hair dye in different doses (500, 100, 50 mg/kg) to four groups of albino rats. The clinical manifestation was observed and the light microscopical examination of sections of vital organs was done.

Results: Eight cases of acute poisoning fatalities investigated by Assiut Forensic Chemical Laboratory were due to ingestion of hair dye. The highest majority of these were suicide cases particularly in Qena, Sohag and Aswan Governorates respectively, with a female predominance. The highest percentage was found in the age group (31–40) years, followed by (21–30) years. Death occurred within 5 min in the first group, within 10 min in the second and within an hour in the third group. The animals of the fourth group survived until sacrificed after 1 week. The most common histopathological changes in all studied organs were vascular congestion and lymphocyte infiltration, with degeneration changes in the hepatocytes and destruction of renal tubules. Conclusion: Deliberate self-poisoning by hair dye is a major problem in Upper Egypt particularly in females. The main toxic effects were directed to the liver and kidneys while the other studied organs were affected to a mild extend. Also there was a well established dose-effect relationship.

58. Are Children the Unintended Victims of Changes in Buprenorphine Prescribing Practices?

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Background: Buprenorphine is an alternative to methadone for the out-patient management of opiate dependence. When used as a substitute for methadone, prescribing is limited to opioid addiction clinics; usually in single doses and take-home weekend doses. The Drug Addiction Treatment Act of 2000 allowed practitioners with an approved opioid addiction clinic the ability to prescribe buprenorphine and to allow retail pharmacies to dispense multiple day quantities. Since the Treatment Act was signed into law, the number of providers in WV that can prescribe buprenorphine has been increasing. In WV, 81 private physicians and 18 treatment centers can now prescribe this drug. The purpose of this study was to determine if the change in prescribing practices for buprenorphine increased the number of pediatric exposures reported to the WV poison center. For comparison, as methadone laws were unchanged, the number of methadone-related exposures was reviewed. Methods: A retrospective review of the number of reported exposures to buprenorphine and methadone in children 55 years between 2001 and 2009. Results: In 2008 and 2009, approx. 50 vs. <10% of unintentional ingestions in children 55 years were to buprenorphine and methadone respectively.

Conclusions: Pediatric buprenorphine exposures rose during the period the number of physicians in WV that could prescribe buprenorphine increased. Poison prevention education should accompany information provided when buprenorphine is dispensed.

59. Plant Food and Bath Salts – How Harmful is Mephedrone?

Wood DM, Greene SL, Dargan PI, Guy’s and St Thomas’ NHS Foundation Trust, London, UK

Background: Mephedrone is one of a number of synthetic cathinones, which are increasingly being used as legal recreational drugs and are widely available for purchase through the Internet (often sold as “plant food” or “bath salts”). The majority of information currently available on the toxicity of Mephedrone comes from user forums, with only two published cases to date. There is increasing concern by legislative authorities regarding the fact that Mephedrone is currently legally available in most countries. We report here a case series of acute toxicity related to self-reported Mephedrone use.

Case series: Since January 2009, there have been 47 presentations to our large inner-city Emergency Department with self-reported Mephedrone use. Their mean ± SD age was 27.8 ± 8.5, range 15–50 years and 50% of patients were male. Baseline vital signs (mean ± SD) were: heart rate 93 ± 27.3 bpm (range 50–158); systolic blood pressure 141.6 ± 21.9 mmHg (range 99–192); temperature 36.0 ± 1.2°C (range 33–38.1). 21.3% had a significant hypotension (HR >120), 27.3% had significant hypertension (systolic BP ≥160 mmHg), no patients had a significant tachypnea (>39°C). The most common clinical feature on presentation was agitation (42.6%); other features included palpitations (23.4%), vomiting (14.9%), chest pain (10.6%), self-limiting seizures (8.5%) and headache (4.3%). Serum sodium was measured in 22 (48.8%), there was only one case of hyponatraemia (sodium concentration of 125 mEq/L). Creatinine kinase was measured in 11 (23.4%) and was raised above the upper limit of normal (229 IU/L) in 7 (63.6%) of these. Thirty-six (76.6%) patients were discharged either directly from the ED or the short-stay ward after a brief period of observation. Benzodiazepines were needed for the management of acute agitation in 7 (14.9%) patients. Conclusions: This case series demonstrates that the toxicological profile of acute Mephedrone toxicity appears to be similar to that seen with other stimulant recreational drugs such as MDMA and amphetamines. The recent recommendation for classification of Mephedrone in the UK, along with other European countries such as Sweden, is appropriate based on the toxicity seen in these cases. The overall toxicokinetic and toxicodynamic profile of Mephedrone and the other cathinones needs further work, including greater analytical confirmation of drugs used.

60. A Case Series of Recreational Pregabalin Overdose Resulting in Generalized Seizures

Reedy SJ1, Schwartz MD.2

1Emory University, Atlanta, GA, USA; 2Georgia Poison Center, Atlanta, GA, USA

Background: Pregabalin (Lyrica™) is a GABA analogue with structural similarity and action similar to gabapentin. Pregabalin is known to have antiepileptic, analgesic, and anxiolytic activity via non-competitive GABA agonism and reduced release of glutamate, norepinephrine, and substance-P. Myoclonus and somnolence have been described in patients using pregabalin as adjunctive therapy for neuropathic pain and epilepsy; however, data is scarce on pregabalin toxicity after...
overdose or recreational use. To our knowledge, we present the first recreational overdoses of pregabaline resulting in generalized seizures in otherwise healthy patients. Case 1: A 16-year-old boy ingested and inhaled as much as nine 300 mg tabs of pregabaline attempting to “get high.” He had found the pregabaline in the house where his family had recently moved. He had also shared the medication with his friend (see Case 2). One hour after use, he developed generalized tonic-clonic seizure activity. Though seizures abated prior to EMS arrival, the patient was slow to arouse and was taken to the ED. Extended UDS, ETOH level, CMP, CBC, and EKG were all within normal limits. Plasma pregabaline level was 25 μg/mL. The patient was observed inpatient and discharged the following day.

Case 2: The patient may have ingested DXM. His first seizure resolved without intervention, but a second seizure while in the ED led to PICU admission for neurological observation. Extended UDS was negative for THC, but ETOH level, CMP, CBC, and EKG were all within normal limits. Plasma pregabaline level was 43 μg/mL. The patient had no events overnight and was discharged the next morning.

The creation and diffusion of laboratory results for DXM and its main metabolite, dextrorphan, may better capture experimental aberrant non-medical use of DXM and its metabolite. DXM, making it easy to consume large amounts of this addictive substance.

61. Parachuting of Water-Extracted Detromethorphan

Kwon SK, Lintner CP, Brandt RD, Cole JB, Stellpflug SJ. Hennepin Regional Poison Center, Minneapolis, MN, USA

Introduction: Dextromethorphan (DXM) is the active ingredient in many over-the-counter antitussives. There have been reports of recreational ingestion of this drug since its introduction in the late 1950s, and this phenomenon, in teenagers especially, has been increasing. Reports of use with special extraction techniques are exceedingly rare, and water extraction specifically has not been reported. We report a 17-year-old boy who became symptomatic after exposure to DXM that he learned about via forums on the Internet. Furthermore, the fact that pregabaline, a schedule V drug, is being abused by minors highlights the abuse potential of prescription drugs.

62. Administration Routes Involved in Non-Medical Use of Long-Acting Opioids in the RADARS(R) System College Survey and Poison Center Database

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Background: Among young-adult, non-medical opioid users, experimentation with alternate administration routes is frequently reported and used as a proxy for assessing escalation toward increasing use and drug dependence. The objective was to classify administration routes among college-aged non-medical users of long-acting opioids (LAO) across two data collection systems. Methods: College students completed an online questionnaire (December 2009) for the RADARS System College Survey Program (CS), and were sampled equally from four US regions. Respondents answered questions about non-medical use and administration routes. The RADARS System Poison Center Database (PC) collects quantity/relevant data weekly on acute drug intentional exposures from 48 of 60 US Poison Centers. CS and PC LAO cases (age 18–23) were identified. Of 1,936 CS cases, 2% (n = 41) used at least one LAO. Acute LAO cases in CS were defined as those reporting past-month use less than or equal to 4 days (n = 31) and were compared to PC LAO intentional exposures (n = 264) as PC cases are acute in nature. Results: Forty-two percent of CS LAO cases reported two routes, and 34% reported three or more (n = 14). CS respondents can report multiple routes; swallowing whole (66%) of cases, chewing/inhaling (71%) and injecting (16%). In PC LAO acute intentional exposures, only 0.8% involved two or more routes; the majority of cases involved swallowing whole (56%), with chewing, inhalation and injection comprising 16%. An independent samples Mann–Whitney U test revealed a significant difference between CS and PC LAO cases for the number of administration routes involved in acute cases (p < 0.001). Conclusions: Larger percentages of alternate administration routes (chewing, inhaling and injecting) reported for CS LAO cases suggests that CS may better capture experimental aberrant non-medical LAO use behaviors in this age group. A significant difference between the number of administration routes reported in CS and PC suggest these programs capture opioid use behaviors differently. An examination of both datasets publically understanding of these behaviors than any one dataset alone.

63. Severe GHB Withdrawal Treated with Baclofen

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Background: Gamma-hydroxybutyrate (GHB) and its precursors such as 1,4 butanediol (1,4 BD) are popular drugs of abuse. GHB is thought to have gamma agonist effects at GABA-A, GABA-B, and specific GHB receptors. Withdrawing from a GHB abuser can lead to sedative hypnotic withdrawal syndromes. Because of its short duration of action, GHB withdrawal symptoms can appear rapidly. Severe, prolonged symptoms have been reported. Standard therapy for GHB withdrawal includes GABA-A agonists such as benzodiazepines. Baclofen, a GABA-B agonist, has been suggested for benzodiazepine-resistant GHB withdrawal. We report a case of severe GHB withdrawal treated with lorazepam infusion which demonstrated clinical improvement after the addition of oral baclofen. Case report: A 34-year-old male presented to the ED with hallucinations, agitation, decreased hearing, and 1.4 BD for the last 7 years. Previous attempts to discontinue use had been unsuccessful due to withdrawal symptoms. Anticipating the need to enter a treatment program, he kept a detailed record of his use which revealed that he used between 1 and 4 mL of 1,4 BD every hour around the clock (photo available). On presentation to the ED both lorazepam and baclofen were administered. Results: HR 103 BP 120/95 RR 16 Sp02, 98% T 99.1°F. Over the next 4 h his HR increased to 163 and his BP increased to a high of 196/76. His temperature rose to 101.1°F. He also became more confused. He was given 8 mg of IV lorazepam in the ED and then started on a continuous infusion at 8 mg/h. Over the next 3 days, the lorazepam infusion was titrated up to 14 mg/h for persistent autonomic dysregulation and agitation. He had some myoclonic jerking but no seizure activity was noted. On the third day he was started on oral baclofen at 10 mg TID. After the addition of baclofen, we were able to significantly decrease the lorazepam infusion over the next 12–24 h. His lorazepam infusion was stopped on hospital day 12. The patient recovered completely and was discharged after 14 days on a scheduled oral benzodiazepine taper. At his 1 month follow up, the patient had not relapsed his 1,4 BD abuse. Conclusion: Baclofen may be a useful adjunct for the treatment of GHB withdrawal due to its GABA-B effect.
as subacute combined degeneration (SCD). We report a case of N₂O abuse presenting with significant neurological deficits, medical complications and eventual clinical outcome. Case: A 29-year-old man presented to the ED with inability to walk, clumsiness, slow thinking. He reported that initially he had numbness/tingling in all extremities that progressed to weakness. He was unable to walk because he did not “know where [his] feet are.” He reported using about four boxes (24 cans/box) of aerosol cans of N₂O on a daily basis for 3–4 months prior. On exam, he had blood pressure of 106/70 mmHg, HR = 80, BP = 120/65, RR = 18. Labs were normal except for alkaline phosphatase 280 IU/L (normal 29–145 IU/L), creatine kinase 259 U/L (normal 25–173 U/L), aspartate aminotransferase 139 U/L (normal 5–44 U/L), alanine transaminase 177 U/L (normal 5–44 U/L) and complete blood count within normal limits. History was significant for one diagnosis of SCD resulting from N₂O abuse. He has a negative past medical history other than remote ethanol abuse but none for more than 10 years. His ethanol level was negative in the ED. A full 10 examination revealed normal lungs and cardiomediastinal silhouette. However, there was diffuse sclerosis and increased density of the entire visualized osseous structure consistent with fluorosis. The patient has no history of prostate cancer and a normal PSA. Conclusions: We present a case of suspected fluorosis secondary to chronic inhalant abuse. The poison center identified the product brought to the ED as a fluorocarbon containing product. Fluoride ions chelate calcium and stimulate uptake into the bone as fluorapatite. Chronic exposure to fluoride can result in increased bone density as noted in this patient.

60. Refractory Hypotension Due to Rogaine® Ingestion
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Background: Minoxidil (Rogaine®) belongs to the class of antihypertensives known as direct vasodilators. These agents control blood pressure by promoting release of nitric oxide in the vascular endothelium ultimately producing peripheral vasodilation with reflex tachycardia. Toxicity can result from dermal exposure, but significant toxicity may occur when minoxidil is ingested. Case: We present the case of a 48-year-old male who ingested an entire 8 oz. bottle of Rogaine®, unknown strength, for its alcohol content. He presented 1 h and 20 min later with a blood pressure of 57/45 mmHg and a pulse of 84 bpm. He received 2 L IV fluids and dopamine was started at 5 mcg/kg/min. Dopamine was then increased to 20 mcg/kg/min when levophed was started at 5 mcg/min and titrated to 25 mcg/min. Blood pressure maintained around 77/44 mmHg with a pulse of 102 bpm. Approximately 3 h post ingestion, the patient developed tremor-like movement, which was controlled with levodopa. Dopamine was weaned off. His blood pressure stabilized with a systolic
BP in the 110s and a diastolic BP in the 60–70s. Over the next 2 days, midodrine was weaned off as his blood pressure returned to baseline. The patient was medically cleared 3 days after ingestion once his hypotension and mental status returned to baseline. Discussion: Ingestion of minoxidil, a direct vasodilator found in Rogaine<sup>®</sup>, can produce significant hypotension requiring the use of multiple vasopressors at high doses as seen in our patient. To date, it is unknown if there are any anecdotal reports regarding the use of minoxidil in minoxidil toxicity. Conclusion: We present a case of a patient with midodrine in whom both severe and refractory hypotension responsive only to multiple high-dose vasopressors. Midodrine is a novel agent that could be used in the treatment of refractory hypotension second to minoxidil toxicity. A better understanding of this condition required aggressive pharmacologic treatment due to the rapid onset of action.

71. In Vitro Study of Acetadote on Coagulation Factors in Plasma Samples from Healthy Subjects

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Introduction: In the treatment of acetaminophen toxicity, clinicians believe that N-acetylcysteine (NAC) artificially elevates prothrombin time (PT). However, the effect of NAC on human coagulation blood remains unverified. In a previous study, we showed that NAC had a dose-dependent effect on PT. To our knowledge, there are no studies that specifically examine the mechanism by which NAC affects PT. This study evaluates the effect from a therapeutic NAC dose on the concentration of coagulation factors II, VII, IX, and X in human plasma samples. Method: We obtained blood samples from 10 volunteer subjects. After centrifugation of each volunteer’s blood sample, the plasma was collected and divided into two 1 mL aliquots. We used the first 1 mL sample as a control. The second 1 mL plasma sample had 5 mL of 20% NAC, as Acetadote, added to make a final concentration of 1,000 mg of NAC per L of plasma. This concentration of NAC approximates the plasma levels achieved after a 150 mg/kg dose. We incubated the two samples for each subject (control and 1,000 mg/L) at 37°C for 1 h and measured the concentration of factors II, VII, IX, and X. We compared factor level concentration using the paired student t-test. Results: Mean values of the control samples for factors II, VII, IX, and X were 1.34 (CI 1.10–1.58) U/mL, 1.37 (CI 1.17–1.57) U/mL, 1.70 (CI 1.44–1.96) U/mL, respectively. Mean values of the NAC-containing samples for factors II, VII, IX, and X were 0.90 (CI 0.79–1.00), 0.66 (CI 0.51–0.80), 0.74 (CI 0.63–0.85), 0.81 (CI 0.71–0.90) U/mL, respectively. All samples containing NAC had significantly lower coagulation factor concentrations than their controls with p < 0.001. Discussion: In a previous study, we were able to demonstrate NAC had a dose-dependent effect on PT. In this study, we compared concentrations of factors II, VII, IX, and X at baseline and for samples that received NAC. All factor concentrations had a significant decrease with the addition of NAC. The CI in factor concentration is not explained by the dilution of adding NAC to the test samples. Conclusion: We are able to demonstrate a significant decrease in the concentration of coagulation factors II, VII, IX, and X with the addition of NAC. This may be the mechanism by which PT increased in our previous study.

72. Influence of Different Antidotal Treatments on Amatoxin-Induced Hepatotoxicity in HepG2 Cells

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Background: In a retrospective study in 388 patients with amatoxin poisoning 258 were treated with silibinin plus penicillin, 130 with silibinin alone. The death rate/1,000 in the combination group was higher than in the monotherapy group (8.5 vs. 4.6%). Therefore we tested the hypothesis of the in vitro combination of amatoxin with silibinin plus penicillin on apoptosis and necrosis in HepG2 (human hepatocellular carcinoma cells) at 48 h after incubation with alpha-amanitin for 1 and 24 h and after incubation. Methods: HepG2-cells were cultured in culture medium (DMEM). The degree of necrosis was measured by the release of adenylate kinase an enzyme that is leaking out of necrotic cells only (Tox Light, Lonza). Apoptosis was determined by fluorescence microscopy using the Live/Dead reagent and the TUNES reagent which is staining apoptotic specific DNA fragments. 1 μM alpha-amanitin was used in all experiments. The concentration of the two antitoxin required aggressive pharmacologic treatment due to the rapid onset of action.

73. Effect of Glycolate on Measured Lactate Using Thermo Fischer Advia 1650 and Vitros 5.1

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Background: Ethylene glycol poisoning results in metabolic acidosis, renal failure and death. Case reports and in-vitro studies show that glycolate, a metabolite of ethylene glycol can cross-react with the lactate oxidase enzyme used in lactate assays. Previous reports suffer from false negative results from lactate concentration. We sought to determine the degree of glycolate interference on lactate concentration, accounting for baseline lactate. Methods: Three different analyzers (Thermo Fischer Advia 1650 and Vitros 5.1) were selected from three hospitals where we provide bedside medical toxicology consultation. Using human fresh frozen plasma (PPP) seven blinded samples were prepared for analysis: control (plasma alone); FFP plus 2.78 mM/L of lactic acid; plasma plus increasing concentrations of glycolic acid 1.31, 2.63, 5.26, 7.89, and 10.52 mM/L. This range was selected based on reported glycolate concentration in confirmed cases of ethylene glycol poisoning. Samples were prepared in triplicate and analyzed during a single batched analysis. Statistical means, standard errors, conversion factors, and correlation coefficients were determined using SPSS software (version 18; Chicago, IL, USA). Results: Control lactate concentrations using the Radiometer ABL 725, Siemens Advia 1650, and Vitros 5.1 were 2.0, 1.79, and 2.2 mM/L, respectively, which are consistent with reported FFP lactates. Figure 1 demonstrates glycolate’s interference with reported lactate concentrations. Assessing linear interference over the experimental range, the derived glycolic acid/lactic acid conversion factor with correlation coefficients (R²) were 0.719 (0.958), 0.101 (0.820), 0.147 (0.964) for the Radiometer ABL 725, Siemens Advia 1650, and Vitros 5.1 respectively. The Radiometer ABL 725 produced the most interference, while the Siemens Advia 1650 and Vitros 5.1 displayed minimal interference. A falsely elevated lactate might prove to be a useful marker for determining a toxic renal pathology. This work is supported by the American Chemical Society.

74. Acetaminophen Levels Drawn Prior to 4 Hours Post Ingestion as Predictors of Levels at 4 Hours Post Ingestion

Rivera GS,1 Dizon L,1 Lugoza C,2 Keyes DC.1
1University of Texas Southwestern, Dallas, TX, USA; 2The North Texas Poison Center at Parkland Health and Hospital System, Dallas, TX, USA; Saint Joseph Mercy Health System, Michigan Emergency Medicine Residency, Ann Arbor, MI, USA

Background: Acetaminophen (APAP) levels drawn prior to 4 h prior to time of ingestion (TOI) have been felt to be of limited value in predicting the need for treatment using the Nomogram. More recently it has been shown that NAC based on high pre-4 h levels or withhold it based on low pre-4 h levels. This pilot study was developed to determine a range of min and max serum APAP levels drawn prior to 4 h associated with treatable and non-treatable levels on the Nomogram. Methods: This was a retrospective chart review. Data was gathered by reviewing the notes section of each chart using a standardized template and trained personnel. Krappa values were obtained among recorders. Cases were included if they were found to have two APAP levels, one drawn prior to 4 h and another drawn at 4 h from the time of ingestion (TOI). All cases were acute ingestions. Cases were divided into treatable and non-treatable based on the 4 h level using the nomogram. Cases were excluded if the time of ingestion was unknown, levels were not recorded, the second level was not provided, or only one level was provided if its presentation later than 4 h from TOI. Results: One thousand and seventeen charts of pts presenting for APAP toxicity were reviewed. One hundred and eight cases met inclusion criteria. In these cases, we found the non-treatable 4 h APAP levels (NT4Ls) and 17 had treatable 4 h APAP levels (T4Ls). Of the patients with NT4Ls the range of pre-4 h APAP levels was from 0 to 300 mg/L (Mean 87, SD 70); of the patients with the T4Ls the range of pre-4 h levels was from 127 to 459 mg/L (Mean 223, SD 32). The lowest APAP level associated with treatable levels was 127 mg/L, the highest level correlating to a non-treatable level was 390 mg/L. An initial APAP level of 0 did not always correlate with a non-detactable 4 h level. Conclusions: This pilot study suggests a wide range of APAP values in both treatable and non-treatable groups. This wide range makes predicting a "threshold" problematic. These results suggest that NT4Ls or T4Ls are difficult. While values less than 127 mg/L were always associated with non-treatable levels, larger or prospective studies with more patients are necessary. For patients with non-treatable 4 h APAP levels, early levels may exceed 300 mg/L.


LSU Health Sciences Center, Shreveport, LA, USA

Mass epidermics of diethylene glycol (DEG) poisoning have occurred worldwide when it is mistakenly used as a solvent in liquid drug formulations such as cough syrups/elixirs. DEG poisoning produces metabolic acidosis, renal failure, and neuropathy that can lead to death without treatment. Recent studies in rats in vivo demonstrated that DEG is non-toxic when the alcohol dehydrogenase inhibitor, furosemide, is dosed to prevent the metabolism of DEG. The two major urinary metabolites of DEG in the rats are 2-hydroxyethoxyacetic acid (2-HEAA) and diglycolic acid (DGA). The goal of the present studies was to assess the relative cytotoxicity of the two metabolites towards human proximal tubule (HPT) cells in culture. Initial experiments with increasing concentrations of the parent compound or both metabolites, separately, at 6 h demonstrated a cytotoxic response. Subsequent time course experiments demonstrated that at 48 h both HEAA and DGA appeared to produce necrotic damage to HPT cells, with not much difference in relative potency. DEG itself at concentrations up to 100 mM/L for 48 h produced no cytotoxicity. These results suggest that a moderately prolonged exposure to the DEG metabolites is necessary to produce cytotoxic damage. The necrotic damage to the proximal tubule resembles a typical DEG's toxic renal pathology. This work is supported by the American Chemical Society.
67. Lack of Glycic Acid Interference with Lactate Measurement Using the Lactic Dehydrogenase Method: A Methodology Based Analysis
Stork CM, Sunheimer R, Grant W, Sunheimer R, Grant W.

Introduction: Cross-reactivity of glycic acid in lactate analyzers has been previously reported. We sought to compare the stability of these findings under differing enzymatic conditions using clinical samples.

Methods: Three spiked serum specimen sets were prepared to contain 0, 3, 7.9, 11.8, 15.8, 23.7, 31.6 mmol/L respectively of glycic acid in each set. Two sets were analyzed using the Roche/Hitachi 904/811/917MODULAR P analyzer (LO) enzymatic method. One analysis set employed a lactate dehydrogenase (LDH) enzymatic assay, adapted to the Siemens Dimension Vista System.

Results: No linear regression curves were fitted utilizing least squares regression and a determination of regression line was made in each case (when possible). Differences were considered significant at p < 0.05. Results: No linear regression curve was possible for the LDH methodology as no apparent interference was seen. The interference curves for the identical LDH dependent methods at the two different laboratories were both linear, but differed clinically and statistically (p < 0.05). Discussion: False elevations in lactate measurement are common after exposure to significant amounts of ethylene glycol. Conclusion: Our study is consistent with the currently available literature in that lactate oxidase methods yield cross-reactivity that is unpredictable and with the LDH method yielding no cross reactivity. This is an important finding especially in areas of high indigenous occurrence of ethylene glycol poisoning (Table 1).

Table 1. Analysis results with spikes glycic acid

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78. Prolonged Elimination of Ethylene Glycol in a Patient Receiving Fomepizole with Normal Renal Function
Haggerty DA, Curtis J.

Drexel University College of Medicine, Philadelphia, PA, USA

Background: Ethylene glycol (EG) ingestion can cause serious morbidity and mortality if untreated. Fomepizole (4MP), a competitive inhibitor of alcohol dehydrogenase, is effective in preventing formation of adverse metabolites. The half-life (t1/2) of EG in the presence of 4MP has previously been investigated, and ranges from 11 to 20 h in those without renal impairment. We report a case of EG ingestion with a prolonged t1/2 of 99 h in a patient with normal renal function. Case report: A 27-year-old male presented to the emergency room 30 min after the sole ingestion of a half-gallon of radiator antifreeze containing EG. The patient admitted to one episode of emesis shortly after ingestion. At the time of arrival he was asymptomatic. Physical examination, vital signs, EKG and initial chemistries were normal including a creatinine of 0.7 mg/dL, an anion gap of 10, a serum ethanol of 9.4 mg/dL and an osmolar gap of 9.4. Blood gas analysis showed no abnormalities. The UA was negative for oxalate crystals. Based on the history, 4MP was initiated. Definitive testing showed an initial EG level of 36 mg/dL. Subsequent levels approximately 24 h apart were 28 and 26 mg/dL before becoming undetectable. Subsequent testing failed to show worsening creatinine, presence of elevated anion or osmolar gaps, or development of acidosis.

Case discussion: This case illustrates an extremely prolonged t1/2 of elimination of EG during treatment with 4MP in a patient with normal renal function. EG has previously been shown to undergo first-order elimination kinetics, with t1/2 ranging from 11 to 20 h in similar patients. The t1/2 in our patient was 99 h, a substantial difference from previously reported values.

Conclusions: Clinicians should be aware of the possibility of prolonged elimination of EG, as this may make hemodialysis a more attractive option for timely and efficient elimination of EG.

Table for Abstract 79

<table>
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80. Association of Caffeine Consumption and Smoking Status with Serum Concentrations of Polychlorinated Biphenyls (PCBs) in the General U.S. Adults, 1999–2006

Mortensen ME, Wong L-Y, Osterloh JD.
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PCBs were fitted in separate regression models, which included age, sex, and race/ethnicity. We used cross-sectional survey data consisting of 1,071 adults (>19 years) participating in National Health and Nutrition Examination Survey (2003–2004). PCBs were measured by NDHRRMS. Specifically, we used the sum of 33 PCB congeners, including 22 non-dioxin-like PCBs and 10 mono-ortho PCBs, as indices of these PCBs. We evaluated the association of smoking and caffeine consumption with these PCBs. Whole weight and lipid-adjusted concentrations of PCBs were fitted in separate regression models, which included age, sex, and race/ethnicity. Results: Six regression models were fitted and the R² varied from 41.6 to 64.5%. New to this study, we found an interaction between caffeine consumption and smoking for lipid-adjusted total PCBs (p = 0.03) and both whole weight and lipid-adjusted mono-ortho PCBs (p ≤ 0.01). Smokers had lower concentrations of total PCBs and of mono-ortho PCBs than non-smokers when caffeine was consumed at least once a day, but not when the consumption was less than once a day. Also, the effects of caffeine consumption and smoking on the concentration of PCBs appeared to be age-dependent. We found an interaction between age and caffeine consumption for whole weight and lipid-adjusted concentrations of mono-ortho PCBs (p = 0.01). For age 20–29 years, those who consumed caffeine for at least once a day had lower mono-ortho PCBs than those who did not. This relation between mono-ortho PCBs and daily caffeine consumption was reversed for age 50+ years. Similar to the above, we observed an effect with increasing age and smoking for whole weight concentrations of total PCBs (p = 0.01) and of non-dioxin-like PCBs (p = 0.05). Smokers had lower concentrations of total PCBs and non-dioxin-like PCBs than non-smokers for age 20–29 years, but not at older age categories. Conclusion: Smoking and caffeine consumption need to be considered in the interpretation of human biomonitoring data for PCBs because they appear to affect the serum concentrations of these chemicals.

81. Efficacy of Cytoflavine in Acute CO Poisoning

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1Irkutsk State Medical University, Irkutsk Russian Federation; 2SPB Medical Academy for Postgraduate Training, Division of Emergency Medicine, St. Petersburg Russian Federation

Background: Cytoflavine, a Russian pharmaceutical consisting of nicotinamide, inosine, riboflavin, sodium succinate and glumacine has been associated with protective neuroproteic effects in hypoxic states. The capacity of cytoflavine to improve clinical outcome in acute carbon monoxide (CO) intoxication was investigated in a controlled retrospective clinical study of 409 subjects treated from 1999 to 2009. Methods: The intervention (CYT) group consisted of 205 patients (146 males, 59 females) with acute carbon monoxide intoxication from home heaters (n = 140) or exhaust gases (n = 65) classified according to the Ljubljankov scale as either moderate (n = 92) or severe (n = 75). Controls consisted of 204 cases with acute CO poisoning from home heaters (n = 161) or exhaust gases (n = 43) classified as either light (n = 42), moderate (n = 92) or severe (n = 75) treated with 100% oxygen and standard supportive care beginning in the prehospital period; the intervention group also received IV cytoflavine 10 cc in D5W b.i.d. Cytoflavine was assessed in terms of its mortality, and duration of CNS signs and symptoms. Results: In patients with light CO poisoning (COHb = 26 ± 1.7%), headache and nausea resolved after 1 day in the CYT group versus 3 days in controls. In patients with moderate CO poisoning (COHb = 43 ± 3.1%, or short-term unconsciousness), USP, symptoms resolved as fast in the CYT group than in the control group. In severe poisonings (COHb = 55 ± 5.3%, with coma and myoclonus) CYT was associated with more rapid recovery of consciousness than untreated patients, except for the subgroup with COHb >70% and a duration of coma of >6 h, in whom there was no benefit associated with treatment. Averaged across all COHb percentages, however, the CYT group versus 4.6 ± 0.8 days in controls. Overall mortality was 2.0% in CYT group and 4.5% in controls. Discussion: Cytoflavine administration was associated with accelerated improvement in the neurological signs and symptoms of CO poisoning, except in patients with extremely high COHb levels or prolonged coma.

82. Urinary Cadmium in Smoking and Non-smoking Adults, 1999–2006

Mortensen ME, Wong L-Y, Osterloh JD.
U.S. Centers for Disease Control, Atlanta, GA, USA

Cadmium (Cd) is a toxic heavy metal present in the environment or was readily explained by a single illness: a neurologic condition is heralded by an inadvertent exposure to a chemical, whose symptoms seemed related predominately to one environmental factor, whose illness resembles that of the “idiopathic environmental illness” described in adults. Like the adult condition, the circumstances surrounding the illness are varied, and the approach to management should be individualized.

83. An Idiopathic Environmental Illness-like Syndrome in Children

Woolf AD1, Hopkins M.2
1Children’s Hospital, Boston, MA, USA; 2University of Texas, Houston, TX, USA

Background: Idiopathic environmental illness (IEI) syndrome is a controversy condition described in adults. Patients develop a broad constellation of symptoms and signs providing the impression of a chemical event. Often the condition is heralded by an inadvertent exposure to a chemical in the workplace. The condition is not well described in children. Objective: To describe cases of IEI seen in a Pediatric Environmental Health Center (PEHC). Methods: All medical records of patients referred to the PEHC between 1997 and 2010 were reviewed for the diagnosis of “multiple chemical sensitivities” or “idiopathic environmental illness.” Patients whose symptoms seemed related predominantly to one environment or were readily explained by a single illness, such as sinusitis, were excluded. We defined IEI symptoms involved >1 body system, involved multiple precipitants, occurred in >1 environment. Charts were reviewed for the patient’s age, gender, symptoms, environmental triggers, diagnostics, and management. Results: Sixteen patients met criteria for IEI 9 males, 7 females. Mean age was 11.1 years old (range 3.5–21.75 years). Precipitants included paints, oil, gasoline, fumes, ammonia, cleansers, perfumes, lawn chemicals, pesticides, foods, preservatives, food dyes, carpets, tobacco smoke, wood stoves, polyurethane, chat, toothpaste, deodorants, deodorant sprays and solvents. Symptoms included detecting objectionable odors (12), bronchospasm (6), rash (6), cough or shortness of breath (7), fatigue or weakness (9), dizziness (8), abdominal pain (8) and behavioral changes (3). Normal or negative diagnostic studies included: complete blood count, liver and renal function, immunglobulins, skin testing, RAST tests, sweat tests, and pulmomanometry, etc. Eight (50%) children used inhaler steroids, bronchodilators, decongestants, and/or antihistamines. Conclusion: There are children whose illness resembles that of the “idiopathic environmental illness” described in adults. Like the adult condition, the circumstances surrounding the illness are varied, and the approach to management should be individualized.
86. Ingestion of One Lead Fishing Sinker Resulting from Mustard Seed.

Background: Purified raw mustard seed is used throughout the food service industry. Little is known about exposures to persons working with “Mustard #1 Seed” (MS1) at the industrial level. We present a case of a patient who developed 18% TBSA partial thickness burns in a delayed manner after ingesting a lead fishing sinker. The patient had no history of pica. A BLL from 1 year prior was <5 mcg/dL. The boy was discharged home was built in the 1980s and he had no history of bone and remained in the bony matrix unless physiologically necessary.

Discussion: Lead foreign bodies (LFBs) are classified as LRFB, MRFB, or URFB based on the time elapsed since ingestion. Ingested LRFBs usually fisherman and lead poisoning patients in the USA. The use of hyperbaric oxygen (HBO) for the treatment of carbon monoxide (CO) poisoning has proven to be controversial. As a group, we have experienced wide clinical variation in both criteria for treatment as well as treatment regimens for patients with acute CO poisoning. Our aim was to survey Midwest hyperbaric centers for insight into specific criteria and protocols for treating CO with HBO. Methods: Hyperbaric centers were identified from the published list of the Undersea and Hyperbaric Medical Society. Ninety-one centers from the nine Midwest states (IA, IL, IN, KS, KY, MI, MN, OH, & WI) were contacted via telephone. A standard script was used as an independent indication for treatment (range 10–40%, modes 20–30%). Two centers enrolled the COHb level as the exclusive indication for diving. Nine centers relied solely on referring physicians’ descriptions of “symptoms,” primarily neurologic in nature, while the remaining centers used a combination of

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88. Environmental Risk Assessment in a Hospitalized Mercury Poisoned Patient Oliver S.1, Crouch BL.1, Caravati EM.2, Baranta C.3, Rice JN.3

Background: The risk of mercury vapor exposure in health care workers caring for an acutely ill patient who aspirated elemental mercury is not known. The purpose of this study is to determine whether a patient who ingested and aspirated mercury is a health risk to health care workers. LUMEX RA-915+ mercury analyzer and Jerome 431-X mercury vapor analyzer were used to measure mercury concentrations on hospital equipment in various areas. Houston, TX; 1Department of Emergency Medicine, University of Texas M.D. Anderson Cancer Center, Houston, TX; 2Department of Environmental and Occupational Health, University of Texas M.D. Anderson Cancer Center, Houston, TX; 3Clinical Toxicology, University of Texas M.D. Anderson Cancer Center, Houston, TX.

Methods: Mercury vapor concentrations were obtained using the LUMEX RA-915+ mercury analyzer and Jerome 431-X mercury vapor analyzer. The instrument was calibrated prior to obtaining measurements. The study was approved by an institutional review board. Relevant demographic data was recorded for each individual including date of birth, gender, predominant residential zip code, and occupational history. An a priori definition, no subjects had an elevated BLL. Conclusions: The use of hyperbaric oxygen for the treatment of carbon monoxide (CO) poisoning has proven to be controversial. As a group, we have experienced wide clinical variation in both criteria for treatment as well as treatment regimens for patients with acute CO poisoning. Our aim was to survey Midwest hyperbaric centers for insight into specific criteria and protocols for treating CO with HBO. Methods: Hyperbaric centers were identified from the published list of the Undersea and Hyperbaric Medical Society. Ninety-one centers from the nine Midwest states (IA, IL, IN, KS, KY, MI, MN, OH, & WI) were contacted via telephone. A standard script was used as an independent indication for treatment (range 10–40%, modes 20–30%). Two centers enrolled the COHb level as the exclusive indication for diving. Nine centers relied solely on referring physicians’ descriptions of “symptoms,” primarily neurologic in nature, while the remaining centers used a combination of
symptoms plus COHb levels. Diving protocols yielded 21 different approaches varying from local institutional profiles to established protocols. Number of sessions (0–8) were reported (moderate, mode 1, mean 1.88), depth ranged from 1 to 3 ATA (median 2.5, mode 2.5, mean 2.49), and duration at depth ranged from 23 to 150 min (median 90, mode 90, mean 99.3). Discussion: Despite controversy, HBO is an approved therapy for CO poisoning, with Weaver et al. showing benefit from three dives in 24 h. Our results demonstrate significant variability in treatment, with most centers favoring a single-stage approach. Conclusion: A standard of care for both the initiation and implementation of HBO therapy for CO poisoning does not exist among US Midwest Hyperbaric Centers.

90. Refusing Referral: Are Workers Getting the Poisoning Treatment They Need?
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1Maine Medical Center/Northern New England Poison Center, Portland, ME, USA; 2Salus Consulting, Minneapolis, MN, USA

Background/purpose: Adults are at risk for poisonings at the workplace and do not always follow medical guidelines. Methods: Occupational poisoning data from the Northern New England Poison Center for 2005–2007 was evaluated per year and referral pattern. Results: Three hundred cases were analyzed. Thirty-one percent (n = 92) of the occupational exposures reported to the Poison Center were from the home or a location other than the workplace or a health care facility. Additionally, 47% (n = 136) were not reported by a health care professional or workplace health/safety officer, but by the patient (22%), or other, such as a spouse (25%), n = 73). More than half (52%, n = 17) of patients refused the referral to a health care facility or left medical advice (AMA) after referral by the Poison Center. Ninety-four percent (n = 16) of occupational-related cases were refused or refused referral to medical centers had some health effects. Patients suffered health effects such as burns (many 2–3rd degree), ocular pain, or muscle weakness. Known medical outcomes ranged from minor to moderate. Some patients volunteered explanations for refusing referral, such as lack of insurance. Often calls were placed by a spouse, who were unable to convince their significant other that their exposure merited medical intervention. Conclusion: Some occupational poisonings were reported from outside the workplace, suggesting that employers are under-informed of incidents at their workplace. Patients refused referral after receiving the medical care they need. Employers and employees need to be encouraged to call the Poison Center and follow the advice given.

91. Pediatric Monosodium Methylarsonate Exposure with Significantly Elevated Urinary Arsenic Levels
Schwarz E, Roth B, Feng S-Y,1 Wax PM.2
University of Texas Southwestern, Dallas, TX, USA

Introduction: Literature concerning ingestion of organic arsenic is rare, and reports of pediatric exposures are even more sparse. We present a case of ingestion of monosodium methylarsonate in a pediatric patient. Case report: A 16-year-old female presented to an ED after a suicide attempt by drinking between a few gulps or up to 8 oz of crabgrass killer. The crabgrass killer is available in 40% and 60% monosodium methylarsonate but neither the patient nor the family could confirm the exact concentration. In the ED, she vomited and was acutely agitated. Although she was never brought to unconsciousness, she was offered airway protection and transferred to Children’s hospital (CH) for further management. Upon arrival to CH, she was given one dose of BAl and extubated that night. She was only admitted to CH. She had nausea without vomiting, abdominal pain, myalgias, and mild hyperflexia during her hospitalization. No other signs of neurological toxicity developed. Upon transfer to a psychiatric institution, her symptoms had improved. She had a normal gait and was able to eat and drink without difficulty. A 24-h urine collection revealed an arsenic level of 746,866.8 μg/L. Speciation of the arsenic revealed that all the arsenic was present as methylated arsenic (MMA, DMA) at 931,645 μg/L (dilution required to obtain may have affected quantitative results). She was kept on succimer for 19 days. At 1 month follow-up, she was a healthy adolescent with a normal exam. She admitted to having sharp, cramping pains in her fingers and toes with worsening 1 week after being discharged. She still reported having rare episodes of pain in her fingers. She did not have any hair loss, rash, or rashes lines on exam. A neurological exam was normal. A repeat 24 h urine specimen was not ordered due to her being in inpatient psychiatric treatment. EMGs and nerve conduction studies were also not ordered. Discussion: Reports of patients exposed to organic arsenic report urinary levels in the lower thousands of micrograms/L. Exposure to monosodium methylarsonate has been reported to cause neuropathy. Our patient had significantly higher urinary arsenic levels without the development of significant clinical sequela.

92. Glufosinate Poisoning
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1Division of Clinical Toxicology, Department of Medicine, Taipei Veterans General Hospital, Taipei, Taiwan; 2Division of Toxicology, Trauma & Emergency Center, China Medical University Hospital, Taichung Taiwan

Background: Glufosinate is a commonly used herbicide. However, data on acute human intoxication are scarce. Aim: We retrospectively analyzed data of human glufosinate poisoning from two medical centers in Taiwan. Methods: The study period ran from August 1993 through September 2009. One hundred and thirty-six cases have been enrolled, including 115 were reported to the Taiwan National Poison Center while 23 patients were hospitalized in Taichung Veterans General Hospital during study period. Clinical data were reviewed and analyzed. Results: Most patients intentionally ingested the herbicide. Twenty-eight (23.9%) out of 117 patients with oral exposure were asymptomatic, while the others developed gastrointestinal (51.2%), respiratory (29.9%), neurological symptoms (35%) and other outcomes (5.1%). Seven patients died after manifesting profuse shock and/or coma following glufosinate ingestion. Conclusion: Glufosinate was thought to be low toxicity to humans but severe neurologic and cardiopulmonary outcomes dose occur and resulted in long-term neurologic disabilities. Medical management of such poisoning is primarily supportive.

93. Death from Elemental Mercury Aspiration Following Intentional Ingestion: A Case Report
Moltz E, Caravati EM, Crouch BI.
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Background: Aspiration of elemental mercury (Hg) is a rare occurrence, reported in the literature revealed few case reports of elemental mercury aspiration and only one fatality reported in 1969. We report a case of elemental mercury ingestion followed by pulmonary aspiration of Hg that resulted in death. Case report: A 23-year-old male intentionally ingested an unknown amount of elemental mercury. There was no history or evidence that Hg was heated in the home. He vomited after ingestion and presented to a hospital 3 h later with abdominal pain, cough, chest pain, headache, vomiting, and body aches. On presentation his vital signs were BP 116/65 mmHg, HR 145, RR 14, T 47.7°C. Complete blood count was 838 μL/L and random urine Hg was 9,998 μg/L and he was started on succimer. Three days after admission blood Hg was 546 μg/L and random urine Hg was 3,951 μg/L. Serial chest and abdominal X-rays revealed diffuse distribution of radiopaque substance in bilateral lung bases and throughout small intestine. Whole bowel enema was not initiated with oral sodium sulfoxide solution but was unsuccessful clearing Hg from his bowel. A bronchoscopy with bronchial lavage was performed and a small amount of Hg was recovered but the majority of it remained in the body and developed worsening ARDS and became more difficult to oxygenate. Despite FiO2 of 100% and maximum ventilator support his SaO2 declined to less than 50%. The patient died 11 days after admission. Case discussion: Reduced iron has been reported to cause little to minimal effects. There have been reports of accidental ingestions of reduced iron with minimal elevations of iron serum, however the elevated levels all returned to normal range within the first 24 h. This case demonstrates it is possible to cause significant elevation of serum iron levels from accidental reduced iron ingestions. Conclusion: Instant hand warmers and disposable heating pads, when ingested, can result in toxic iron levels. Poison center personnel and emergency physicians should be aware of this effect and patients should be monitored until symptoms resolved and iron serum levels are normal or trending downward.

94. Heating Pad Ingestion with Significant Iron Level Elevation
Lutnae CP, Kwon SK, Stelppflug SJ, Cole JB.
Hennepin Regional Poison Center, Minneapolis, MN, USA

Background: Instant hand warmers and disposable heating pads are commonly used over-the-counter products. The active ingredient is reduced iron which oxidizes when exposed to oxygen, causing an exothermic reaction. Reduction of the iron can occur when ingested orally, can result in toxic iron levels. Poisoning was not expected to cause significant toxicity when ingested orally. This supposition, however, is based on a very limited number of human cases. We report a case of accidental heating pad ingestion that resulted in significantly elevated serum iron levels. Case report: A 52-year-old man opened a “Heat Treat” disposable heating pad thinking it was instant coffee, placed the contents into a cup, added water and drank it. After realizing his mistake the patient was referred to the emergency department (ED) by poison control. The serum iron level 3 h post-ingestion was 308 mcg/dL (normal range 40–150). Coincidentally the patient had an iron level 1 week prior of 142 mcg/dL in a work-up for chronic mild pancytopenia. Plain films revealed high density material within the stomach. Whole bowel irrigation was performed. The patient had a history of chronic abdominal pain, and reported it was worse than baseline. He also complained of nausea but did not vomit. The serum iron level peaked at 373 mcg/dL 6.7 h post-ingestion. Two days post-ingestion the iron level was still elevated at 280 mcg/dL but fell to 91 mcg/dL the next day. The patient’s abdominal pain returned to baseline 2 days post-ingestion and the remainder of his symptoms resolved. The patient was discharged on hospital day 3 when the iron level was 71 mcg/dL. Case discussion: Reduced iron has been reported to cause little to minimal effects. There have been reports of accidental ingestions of reduced iron with minimal elevations of iron serum, however the elevated levels all returned to normal range within the first 24 h. This case demonstrates it is possible to cause significant elevation of serum iron levels from accidental reduced iron ingestions. Conclusion: Instant hand warmers and disposable heating pads, when ingested, can result in toxic iron levels. Poison center personnel and emergency physicians should be aware of this effect and patients should be monitored until symptoms resolved and iron serum levels are normal or trending downward.

95. Non-Fatal Attempted Suicide with Orpiment (Arsenic Trisulfide) Ingestion
Tebb Z,1 Eberhard A,1 Heard K,2 Wendlandt R,3 Kosnett MM,2 Buchanan JA.2
1Department of Emergency Medicine, Rocky Mountain Poison & Drug Control Center, Denver, CO, USA; 2Rocky Mountain Poison & Drug Center, Denver, CO, USA; 3Department of Geology & Geologic Engineering, Golden, CO, USA

Background: Arsenic trisulfide (As2S3), orpiment, is a mineral found near volcanoes, in ore and as herbal remedies. Minimal literature exists on orpiment ingestion. Case report: A 57-year-old male jeweler presented to an ED 13 h after he crushed and ingested a significant amount of arsenic trisulfide. He developed signs and symptoms suggestive of arsenic poisoning such as abdominal pain, vomiting, diarrhea, and tachycardia. He died 4 days after admission. Postmortem examination revealed the cause of death to be suicide by arsenic ingestion.
ingested an egg-size rock of opium in a self-harm attempt. The patient also took four acetaminophen/ diphenhydramine tablets and three melatonin pills. His only symptom prior to arrival was nausea. The patient was asymptomatic except for minor bleeding from a self-inflicted neck wound. Initial vital signs were HR 126 bpm, BP 162/105 mmHg, RR 18/min, RA Sat 98% and oral temperature 36.5°C. Physical examination revealed a clinically sober male with a 1.5 cm slash wound to his neck and was otherwise unremarkable. An ECG revealed a sinus tachycardia, HR 129 bpm with a QTc interval of 47 ms. A flat-plate X-ray showed hyperdense material throughout the bowel. Laboratory studies revealed normal LFTs, basic metabolic panel and an elevated white blood count of 20,700/L. The patient was started on polyethylene glycol and observed in the telemetry unit. On Hospital Day 1, the patient remained asymptomatic and a random spot urine arsenic level was 1,489.5 μg/L (background range <30 μg/L). On HD 8, the urine arsenic level decreased to 802.0 μg/L. One month he later returned with a sample of the mineral and was asymptomatic. Discussion: We describe a case of As₂S₃ ingestion that resulted in minimal symptoms. The exposure was confirmed by an elevated urine arsenic concentration, an abdominal X-ray with radiopaque material and the product ingested was subsequently identified by a mineralogist with diffractometer and CuKα radiation. The LSD50 of in rats and mice is approximately 10 times less than for arsenic trioxide (As₂O₃) and As₂S₃ is considered relatively non-toxic as it is comparatively insoluble with low bioavailability. As₂S₃ can oxidize to As₂O₃ on surface crystals which could lead to increased toxicity. Conclusion: We report a case of non-fatal As₂S₃ ingestion.

96. Unintentional Ingestion of Octane Booster with Methylene cyclopentadienyl Manganese Tricarbonyl: Case with Chelation, Blood and Urine Manganese Levels

Bottei E,1 Iowa Statewide Poison Control Center, Sioux City, IA, USA

Case report: EMS called the PCC about a 45-year-old woman who accidentally drank an octane booster. She vomited spontaneously and had two witnessed tonic-clonic seizures. The octane booster bottle contained methycyclopentadienyl manganese tricarbonyl (MMT) listed as its main ingredient, but the percentage was not listed. The exact composition of the product was not determined for several days. Despite an extensive literature search, absolutely no human data could be found on ingestion of MMT or the effect of organic Mn via any route. Given that Mn is a known neurotoxin and the patient had two seizures, it was decided to chelate the patient with both EDTA and BAL. While there is no proven benefit of chelation in this circumstance, chelation may help hasten the elimination of Mn. The recommended chelation was EDTA 50 mg/kg/day (up to 3 g) over 24 h 3 days along with BAL 5 mg/kg q4 × 24 h then 3 mg/kg q4 × 48 h. Serial whole blood Mn levels and 24-h urine levels were collected (see table). Eventually, we learned that the total octane booster is 3% of the product and the MMT is 62% of the octane booster. If the patient retained the entire 1 oz, she would have ingested 139 mg (2.53 mmol) of elemental Mn. The patient received only 24 h of EDTA and BAL (8.02 mmol EDTA and 17.39 mmol BAL). The patient did very well clinically, was discharged home 3 days after the ingestion, but was lost to follow-up. Discussion: While the etiology of the two seizures is uncertain, she did not appear to suffer any other acute effects from the ingestion. Chelation appears to have removed a large amount of Mn via the urine; oral administration of Mn was eliminated in the urine, and the feces are the major route of elimination (up to 99%). Mn whole blood half-life for normal individuals (after IV injection) is 1.28 min; the patient’s data gives a half-life of about 17.5 h. Conclusion: Ingestion of MMT did not appear to have a major clinical effect and chelation removed approximately 33.9 mg of Mn.

97. Lead Chelation Therapy in a Patient on Dialysis

Hinson DE,1 Nasar AS,2 Dehart LM.1

Case report: A 51-year-old Hispanic male with a history of diabetes, hypertension, and end-stage renal disease on chronic dialysis, who had been in and out of the hospital for several months presented to the ER with complaints of abdominal pain, anorexia and diarrhea. He later developed profound weakness and ascending paralysis. Cholelithiasis and Guillain Barre Syndrome were ruled out. On Day 16, a heavy metal screen was done, and revealed elevated lead levels (84 mcg/dL). It was later ascertained that the patient was cooking from a clay pot purchased in Mexico. It is believed that the pot was the source of his lead toxicity. The Poison Center Medical Toxicologist recommended a reduced dose of oral meso-2, 3-dimercaptosuccinic acid (DMSA) followed by dialysis. The patient was given an oral dose of DMSA followed by dialysis, the lead level before and after dialysis was 56 and 47 mcg/dL, respectively. There was quick resolution of his hepatotoxicity during his hospital stay but ended requiring regularly scheduled hemodialysis (HD) for renal failure. After 2 weeks on HD, the patient’s renal function slowly started to recover with increased urine production. This case demonstrates how often common toxicities may still exist in antique collections and importance of obtaining a thorough history. Although there is no known antidote for CCl₄, agents such as NAC and silimarin have been advocated due to their safety profile and a potential benefit may exist.

98. An Old Toxin Resurfaces: Carbon Tetrachloride Induced Hepatotoxicity and Nephrotoxicity

Gupta AK,1 Keene KG,2 Stanger CA,2 Chapin NA,2 Caruso MT,1 CKSM,12

1North Shore University Hospital, Manhasset, NY, USA; 2Columbia Memorial Hospital, Hudson, NY, USA

Carbon tetrachloride (CCl₄) was once a commonly used solvent, refrigerant, and fire extinguisher. Due to its industrial use, production, and potential for exposure. An 80-year-old man past medical history presented to the emergency department with vomiting and decreased urine output. Vital signs were BP 185/110 mmHg; pulse: 83 beats/minute; respirations: 20 breaths/minute; normal temperature; oxygen saturation 99%. Physical examination was unremarkable. Serum electrolytes were: Na+ 118, K+ 3.3, Ca²⁺ 76, CO₂ 20 (units in mmol/L), blood urea nitrogen 52 and creatinine 14.5 (units in mg/dL). Aspartate (AST) and alanine (ALT) aminotransferases were elevated at 640 and 1,588 U/L, respectively. Upon further questioning, the patient revealed that while handling an antique fire extinguisher from 1,949 at his home, he unintentionally dropped it and spilled the contents over himself including his face. For the following 3 days, the patient developed nausea and abdominal pain. He did not seek medical attention due to the belief that there was a decrease in urine output. The local poison control center identified the extinguisher as containing CCl₄ and recommended treating with N-acetylcysteine (NAC). The patient was started intravenously NAC in the ED and oral silimarin, which was obtained from a local health care store, was added the next day. The patient had quick resolution of his hepatotoxicity during his hospital stay but ended requiring regularly scheduled hemodialysis (HD) for renal failure. After 2 weeks on HD, the patient’s renal function slowly started to recover with increased urine production. This case demonstrates how often common toxicities may still exist in antique collections and importance of obtaining a thorough history. Although there is no known antidote for CCl₄, agents such as NAC and silimarin have been advocated due to their safety profile and a potential benefit may exist.

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Clinical Toxicology vol. 48 no. 6 2010

Abstracts
homeopathic treatments may contain toxic amounts of heavy metals including mercury and lead. We report the first case of elemental mercury toxicity from a Vietnamese sin-sumas remedy. Mercury poisoning can result in generalized symptoms of fatigue and arthralgias or more classic symptoms such as erythromone and memory impairment. As public use of non- traditional medications, supplements and remedies increases, more awareness is needed amongst health care providers regarding the potentially hazardous side effects and toxicities that may result from these un-regulated products.

100. Pink Disease: Fading but Hopefully not Forgotten

French LK, Hendrickson RG, Horowitz BZ. Oregon Poison Center, Portland, OR, USA

Background: Hg, a naturally occurring metal, has several commercial applications, and human poisoning, while infrequent, may occur from exposure to three distinct forms: elemental, inorganic and organic. Pink disease is an idiosyncratic hypersensitivity reaction to chronic exposure to mercury ions. Case: A previously healthy 18-year-old female admitted for several days due to a diagnosis of a viral upper respiratory infection. Initial workup revealed a temperature of 38 degrees Celsius, a heart rate of 117 beats per minute, and a blood pressure of 120/80 mmHg. Patient had no history of allergy or drug sensitivity, and no history of prior mercury exposure. On examination, the patient was noted to have diffuse purple discoloration of the fingertips, finger swelling, poor appetite, diaphoresis, irritability, poor energy, rash and memory impairment. There was an absence of an occupational or medical history that could explain her symptoms. The patient was a college student with no occupational exposure to mercury. The patient reported being exposed to elemental mercury vapor in her workplace. The patient was started on oral DMSA treatment. Patient was discharged from the hospital with full resolution of symptoms and returned to the workplace.

102. Aluminum Toxicity from Dialysis Treatment With and Without Diferoxamine

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1Poison Control Center, Children’s Hospital of Michigan, Detroit, MI, USA; 2Wayne State University School of Medicine, Detroit, MI, USA

Background: Outbreaks of acute aluminum (Al) poisoning have been reported at dialysis centers due to contaminated water supplies. There is little data establishing/supporting methods for Al elimination. We report two patients who became Al poisoned, despite water quality monitoring, due to an object that fell into an acid bath used for dialysis. Case report: Patient A presented with rapidly progressive alteration in mental status. Serum Al level was 386 mcg/L (normal 0–6). Over the course of 163 mcg/L. He received daily 6 h treatments for 3 days resulting in an elimination half life of 74.9 h. The contaminated acid tank was replaced. Further treatment with DFO was started. Patient B presented with an Al level of 163 mcg/L. He received daily 6 h treatments for 3 days resulting in an elimination half life of 74.9 h. The contaminated acid tank was replaced. Further testing of all patients at the affected center showed no abnormal Al levels. Discussion: Aluminum toxicity manifests itself in mental status changes or osteomalacia. In this study, we report two cases of Al elimination with rapid mobilization of Al from the bone and soft tissue. Literature suggests that dialysis should be performed 8 h post DFO administration. Our patients received 6 h treatments which were similar regardless of treatment with DFO.

103. Lead Intoxication: Coffee Laced with Lead Filings

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Introduction: We are reporting a case of deliberate ingestion of coffee laced with lead filings over a period of 6 months with a whole blood level (BLL) of 456 mcg/dL. Case report: Fifty-eight-year-old man was referred to our service by his general practitioner (GP) with an inclination for soft drinks. On admission to our service he was asymptomatic. We elected to commence him on oral DMSA (succimer) for 2 weeks. At day 4 post admission, he became unwell with symptoms suggestive of lead encephalopathy and was referred to parenteral chelation with BAL and EDTA. He received this for 24 h, however developed severe side effects from the IM BAL including pain at the injection sites, paresthesias, diaphoresis, nausea and vomiting. His neurological symptoms resolved after 24 h. It was unclear if this was a side effect of succimer or early lead encephalopathy. He continued parenteral chelation. We recommenced oral DMSA. Two weeks after chelation therapy, his level was 84 mcg/dL and oral DMSA was ceased. He had his BLL monitored every month to confirm no further exposure and his lead levels initially declined to 34 mcg/dL in 6 months but his levels have plateaued since. It is now 12 months post chelation therapy, his most recent BLL is 27 mcg/dL. His only complaint is poor appetite. He has a history of formal neuropsychological follow up with no apparent neurological injury. Discussion: This case is of a man who had an exposure history of at least 6 months and was relatively asymptomatic with a very high BLL. He presented a dilemma on what chelating agent we should use and for how long, as well as his apparently normal neurological status despite of extremely high BLL. A short period of ingestion. Most of the literature describes occupational exposure of lead and the effects on children. The pattern and the dose of exposure are important in determining toxicity. It appears that high cumulative lead levels over a period of years are associated with neuropsychiatric impairment in adults. In children, the threshold to chelate is much lower as their developing brains appear to be more susceptible to the effects of lead.
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Background: Infant botulism is thought to be caused by consumption of honey; however, the source of exposure is most often indeterminate. It is common in Spanish speaking communities to treat infant colic with chamomile. Botulism spores have been identified as contamination of chamomile preparations. We report three cases temporally associated with consumption of chamomile tea. Case 1: A 5-month-old male presented with 5 days of constipation, 1 day of poor feeding and decreased strength. The mother treated his constipation with suppositories and chamomile tea prepared from a product obtained from a local grocery store. On the day of admission, the infant was flaccid, hyporeflexic, with poor suck, no withdrawal to pain, and a weak cry. Stool tested positive for C. botulinum toxin type B. Case 2: A 1-month-old female presented with constipation and poor feeding. Her parents had given her chamomile tea made from commercial tea bags sweetened with honey for her symptoms. On physical examination, she was hypotonic with no Moro reflex and nonreactive pupils. Stool was positive for C. botulinum toxin type A. Case 3: At 6 months of age, the mother presented with constipation and poor feeding developed respiratory arrest. He had been given chamomile flower and star anise tea prepared by her mother from commercial star anise and chamomile from her own home garden. The child died 1 day after the Stool was positive for Botulism toxin type A.

Discussion: The frustrating nature of the colicky infant has prompted the development of many home remedies, including chamomile tea; its consumption practice in some ethnic populations. The presence of botulism spores has been reported in samples of chamomile in Argentina, at a greater frequency than that found contaminating commercial preparation of honey, resulting in a warning to not feed chamomile preparations to infants under a year of age. While we were unable to prove an etiological connection between the tea and our cases, the temporal association is compelling. Analysis of the tea products in these cases is pending.

Conclusion: The association between chamomile tea and infant botulism warrants further study. This seemingly benign tea product in these cases is pending.

105. Prospective Evaluation of Duration of Pain, Swelling, and Functional Deficits in Patients with Crotaline Envenomation

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Introduction: There is limited information about the duration of symptoms in patients who have experienced crotaline envenomation, particularly agkistrodon species. Often copperhead and water moccasin bites are thought to be due to other non-crotaline species. Previous studies have been retrospective and relied on patient recall, sometimes years after the bite. Stool tested positive for C. botulinum type B.

Methods: Case series of patients contacting the poison center for bites, with constellation of symptoms temporally associated with consumption of honey, resulting in a warning to not feed chamomile preparations to infants under a year of age. Only one case was included in the study. This case is presented.

Results: Stool was positive for Botulism toxin type A.

Discussion: The frustrating nature of the colicky infant has prompted the development of many home remedies, including chamomile tea; its consumption practice in some ethnic populations. The presence of botulism spores has been reported in samples of chamomile in Argentina, at a greater frequency than that found contaminating commercial preparation of honey, resulting in a warning to not feed chamomile preparations to infants under a year of age. While we were unable to prove an etiological connection between the tea and our cases, the temporal association is compelling. Analysis of the tea products in these cases is pending.

Conclusion: The association between chamomile tea and infant botulism warrants further study. This seemingly benign tea product in these cases is pending.
of children who were reported to have ingested Lantana camara. Methods: We performed a retrospective review of the California Poison Control System (CPCS) database for all pediatric ingestions of Lantana camara identified in the database for the time period 1997–2008. Data collected included age, gender, clinical effects, duration of effects, medical interventions and outcomes. Results: There were a total of 641 patients. 341 (53%) of which were male. Patient ages ranged from 1 to 16 years with a mean of 2.5 years (ages 0–3 = n = 547; ages 4–6 = n = 66; ages 6–9 = n = 18; ages 10–12, n = 7; ages 13–16, n = 3). Plant parts used were shown in Table 1 (some patients ate more than one plant part): Reported effects among all patients and among patients who ingested ripe and unripe berries are shown in Table 2: 31% (61) patients were managed in a healthcare facility and 2 (0.3%) were admitted, despite the fact that both were asymptomatic. Therapies administered were activated charcoal (n = 32), spec (n = 10), intravenous fluids (n = 3), and gastric lavage (n = 1). No significant effects and no deaths were recorded. Conclusions: In this case series, ingestion of Lantana camara (including unripe berries) was not associated with significant toxicity; patients ingesting unripe berries did not exhibit more frequent or severe symptoms than those who ingested ripe berries or other plant parts. The vast majority of patients experienced minimal symptoms. Patients were not noted to exhibit signs of antimuscarinic toxidrome. Children with asymptomatic ingestions or those with mild symptoms can be managed at home.

110. Retrospective Review of Black Widow Spider Bites
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Background: Black widow spider (BWS) (Lactroctes sp.) envenomation is common. Following envenomation local pain, erythema, abdominal pain, rigidity, hyper- tension, and diaphoresis can be seen. While an effective specific antivenom, (AV) is available, Lactroctes mactans (equine-derived) (Merck), its use is limited due to concern of possible severe allergic reaction. We performed current study to determine rate of adverse effects observed in patients treated with BWS envenomation. Methods: Retrospective review of poison system electronic database from January 1999 to December 2009. All cases of BWS envenoma- tion treated with AV were included. Age, gender, presenting symptoms, adjunctive therapy, number of vials of AV given, response to AV, and adverse reaction to AV were recorded. Descriptive statistical methods were used. Results: Ninety-six patients were treated with AV with mean age 27-year-old (0–74-year-old), 76% were male. Following envenomation generalized pain was reported in 91% (erythema at 57%), hypotension (21/400) 43%, abdominal pain 41%, muscle rigidity/cramping 30%, tachycardia (2100 bpm) 23% and diaphoresis in 21%. No patient required more than one vial of AV. One patient developed urticaria to AV halfway through infusion which was immediately dis- continued. Another patient developed generalized erythema following completion of infusion but no other effects. There were no deaths in any patients receiving AV. There was no shortness of breath or respiratory distress, no hypotension or chest pain following AV administration. All patients reported pain relief with AV and did not require additional AV doses. Adjunctive therapies included opioids 69%, benzodiazepines 64%, calcium 21%, NSAIDs 17%, and other muscle relaxants 11%. No cases of serum sickness were reported. Treatment for Lactroctes mactans AV envenomation includes opioid pain control and muscle relaxants. Whilst these medications can provide symptomatic relief they do not neutralize venom. In addition, adequate pain control can be difficult to achieve. Adjunctive treatment includes administration of AV. Although the AV available in the U.S. is derived from horse serum, hypersensitivity reactions appear to be mild and rare occurrences. Further prospective studies are required to further elucidate.

111. Rattlesnake Envenomations in Patients on Anticoagulants and Antiplatelet Agents
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Background: Rattlesnake bites (RSB) frequently result in thrombocytopenia and coagulopathy. Despite impressive mortality in non-anticoagulated patients, previous RSB series have demonstrated <1% of patients develop clinically significant bleeding or require transfusions. Little is known about RSB in patients who take anticoagulants or antiplatelet agents (AAA). Methods: After IRB approval, we conducted a retrospective chart review of all RSB patients admitted to an urban teaching hospital between July 1, 2000 and March 31, 2010. Data were abstracted on a pre-designed data abstract sheet. For patients with multiple envenomations during the study period, only the first was included in the analysis. Only patients who took AAA daily were included. Results: Thirty-two unique encounters of patients taking AAA were identi- fied. Medications included ASA (n = 24), clopidogrel (n = 7), and warfarin (n = 7). Mean age was 62.5 years. Of the 32 patients, 24 were male, and 19 had bites to the upper extremity. Mean length of stay was 3.84 (±2.42) days, and median (IQR) number of antivenom vials given was 12 (10–20). A decline in hemoglobin (Hgb) of >25% during the initial hospitalization was noted in 7/32 (21.9%) patients. Clinically significant gastrointestinal bleeding (GIB) occurred in 2/32 (6.25%) patients, two on ASA, one on clopi- dogrel). Follow up data were available for 23/32 (72%) patients. Late bleeding occurred in 2/23 (8.7%), includ- ing 1 patient on ASA who had a GIB, and another on clopidogrel. Of these, 23/32 (72%) patients had an AAA. Hematologic recurrence after antivenom was identified in 7/23 (30.4%). Three of these seven were retreated with antivenom, including both of the patients with delayed bleeding. The overall incidence of bleeding in this study was 12.5% (4/32). Five (15.6%) patients were transfused (three with early bleeds, two with late bleeds). A fifth patient, on ASA, developed a GIB associated with hematologic recur- rence. Her Hgb fell to 4.9 g/dL, but she refused transfusion. Conclusion: Patients taking AAA are at risk of early bleeding associated with initial envenomation, as well as late hematological recurrences and antivenom treatment with antivenom.

112. Pediatric Poisoning from Baptisia Australis
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Background: Animal poisoning from cytisine-containing plants have been reported in the literature. We report what is believed to be the first human poisoning to the cytisine-containing plant, Baptisia australis. Case Report: A 6-year-old male was brought to the Emergency Department with complaints of abdominal pain and multiple episodes of vomiting. Both were noted to be unfettered. He was taking 110, diaphoretic, dizzy, and ataxic. Initially attributed to heat exertion, both admitted hours later to ingestion of seeds from a Baptisia australis plant growing in the yard. The parent posi- tively identified the plant by botanical name. Both patients were treated with intravenous hydration and support, and symptoms fully resolved after 12 h. Discussion: Baptisia australis contains the quinolizini- cle alkaloids cytisine, lupanine, d-sparteine, and N- methylcytisine. Cytisine has nicotinic-receptor agonist effects and produces similar CNS and gastrointestinal effects as nicotine. Animal poisoning from other quinolizidine alkalobiotics is rare. Reports of Baptisia poisoning (B. aurea, B. Genista, and Sophora sp. has been reported, and produces a clinical cytisine poisoning picture consistent with those seen in our patients. Cytisine poisoning from Laburnum sp. have caused at least one documented fatality. Conclusion: In severe poisoning, the initial nicotinic cholinergic symptoms of nausea, vomiting, tachycardia, and hyperthermia can progress to decreased hypotension, bradycardia, coma, and finally respira- tory failure. The treatment is early gastrointestinal decontamination if appropriate, with good supportive care. Many patients require ICU support as needed. Exposure to cytisine-containing plants, and other nicotine-like alkaloids can lead to severe poisoning but with prompt supportive care patients should make a full recovery.

113. Non-Pharmaceutical Cardiac Steroid Poisoning: Bufotoxins Are Associated with More Severe Toxicity
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Background: Cardiac steroids are steroids molecule with pharmacological and toxicological effects on cardiac tissue. Most cardiac steroids from plants and marine sources are synthetic congeners (1). While marine cardiac steroids from Bufo toads (bufotoxins) are bufadienolides. Non-pharmaceutical cardiac steroids have been used as therapeutic agents, herbal tonics, and aphrodisiacs. The effects of these toxicants can range from minor to severe toxicity, including death, and is of grave public health concern in some parts of the world. Reports of poisoning of these agents however remain limited. Methods: We conducted a retrospective analysis of all non-pharmaceutical cardio- active steroid exposures reported to the Taiwan National Poison Control Center between 1987 and 2008 to better understand the toxicity profile and factors associ- ated with severe cardiac toxic steroid poisoning. Results: A total of 64 patients were analyzed. Bufo toads or Chan Su were involved in 36 cases, Aconitum- neum (Veratrum and Thevetia species) in 13 patients, Digitalis species in 11 patients and unidenti- fied plants in 4 patients. Unintentional exposure was the most common reason for exposure, especially taking the herb or toad for a mistaken therapeutic effect. Eighteen patients manifested severe effects and seven died. All the patients who died ingested parts of Bufo toads or Chan Su. Serum potassium level was signifi- cantly higher among patients who died compared to those survivors (6.1 vs. 4.5 mmol/L, p = 0.01). Conclusions: Non-pharmaceutical source of cardiac active steroid poisoning is uncommon. Clinical features of such poisoning are rare and similar to those of true opium alkaloid poisoning. However, poisoning from bufotoxins is frequently associated with severe/fatal effects and is more toxic compared to poisoning from plant cardenolides. Serum potassium level has prognostic significance in such poisonings.

114. Milkweed Induced Cardiac Glycoside Poisoning
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Introduction: Milkweed (Asclepias spp.) is ubiquitous within North America and many varieties are known to contain cardiac glycosides. Several insects, includ- ing the monarch butterfly (Danaus plexippus), feed on the plant and retain glycosides as a natural defense. Many published resources list common milkweed as an edible plant, although with the caveat that it must be boiled twice before consumption. Case report: A 69-year-old male presented with nausea, vomiting, abdominal pain and diaphoresis. Symptoms began 2 h after consumption of approximately 1 cup of common milkweed (Asclepias syriaca) that he had picked on his property. Medications included only a statin; he had no prior cardiac history. Initial vital signs: heart rate 43, blood pressure 113/48, afebrile, oxygen saturation 100%. An electrocardiogram (ECG) showed a junctional escape rhythm. Initial laboratory values were significant for: digoxin level 2.6 mg/mL; potassium 3.7 mmol/L. He received four
vials of digoxin Fab fragments. Six hours later a repeat potassium was 7.2 mmol/L and he remained in repeat dosage and the patient was discharged without further sequelae. The peak free digoxin level was 4.79 ng/mL as determined by a digoxin turbidometric immunoassay (Architect 8000, Abbott).

Discussion: Digoxin is a cardiac glycoside demonstrative of similar characteristic. The following fact can be detected in human blood using a variety of immuno- logic techniques. Antibody reagents utilized in clinical tests purchased from different vendors will display varied effects on digoxin as well as cardiac glycosides. Therefore, test results acquired from different hospitals may not be compared directly. Similarly, therapeutic immunoglobulin fragments are highly specific for digoxin compared to other cross reacting cardiac glycosides. Conclusion: Asclepias spp. ingestion may result in cardiac glycoside poisoning. Dosing of digoxin Fab fragments cannot be deducted directly from the digoxin level following Asclepias spp. poisoning and larger doses of digoxin Fab fragments may be needed in treatment.

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Introduction: There exist a variety of plants with anticholinergic properties; many of these are consumed both intentionally and unintentionally. To date, there have been no comprehensive reviews of human exposure to these plants. Objectives: We sought to identify characteristics of patients with reported exposures to anticholinergic plants. Methods: We performed a retrospective review of the California Poison Control System (CPCS) database for all cases of human exposure to anticholinergic plants for the time period 1997–2008. Data collected included age, gender, route of exposure, reason for exposure, clinical effects, duration of effects, medical interventions and outcomes. Results: There were a total of 1,786 patients, 1,273 (71%) of which were male. Patient ages ranged from 1 to 84 years with a mean of 18 years. One thousand two hundred and ninety-three (72%) patients were from the digoxin level following Asclepias spp. poisoning and larger doses of digoxin Fab fragments may be needed in treatment.

116. Herbal Body Building Supplement – Get Big or Die Trying
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Background: Clenbuterol is a potent beta, and beta1 agonist. It is abused by body builders as an anabolic and lipolytic agent. We present literature reports describing clenbuterol-contaminated heroin leading to adverse cardiovascular effects. We report an herbal body building supplement imported from China adulterated with clenbuterol. Case report: Twenty-one Dallas residents who used an herbal supplement business sold one pill of a new formulation provided by their Chinese supplier. The compound, “Scorch,” reportedly contained caffeine, yohimbe, willow bark, and sida cordofolia (ephedrine-alkaloids). Within 15 min each patient had palpitations. Vital signs 1.5 h post-ingestion were BP 79/27, R 27, T 37.6, 98% RA in patient A. Patient B had a peak lactate of 9.7 mmol/L at 8 h, CPK of 11,803 U/L at 14 h, and troponin of 10.5 ng/mL at 31 h. His lowest K+ was 2.4 mmol/L at 4 h. Esmolol and phenylephrine drips were used to control HR and BP. His ECG showed no ischemia but could not relax a normal ejection fraction. Vital signs 1.5 h post-ingestion in patient B were: BP: 100/54, P 158, R 24, T 37.6, 100% RA. He developed a peak lactate of 40.4 mmol/L at 40 h, CPK of 253 U/L at 40 h, and troponin of 2.13 mg/mL at 43 h. His lowest K+ was 3.0 mmol/L at 4 h. Despite denying co-ingestants, his theophylline level was 0.8 mcg/mL and caffeine was 8.8 mcg/mL and was treated with metoprolo for HR control. Both patients tested positive for urinary clenbuterol and tests on the pills confirmed clenbuterol. Discussion: Both patients had rapid development of hypokalemia, myocardial ischemia, lactic acidosis consistent with other reports of clenbuterol ingestion. Non-invasive monitoring showed low systemic vascular resistances with high cardiac outputs. Both were successfully treated with beta blockade. Pt A had an abnormal echocardiogram showing impaired myocardial relaxation that resolved. Pt B has had persistent tinnitus for 6 months after the ingestion. Conclusion: Clenbuterol is a long acting potent oral beta2 agonist that leads to peripheral vasodilation and tachycardia. Our report supports the use of physiologic parameter based treatment with beta blockers in these cases. Physicians should be aware of the variety of compounds which may be unexpectedly in herbal body building products.

117. Heavy Metal Contaminants in Yerberia Shop Products
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Background: Yerberia, found in many large urban centers, specializes in the sale of Hispanic herbal remedies. Products sold often contain unknown ingredients at unknown concentrations. Lead (Pb) and arsenic (As), which may be associated with health risks when ingested, have been identified in some herbal products. We analyzed medicinal products sold at regional Yerberia stores in the Phoenix, AZ, USA using high performance liquid chromatography (HPLC)/mass spectrometry. Results: A total of 21 samples were analyzed. Pb was detected in 4/21 samples at levels ranging from 0.54–1.6 mg Pb/kg product [detection limit (DL) ≥ 0.5]. As was detected in 1/21 (0.5%) at 0.54 mg As/kg product (DL ≥ 0.5). Three products had Pb concentrations >12,000 mg/kg product, which has been previously cited as a potential health hazard. Conclusion: Yerberia medications may be contaminated with heavy metals, including Pb at potentially hazardous levels.

118. New Comprehensive Amanotoxid Mushroom Poisoning (AMP) Treatment Protocol
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Background: Mild AMP cases often die in developing countries where presentation is late, diagnosis easily missed & access to intravenous fluid replacement (IFR) is limited. Severe AMPs anywhere lead to death or liver transplant. There is no reliable strategy to prevent or reverse AMP induced fulminant liver failure (FLF). Intravenous sildinib (IS) has been used for AMP in Europe for two decades. Uncontrolled data suggested significant efficacy, yet some still do not use it. IS was unavailable in USA until FDA granted Emergency INDs in 2007 & 2009. Methods: 1 Comprehensive literature review. 2 Multi center AMPs. 3 Experience with AMP and IS gained from IND cohorts. Results: 1 Dogs with surgical biliary fistulas survived fatal amatoxin doses, as did dogs receiving IS serially after a fatal dose. Two case reports of AMP recovery after nasobiliary drainage were uncovered. Removed bile from one contained >4 mg amatoxin. 2 The critical importance of preventing early renal failure is under-appreciated. Kidney failure can follow. After aggressive IFR some still develop FLF later. 3 All middle-aged patients (n = 119) with acute AMP were treated with IS. Anticholinergic poisoning (AMP) Treatment Protocol

119. Evaluation of Duration of Morbidity Post Snake Envenomation
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Background: The morbidity associated with snakebite envenomation has not been well documented. Method: Using a standardized questionnaire all patients with snakebite reported to three regional poison centers during the year 2009 were asked to come to hospital discharge by telephone until resolution of symptoms. Data points such as days to return to work were only assessed in patients that had a job. Results: Two hundred and twenty patients were enrolled in the study. The median age were 34 and 31 years, respectively, with a range from 2 to 80 years. One hundred and fifty-three patients (67%) were male. The snakes were identified as copperhead (n = 108); unidentified venom (n = 69); cottonmouth (n = 35) and timber rattlesnake (n = 15). One hundred and six (47%) received antivenin. One hundred and eighty-two (80%) patients continued to have pain after discharge (e.g. edema) symptoms post discharge. See Table. There were no deaths. Discussion: Antivenin administration reduced edema, but patients continued to experience significant
morbidly. Conclusion: Use of antivenin <4 h post bite significantly reduced duration of edema versus no antivenin or late administration.

120. Tarantula Bites Are No Big Deal. Really?

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Background: The Cobalt Blue Tarantula (Haplopelma lividum) is a species native to Thailand and Myanmar. These "Old-world" tarantulas (from Europe, Africa, Asia and Australia) can be quite aggressive and are more likely to attack when disturbed. While the bites of many species of tarantula are known to be no worse than a wasp sting, accounts of bites by species such as the Cobalt Blue tarantula have been reported to be very painful. Old world tarantulas often have more potent, medically significant venom. Case report: An 18-year-old male pet store worker was bitten on the middle finger of his right hand while feeding a Cobalt Blue tarantula. He noted immediate pain near the fang puncture site and soon began to experience redness and localized swelling. He presented to a local ED within 1 h of the bite where he was treated with diphenhydramine, prednisone, sterile dressing and released. Later that evening the patient began to experience muscle spasm, described as cramping to fingers and toes bilaterally. After contact with the Poison Center the next morning he was referred to another local HCF for evaluation. His vital signs were within normal limits and no significant laboratory abnormalities were noted but the patient appeared anxious and in obvious mild to moderate distress with muscular cramping spreading to larger muscle groups. After consultation with the treating physian, he was determined to treat the muscular symptoms with hydration and benzodiazepines and the addition of opiates as needed. Over the next 2 days, it persisted in the digit. Necrosis of the finger was evident by day 5 and amputation at the PIP joint was performed on day 11. Conclusions: SAIMR antivenom rapidly reversed systemic effects (thrombocytopenia), but not local tissue effects. Surgical debridement is typically unnecessary following North American viper bites. However, based on this case and prior report (Cin Toxicol 2002; 40:911), early surgical intervention (dermomyotomy) may be beneficial for puff adder bites to the digit.

122. Fatality from Intentional Ingestion of Datura Sauveolens

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Background: Solanaceae plants contain the belladonna alkaloids (atropine, hyoscyamine, and scopolamine). Ingestion of these agents causes the anti-cholinergic toxidrome with both central and peripheral manifestations. Peripheral effects include skin flushing, dry mouth, mydriasis and hyperpyrexia and central effects include altered mental status and seizures. Case report: A 28-year-old male was found unresponsive after ingesting an unknown amount of Angel's Trumpet (Datura Sauvelens). Paramedics found the patient in asystole with no spontaneous respirations. He was intubated at the scene and cardiopulmonary resuscitation was initiated. Upon arrival to the hospital, he was noted to be hypothermic and had flushed skin, decreased bowel sounds and pupils that were fixed and dilated. As the patient was in extremis, and not responding to resuscitation, intravenous physostigmine (1 mg) was administered without any improvement in his condition. The patient was pronounced dead shortly afterwards. Autopsy results revealed a heart blood scopolamine level of 13 ng/mL and atropine level of 150 ng/mL. Discussion: Datura Sauveolens is a well known toxic plant with anti-cholinergic effects. It is ubiquitous in the Southeastern United States, Caribbean and South America. The evergreen bush consists of trumpet-shaped purplish flowers that contain varying amounts of tropane alkaloids. The different ratio of belladonna alkaloids in these plants accounts for the variability of clinical manifestations observed in toxicity. Amongst Solanaceae plants, the scopolamine content is highest in Datura Sauveolens with approximately 0.65 mg per blossom. Scopolamine is known to penetrate the blood brain barrier more readily than atropine and therefore may contribute to more severe central nervous system manifestations. Death due to this plant ingestion has been reported but is extremely rare and may be secondary to hyperpyrexia, ventricular arrhythmias and cardiovascular compromise. We report the second case fatality by Datura Sauveolens from intentional overdose with this species.

123. Prolonged Ketoacidosis with Normoglycemia in a 2-Year-Old Following Ingestion of Meizitang Herbal Weight Loss Supplement Containing Illicit Sibutramine

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Background: Meizitang is a Chinese herbal weight loss supplement sold over the internet. Illicit Sibutramine has been detected in the supplement on multiple occasions. Sibutramine is a monoamine reuptake inhibitor with noradrenergic and serotonergic effects. Previous reports of sibutramine exposure have primarily documented hyperadrenergic, serotonergic, gastrointestinal, and neuropsychiatric effects. Case report: A 2-year-old healthy female ingested an unknown quantity of Meizitang herbal supplements. She vomited once, was taken to an ED, and discharged after 4 h of observation with Poison Control Center consultation. At home she refused to take PO, became tremulous, and was taken to another ED 12 h after ingestion. She was found to be tachycardic, ketonuric, and mildly acidotic with an AG 2.4. Treatment with a high dextrose containing solution resulted in resolution of her ketoacidosis and symptoms. Additional workup including T3/T4, salicylate level, and a serum amino acid profile were normal. The capsule was sent to NMS labs for a qualitative drug analysis which revealed presence of sibutramine. Case discussion: To our knowledge this is the first reported case of prolonged ketoacidosis after sibutramine or herbal weight loss supplement ingestion. Since the herbal product contains an illicit alkaloid sibutramine there are few reports of drug induced normoglycemic ketoacidosis in the literature. No clear mechanism exists to explain ketoacidosis from sibutramine. Conclusion: We report the first case of a normoglycemic ketoacidosis in a child following ingestion of a weight loss supplement containing Sibutramine. Physicians and Specialists in Poison Inhibition should be aware of this potential for pharmaceuticals in herbal supplements and their potential for adverse effects, particularly in young children.
124. Potentially Lethal Ingestion of DMT and Syrian Rue

Stellplfg SJ, Cole JB, Banga SA, Roberts DJ. Hemepbrine, N,N-dimethyltryptamine (DMT), and Peganum harmala (Syrian rue), with the DMT dose over 10 times the LD50. Case report: A 24-year-old male presented with altered mental status and dizziness. His initial presentation was 4 h after ingesting 10 g of DMT and 4.5 g of Syrian rue. Physical exam included heart rate (HR) 120, blood pressure (BP) 145/84, normal skin, and reactive dilated pupils bilaterally. One hour after arrival his signs and symptoms worsened, with a HR in the 130s and significant confusion and hallucinations. The patient was admitted to a telemetry unit for monitoring and supportive care including IV fluids and benadine. Over the subsequent 8 h the patient’s hallucinations cleared, his mental status improved to near baseline, his HR declined to normal, and his BP normalized. He was discharged uneventfully at that time. Discussion: This patient ingested a potentially fatal amount of DMT, which is a hallucinogenic tryptamine. Tryptamines can be found in plants, such as DMT-containing plants that cannot be detected by traditional methods. DMT is orally active when used in conjunction with an MAOI. This combination also causes the effects of the DMT to last much longer than if smoked or injected directly into the body. The patient above took the DMT and Syrian rue to experience a long-lasting hallucinogenic high. He achieved this goal, and the course of the altered mental status lasted a total of 12 h, which is many times longer than the typical high would have lasted with DMT alone. The dose of the DMT this patient reported using is well above the estimated 8 mg/kg LD50. Conclusion: The presentation of this patient, with tachycardia and altered mental status, is consistent with the ingestion of DMT and Syrian rue that he reported. This combined ingestion should be recognized by the medical toxicologist.

125. Scombrotoxicity in a Patient Taking Isoniazid

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Background: When inadequately preserved or refrigerated, the musculature of dark-fleshed fish of the Scombridae family (mackerels, tunas, and bonitos) may undergo bacterial decomposition. During this process, the amino acid L-histidine in the fish decarboxylates to histamine. Histamine is a vasoactive amine, and, rarely, histamine. Histamine is a vasoactive amine, and, rarely, histamine. Histamine is a vasoactive amine, and, rarely, histamine. The presentation of this patient, with tachycardia and altered mental status, is consistent with the ingestion of DMT and Syrian rue that he reported. This combined ingestion should be recognized by the medical toxicologist.

126. Bradycardia Resistant to Atropine Following Monkshood Ingestion

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Background: Monkshood (Aconitum napellus), commonly known as wolf’s bane, is a wild flowering plant native to the Northern Hemisphere which can also be cultivated. The plant has a long and well documented history as a poison, being used for hunting and homicide. Aconitine and other alkaloids found in all parts of the plant are responsible for the toxicity of monkshood. Many fatalities have been reported following ingestion and patients commonly present with gastrointestinal, neurological and cardiovascular symptoms. Case report: We report the case of a 45-year-old male patient who was hospitalised following an intentional ingestion of a 3–4 inch piece of monkshood root from his garden. The patient began to vomit and complain of dizziness within 2 h of ingestion. He was found collapsed and his heart rate, blood pressure and level of consciousness all dropped en route to hospital. Bradycardia (46 beats per minute) and hypotension (blood pressure 90/50 mmHg) were recorded on admission. An ECG revealed flattened T waves and bigeminy. The patient was moved into the Trendelenburg position and given 500 mL of normal saline. At this point the National Poisons Information Service (NPIS) was contacted for advice. Atropine and colloid administration were recommended in accordance with ToxBase (The primary clinical toxicology database of the NPIIS). It was also suggested that transfer to a tertiary centre. Transfusion of an isotropic should be required should the patient’s pulse and blood pressure not improve. Atropine (3 mg) was given intravenously but no increase in heart rate was observed. Atropine was again given and at 4 h post ingestion the patient’s blood pressure dropped to 60/40 mmHg and he was given one litre of gelofusine intravenously over a 30 min period. Following this intervention the patient’s blood pressure began to improve and continued to do so until he had made a full recovery. He was discharged from hospital 2 days later. Conclusion: Severe bradydycardia and hypotension may occur when monkshood is ingested and Bradycardia may, as in this case, be resistant to atropine. Supportive therapy with close monitoring of blood pressure and ECG is recommended for patients who have been poisoned by monkshood.

127. Bok Choy Hypothyroidism

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Background: Brassica spp. inhibit thyroid function in animals. We present a case of severe hypothyroidism following ingestion of a large quantities of raw bok choy (Brassica rapa). Case report: An 88-year-old Chinese born woman living in the US for 30 years presented with increasing lethargy, weight gain, cold intolerance, and increased difficulty swallowing for 3 days. Her family also noted 1 month of facial swelling. PMH included a stroke without residual weakness and recently diagnosed type II diabetes; she was on no prescription or herbal medications; 1 year previously her TSH was normal. Initial vital signs were abnormal: T 95.2°F; SpO2, 99% on NRB mask; and capillary glucose, 91 mg/dL. Physical exam was notable for somnolence with dry skin and mucous membranes and nonpitting edema of her face, neck and extremities. Marked gross edema was noted. There was no stridor, exophthalmos, or goiter. Tension reflexes were absent throughout. ECG showed sinus bradycardia with normal intervals. Serum TSH was elevated: sodium, 118 mEq/L; potassium, 4.7 mEq/L; chloride, 81 mEq/L; bicarbonate, 30 mEq/L; BUN, 32 mg/dL; creatinine, 1.6 mg/dL; normal liver function tests. TSH was 74 mU/L (normal < 5) with free T3 and free T4 undetectable. She received levothyroxin 100 mcg daily, dexamethasone, and broad spectrum antibiotics. A family member later disclosed that the patient had been eating two bowls of raw bok choy daily for 2 months for glucose control. She was discharged 2 weeks later clinically well with improving thyroid function tests. We are unable to measure or correlate goitrin concentration in a sample of the patient’s stool.

Discussion: The genus Brassica includes broccoli, cabbage, canola, cauliflower, and turnips. All species contain various glucosinolates, presumably as defense against herbivores. Progoitrin is a glucosinolate found in several Brassica spp., including bok choy. Upon hydrolysis it yields two goteic compounds: thioacyand progoitrin is an inhibitor of thyroid peroxidase (an analog of methimazole, which inhibits thyroxine deactivating synthesis of thyroid hormones). Conclusion: Ingestion of supranormal quantities of raw bok choy may be associated with severe hypothyroidism.

128. Hold the Anchovies? A Presumptive Diagnosis of Clupeotoxicosis in West Michigan

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Background: Clupeotoxicosis poisoning occurs in humans who eat fish contaminated with a neurotoxin occurs in clupeoid fish, such as herring, anchovies, and sardines. The toxin is concentrated in fish organs and is tasteless and odorless. The identity of the toxin is unknown. The poison occurs in clupeoid fish when the fish is cooked. Few documented ingestions have been reported in the literature. Case report: Forty-year-old male presented with progressive nausea, fatigue, and a metallic taste in his mouth. He then noticed a metallic taste with raw clupeoid fish, including sardines and anchovies. The patient called his friend who ate the same pizza, and experienced similar, but more severe symptoms, including vomiting. The patient then used the Internet to search for causes of metallic taste and noted “clupeotoxaxism” associated with anchovies and proceeded to the ED. On physical examination, the patient was afebrile, hemodynamically stable, and had no localizing signs of toxicity. Symptoms at the time of presentation were resolving except for the metallic taste in his mouth. Results: Given patient’s symptoms and history of ingestion of anchovies, patient was given the presumptive diagnosis of mild clupeotoxicosis. Toxicology consultation confirmed the likely diagnosis. Nausea was controlled with antiemetics. After several hours of observation, the patient was discharged on promethazine (Phenergan) without apparent side effects as well without medical treatment. The local public health department was notified. Discussion: The diagnosis of clupeotoxicosis is based on history of eating clupeoid fish, with development of characteristic symptoms within hours. Symptoms begin with a sharp, metallic taste in the mouth, followed by abdominal upset, diffuse vomiting, and diarrhea. This then progresses to hemodynamic instability, vertigo, and neurological manifestations such as nervousness, dilated pupils, hypersalivation, headaches, cramps, respiratory distress, coma, and ultimately death. No specific antidote is available. Our case of clupeotoxicosis was compatible with the literature, including subjective and objective improvement with supportive care. Conclusions: The diagnosis of clupeotoxicosis is based on history of eating clupeoid fish, such as...
130. Liberty and Death

French LK, Burton BT.

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Background: Psilocybin is the tryptamine constituent in the mushroom genus Psilocybe. Several species are found in the Pacific Northwest. Injury and death are rare from recreational use but typically stem from the consequences of abnormal behavior. Case: A healthy 20-year-old man reportedly ingested as much as 4 g of hallucinogenic mushrooms one evening (typical single ingestion is 1/8 g) prior to entering a sleeping woman’s apartment. Upon awakening, she demanded he leave and a struggle ensued. Police were summoned to the home but the man became increasingly violent and failed to comply with their commands. He did not submit to multiple Taser discharges. Instead, he managed to pull out or break the wires and continued to struggle and attempt to escape. Approximately 30 minutes later, after being outdoors, additional attempts to subdue the man included pulling out or breaking the wires and continuing to struggle and pull away. After 96 minutes, he was transferred from the initial health care facility for further treatment. During the hospitalization, the man’s mental status remained constant over 5 years, with most occurring in July. Of the 79 snakebites recorded, 76 were presbyphthallus and 3 were genus Bitis. Seventy-five percent of the patients (15) had abnormalities in coagulation (INR > 3, fibrinogen < 50, platelets < 25) during their hospitalization. One patient received platelet transfusion and one underwent fibrinogen transfusion. Only 836 counties had enough antivenom to meet the median requirement.

Discussion: We noted that Oregon counties were not uniformly stocked with adequate antivenom to treat the average snake bite victim. The majority of patients did not have a significant coagulopathy.

Conclusion: Venomous snakebites in Oregon are a relatively infrequent occurrence with no fatalities reported in the 5 years studied.

131. A Bittersweet Symphony

Ricci G,1 Zannoni M,1 Cigolini D,1 Codogni R,1 Pratico F,2 Rocca G.2

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Background: Ingestion of large amounts of amydalin-containing seeds has been linked to symptoms of inhibition of cellular respiration. Apricot kernels have usually a pleasantly bitter aftertaste and are used in confectionery as essence, as an ingredient in the macaroons, in syrups or liqueurs and generally in conjunction with sweet almond to give the recipe an aftertaste. Case report: A 35-year-old mentally disturbed woman was admitted to our ED. She was found in her living room surrounded by apricots in which the pits had been extracted. EMS stated the woman had swallowed 40–60 pits 30 min prior to ED arrival. Her initial vital signs: BP 120/70, HR 120, RR 20, T 37.5°C, O2 sat 98%. A slight metabolic acidosis was present on ABG. Decontamination included gastric lavage and 70 g of activated charcoal. She was placed on monitors and given IV fluids and magnesium. Ninety minutes after ingestion, she reported headache, nausea and diarrhea. Vital signs: BP 75/50, HR 145, RR 28, O2 sat 97%, O2 94% on NIV. Her pupils were 1 mm, unresponsive to painful stimuli. After attempting entry into a police vehicle containing a loaded rifle, the man was shot and killed. Autopsy report confirmed the lethal gunshot wound to the head. The case is one of a limited number of deaths following ingestion of an amydalin-containing seed, a potentially toxic event. The case supports aggressive blood pressure management in those suffering from the hypertensive crisis associated with an MAOI interaction.

Echo demonstrated global LV hypokinesis (EF 32%), which when repeated 2 days later after tx with diuretics, an ace inhibitor, and carvedilol demonstrated improvement to 46%. No coronary artery CT scan was negative for inducible ischemia and chest CT scan excluded PE. He was Dced after 5 days and lost to follow up. Case discussion: The case is one of only a few detailed case reports documenting the effects of the hypertensive crisis associated with an MAOI interaction. Of the listed ingredients both the beta-phe-nyl-ethylamine (a biogenic amine similar to tryptamine) and synephrine may have been contributory. Conclusion: Cardiovascular complications from an MAOI/supplement interaction can be significant. We report a case of a hypertensive crisis after the use of a dietary supplement and review the literature regarding the interaction. We also review the adverse effects of this interaction and the potential for toxicology caused by the use of dietary supplements.

132. Hypertensive Crisis from a MAOI/Supplement Interaction Leading to Myocardial Infarction and Acute Heart Failure

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Background: Cardiovascular complications, and supplement interactions with MAOIs have only rarely been reported. We report a case of a hypertensive crisis leading to MI and acute heart failure in a pt on phenelzine who ingested the supplement AtroPhex®. List of ingredients includes B-phenylethylamine and synephrine. Soon after ingestion he had chest tightness, SOB, and HA. He had been educated on food restrictions and denied ingesting Cled foods or using other supplements or illicit drugs. Vitals were: BP 157/102, P 78, R 30, T 96.0°F, and Pox 99% (RA). He was diffusely dia- lyzed for 5 h and required 17 vials of fresh frozen plasma. The combination of aspirin with the nonsteroidal antiinflammatory drug. This case is one of a limited number of deaths following ingestion of an amydalin-containing seed, a potentially toxic event. The case supports aggressive blood pressure management in those suffering from the hypertensive crisis associated with an MAOI interaction.

We report nicotine toxicity from multiple routes of exposure due to a previously unreported nicotine-con- taining product named “Nasvai.” A 32-year-old man presented with acute confusion, tremuloseness, emesis, diarrhea and altered sensorium. He had syncope with seizure-like activity. Upon arrival he was responsive only to painful stimuli. Vital signs were: T 96.8°F, pulse 84 bpm, RR 19, BP 155/76 mmHg, O2 Sat 100% on room air, glucose 127 mg/dL. Pupils were pinpoint but reactive. Neurologic exam was normal. The ECG was notable only for a QRS of 108 ms. Head CT, basic labs and chest X-ray were unremarkable. Urine toxicology showed cannabinoids. A bottle containing a dark green colored powder was found in his pocket which a co- worker identified it as Nasvai, a homemade smokeless tobacco. Sodium bicarbonate did not alter the ECG, the patient was treated supportively and returned to baseline in 2 h. He admitted to use of oral Nasvai, which had unintentionally swallo wed some and had smoked a cigarette simultaneously 1 h prior to arrival. Nasvai is widely available in central Asia and primarily contains tobacco. The composition is variable and may contain slaked lime, dung, diphenylylamine and other substances. It is placed on the oral mucosa for sublingual absorption; users are advised to avoid swallowing it and to avoid simultaneous smoking of cigarettes. The combination of oral buccal absorption, gastrointestinal ingestion, and inhalation in this case highlights the potential for toxic- ity via several routes of exposure. Typically cigarette smoking results in delivery 1 mg of nicotine into the blood, though peak levels depend on the amount of nicotine which may be variable. Slightly slower absorption occurs with smokeless tobacco, however peak nicotine levels are generally equivalent to inhalational exposure.

Conclusion: This is the first case report of toxicity from smokeless tobacco product from central Asia. It also highlights the potential for toxicity from multi- ple, simultaneous routes of exposure to nicotine.

133. Nicotine Toxicity from Multiple Routes of Exposure After use of Nasvai an Uzbekistani Smokeless Tobacco

Sasso P,1 Mital RC,2 Farmer BM,1 Bouchard NC,1 Nasvai, a smokeless tobacco product from central Asia

1Well Cornell Medical Center, New York, NY, USA; 2Columbia University School of Medicine, New York, NY, USA

Nicotine toxicity causes a wide spectrum of symptoms, thus diagnosis may be difficult. We describe a case of nasvai toxicity which was lack- ing. We report nicotine toxicity from multiple routes of exposure due to a previously unreported nicotine-con- taining product named “Nasvai.” A 32-year-old man presented with acute confusion, tremuloseness, emesis, diarrhea and altered sensorium. He had syncope with seizure-like activity. Upon arrival he was responsive only to painful stimuli. Vital signs were: T 96.8°F, pulse 84 bpm, RR 19, BP 155/76 mmHg, O2 Sat 100% on room air, glucose 127 mg/dL. Pupils were pinpoint but reactive. Neurologic exam was normal. The ECG was notable only for a QRS of 108 ms. Head CT, basic labs and chest X-ray were unremarkable. Urine toxicology showed cannabinoids. A bottle containing a dark green colored powder was found in his pocket which a co- worker identified it as Nasvai, a homemade smokeless tobacco. Sodium bicarbonate did not alter the ECG, the patient was treated supportively and returned to baseline in 2 h. He admitted to use of oral Nasvai, which had unintentionally swallo wed some and had smoked a cigarette simultaneously 1 h prior to arrival. Nasvai is widely available in central Asia and primarily contains tobacco. The composition is variable and may contain slaked lime, dung, diphenylylamine and other substances. It is placed on the oral mucosa for sublingual absorption; users are advised to avoid swallowing it and to avoid simultaneous smoking of cigarettes. The combination of oral buccal absorption, gastrointestinal ingestion, and inhalation in this case highlights the potential for toxic- ity via several routes of exposure. Typically cigarette smoking results in delivery 1 mg of nicotine into the blood, though peak levels depend on the amount of nicotine which may be variable. Slightly slower absorption occurs with smokeless tobacco, however peak nicotine levels are generally equivalent to inhalational exposure.

Conclusion: This is the first case report of toxicity from smokeless tobacco product from central Asia. It also highlights the potential for toxicity from multi- ple, simultaneous routes of exposure to nicotine.

134. Characterization of Prescription Stimulant Exposures Using RADARS(R) System Poison Center Program Data

Zosel A, Bodmer M, Bailey C, Bailey JE, Dart RC, RADARS(R) System Poison Center Group, Rocky Mountain Poison & Drug Center, Denver Health, Denver, CO, USA

Background: Stimulant prescriptions for the treatment of attention-deficit/hyperactivity disorder have increased in recent years. Consequently, stimulant misuse and abuse is now a recognized problem in all ages. We describe stimulant exposures and associated medical outcomes among children and adolescents. A retrospective chart review was conducted of all children and adolescents from the Rocky Mountain Poison & Drug Center. Laboratory data were used to determine rise in urine and blood levels. Results: Urine and blood levels were determined for amphetamine, methamphetamine, benzoylecgonine, and cocaine. A total of 118 cases were evaluated. The mean age of the patient was 14 years. The majority of cases involved males (76%). Most cases involved generic stimulants (42%). The mean amount of drug involved was 10 mg. The most common route of exposure was smoking (63%). Other common routes of exposure were chewing and sniffing. Conclusion: The Rocky Mountain Poison & Drug Center data demonstrates a significant increase in stimulant misuse and abuse.
as reported to the RADARS System Poison Center (PC) Program and compare to prescription opioid exposures. Methods: The PC Program captures weekly acute drug exposure data from 48 of 60 US PCs. PCs use a standard electronic system to record calls from the public and the coordinating center performs quality control checks to verify coding accuracy. Stimulant (prescription amphetamine and methylphenidate) and opioid (buprenorphine, fentanyl, hydrocodone, hydromorphone, morphine, oxycodone, oxymorphone, tramadol) exposures from third quarter 2007 through third quarter 2009 were analyzed. Results: Thirty-four thousand five hundred and forty (17 cases per 100,000 population) stimulant exposures (53% amphetamine; 47% methylphenidate) were recorded during the study period. Mean age was 16.5 years (SD 13.5) and 57% were male. Site of ingestion was at own residence in most exposures (91%). The median number of substances ingested was one (range 2-26) while 31% (n = 10,379) involved two or more substances. Of known associated outcomes, 57% were no, minor or moderate effects, 2% (n = 524) were major effects and 0.06% (p.<.01) were death. Ninety-one, four hundred and ninety (59 cases per 100,000 population) opioid exposures were reported during the study period; 5% (n = 5,787) were major effects and 0.5% (n = 572) were deaths. Thirty-nine percent of stimulant exposures were intentional, compared with 57% of opioid exposures. Thirty-nine percent of stimulant exposures were therapeutic errors, compared with 22% of opioid exposures. Most frequent clinical effects reported for opioids and stimulants were unremarkable. Although fewer stimulant exposures were reported and were associated with fewer poor outcomes compared to opioid exposures, stimulant exposures still resulted in a significant number of poor outcomes. In conclusion, more therapeutic errors occurred with stimulants, reflecting the use of these drugs and associated dosing errors in young children. Our conclusions are limited to cases reported to PCs, which often represent serious exposures.

135. Glyburide Overdose from Ingestion of “Valium”
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Background: Glyburide is anecdotally known to be sold on the street as “valium” because of its similar appearance. A 57-year-old male, with a documented history of polysubstance abuse, including valium, was found unresponsive at a rehabilitation facility. Paramedics at the scene recorded a fingerstick glucose of 41 mg/dL. Brief improvements in mental status occurred after administration of one ampule of intravenous dextrose 50% and naloxone. After arrival to the emergency department, the patient was intubated for re đèrecedence of obtundation refractory to repeated naloxone. Because of persistent hypoglycemia, the patient was administered a continuous dextrose infusion. Opiate and glaucon are also administered. By hospital day #2, the patient’s serum glucose levels remained in the normal range without supplemental intravenous glucose and he was extubated with full return of his mental status. Methods: Time-of-Flight Liquid Chromatography/Mass Spectrometry (TOF LC/MS) was used to analyze the patient’s serum. Results: TOF LC/MS qualitatively confirmed the presence of glyburide in the patient’s serum. Conclusions: This is the first case of a glyburide overdose from ingestion of “valium” purchased on the street that has been confirmed by laboratory testing. Review of pill pictures of both drugs demonstrates the similarities of glyburide and diazepam pills. Clinicians need to remain aware of the possibility of salbutamol/area toxicity in the patient who presents with altered mental status and hypoglycemia after an overdose of “valium.”

136. Cardiac Arrest due to MDMA/MDEA Intoxication: Serum, Urine, and Drug Specimen inhabitants, and seeing “an irregular heart beat through my chest” shortly after ingesting the green pill. Methods: The serum, urine, and pill samples along with extracts from the tubes were analyzed using Agilent Liquid Chromatograph (LC)-Time-of-Flight Mass Spectrometer (LC2100-MS/TOF 6230). The chromatograms obtained were analyzed using Agilent’s MassHunter Qualitative Analysis software to determine the presence of potential drugs in the samples. For drugs confirmed to have both formula and retention time matches, Agilent’s MassHunter Quantitative Analysis software was used to determine their levels. Conclusion: Ingestion of MDMA/MDEA resulted in cardiac arrest and ischaemic ECG changes without evidence of atherosclerosis, possibly due to transient coronary vasospasm. This is the first published case of premortem MDEA level in an intoxicated patient.

137. Spice Ain’t So Nice
Banerji S, Deutsch CM, Bronstein AC.
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Background: Spice, an incense product, is sold in the US and other countries. It may contain a variety of cannabinoïd agonists like JWH 018 and JWH 073 that lack euphoria. The herbal blends are mixed with synthetic cannabinoids that are undetected on urine drug screens. Spice use has increased in the military because it was legally available. Recently, cases of Spice exposure via smoking have been under DEA, FDA, and CDC review. With the increased use of Spice, some patients exhibit symptoms of anticholinergic toxidrome as described by the treating physician (Table 1). Seventeen (27.8%) patients received medical evaluation (six in the hospital ED at the time of the call and one was referred by our center). Eight out of nine patients admitted to using Spice only. All symptoms resolved with symptomatic and supportive care including benzodiazepine administration (n = 3). Three patients had urine drug screens that were negative for THC. Conclusion: Spice appears to be an emerging public health problem among young females. The clinical picture is similar to THC exposure with some anticholinergic clinical effects. The incense’s availability and legal status make it easy for young people to acquire. This may burden health care facilities as it is not a common finding in our small sample required medical evaluation. Further characterization is needed with a larger sample size to better understand the toxicity of this THC homologues.

138. Spice: A New “Legal” Herbal Mixture Abused by Young Active Duty Military Personnel
Behbata VS1, Varnsay S2, Sessions D3, Barry D4, Borys D1.

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Background: Spice is a herbal mixture smoked for euphoria. The herbal blends are mixed with synthetic cannabinoids that are undetected on urine drug screens. Spice use has increased in the military because it was considered legal and is not detected on urine drug screens. We describe three cases of Spice use in active duty military personnel. Case 1: Nineteen-year-old male presented with paranoia, agitation, and visual hallucinations after smoking the “Space” brand of Spice. He arrived to the emergency department (ED) in restraints, pulse 114, and blood pressure 146/78. He did not have nystagmus or other abnormalities requiring sedation for agitation. His serum glucose was 197 mg/dL. Head CT, urine drug screen, serum white cell count (WBC), serum creatinine (CK) and ethanol (ETOH) levels were unremarkable. He was diagnosed with Spice hallucinations. Urine TLC was negative. Urine GCMS detected DHEA. Case 2: Nineteen-year-old female presented with sedation, amnesia, and mild agitation. She smoked the “Space” brand. Pulse and temperature were normal. Blood pressure was 138/70. She was alert within 3 h of arrival. Her CK, ETOH, and urine drug screen were unremarkable. Her serum WBC was 14 K and glucose 220. She had a mild acidosis that resolved. Urine TLC detected acetaminophen, dextromethorphan, and doxylamine. Urine GCMS detected only levodopa and DHEA. Case 3: Twenty-three-year-old male presented with delusions and paranoia. He complained of “monsters on his back.” Lorazepam 4 mg was administered. His pulse was 110. His blood pressure and temperature were normal. Serum WBC was 13 K. Urine drug screen, creatinine, ETOH levels, and glucose were unremarkable. He did not have an acidosis. His symptoms improved in the ED. He recalled all events. His urine TLC and GCMS were negative. Discussion. TLC and GCMS allow us to identify the component in urine in cases of Spice exposure. All three cases had similar symptoms. All cases were admitted and evaluated by a toxicologist. Mild tachycardia was common. Two cases had hyperglycemia. Two cases had paranoia and hallucinations requiring sedation. Conclusion: Spice is a new herbal mixture that is increasingly used in the military. Expected effects are similar to cannabis, but may include more paranoia and hallucinations, and may differ for each brand.

Most frequent clinical effects

**Symptom** | **N (%)**
--- | ---
Tachycardia | 6 (66.7)
Anticholinergic toxicity | 4 (44.4)
Agitation/irritability | 4 (44.4)
Tremor | 4 (44.4)
Confusion | 3 (33.3)
Pallor | 2 (22.2)
Mydriasis | 2 (22.2)
Hypertension | 2 (22.2)
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prescription drug abuse studies are sparse and no study ID calls for hydrocodone (HC) and other commonly study of calls to all certified PCs in one state from 2002 state.

Objective: made to PCs have been shown to be a drug abuse may be rising in military communities (active duty, manders have raised a concern that prescription opioid USA

tions (not including hydrocodone).

Background: Prescription opioid use in military members has risen because of increased war injuries. A concern of prescription opioid abuse or misuse has developed, leading to congressional inquiries and mili- tary investigations. Military prescription drug abuse studies are limited and no study has used poison center data to evaluate military drug abuse. In civilian studies, telephone calls to PCs requesting identification (ID) of drugs of abuse have been shown to be a drug abuse marker. Objective: Our goal was to evaluate PC drugs of abuse identification calls from military bases over an 8 year period. Methods: This is a retrospective, observational study of calls to all certified PCs in one state from 2002 to 2009. The five-digit zip codes from the three largest military bases in the state and areas adjacent to the bases were identified (10 total zip codes). Drug ID calls were included for hydrocodone combination tablets (HC), benzodiazepines (BZ), tramadol, propoxyphene, and other acetaminophen combinations (not including hydrocodone). Results: There were 9,437 drug ID calls from three military bases. The calls increased 105% over the study period. Among all drugs evaluated, HC calls increased more since 2002 than the other drugs in the study (460%, range 450–800%, p < 0.03). It made up the greatest proportion of calls from 2004 to 2009 range (2.8–5.2% of cases), expect for year 2008. The total number of calls and proportion of drug ID calls for HC was statistically greater than the other drugs studied (p < 0.02). Since 2002, BZ calls rose 188%, range 106–235%. The proportion of total drug ID calls for BZ was significantly greater than tramadol, propoxyphene, and APAP combina- tions (p < 0.05). Conclusion: Poison center calls for hydrocodone drug ID calls from military bases were more common and rising faster than any other abused drugs. Since drug ID calls may be a surrogate of drug abuse, these results suggest hydrocodone abuse may be rising in the military.

140. Drug Identification Calls for Drugs of Abuse: Is There a Difference Between Military and Non Military Counties? Bebarta VS,1 Vargas T,2 Borys D,1 Morgan D,1 Valtier S,3 1Texas A & M University Health Sciences Center and Central Texas Poison Center, Temple, TX, USA; 2Department of Emergency Medicine, Wilford Hall Medical Center, San Antonio, TX, USA; 3Clinical Research Division, Wilford Hall Medical Center, San Antonio, TX, USA

Background: Congressional leaders and military command have raised a concern that prescription opioid abuse may be rising in military communities (active duty, families, retirees). Studies evaluating military prescription drug abuse studies are sparse and no study has used poison center (PC) data to evaluate military drug abuse. In civilian studies, drug identification (ID) calls made to PCs have been shown to be a drug abuse marker. Objective: We sought to compare the incidence of PC Drug ID calls from counties with large military bases with the rates of the entire state. Methods: This was retrospective, observational study of calls to all certified PCs in one state from 2002 to 2009. We identified counties with the three largest military bases in the state. We obtained the rates of PC drug ID calls for hydrocodone (HC) and other commonly abused prescription drugs (benzodiazepines (BZ), tramadol, propoxyphene, and acetaminophen (APAP) combina- tions [not including hydrocodone]). Results: The three counties had 22,201 drug ID calls and the entire state had 181,704 calls in 2009. All Drug ID calls rose 159% for the state. HC was the most common drug identified in all three military counties. Since 2002, HC drug ID calls rose 260% (range 190–318%) in the military counties. HC drug ID calls increased 339% in the entire state (p = 0.05). We corrected these rates for total drug ID calls. Among all drugs evaluated in our study in military counties, HC calls increased more since 2002 than the other abused drugs (p < 0.03). BZ calls were stable or decreased, tramadol decreased significantly, and propoxyphene and APAP combinations were unchanged (p > 0.05). The state’s call patterns were similar (p > 0.05). HC made up the greatest proportion of calls from 2002 to 2009, except for year 2008. The total number of drug ID calls for HC was greater than the other drugs studied (p < 0.02). Conclusion: Hydrocodone drug ID calls in military counties are common and rose faster than other abused drugs. However, this pattern is similar to the entire state, thus military counties and their communities may not be different from non-military counties. Military counties have a high prevalence of hydrocodone drug ID calls and that may reflect an increase in abuse.

141. Buprenorphine: A Prescription Drug Abuse Marker for Military Bases – Poison Center Drug Identification Calls Doyon S1, Ripple M,2 Ali Z,2 Fowler D,2 1University of Maryland School of Pharmacy, Baltimore, MD, USA; 2Office of the Chief Medical Examiner, Baltimore, MD, USA

Background: Buprenorphine only overdoses may result in severe respiratory and central nervous system depres- sion but have not been shown conclusively to cause death. Case report: A 29-year-old woman with a history of injection drug use, asthma and severe aller- gies including anaphylaxis, injected herself with one crushed purported buprenorphine tablet purchased from an online pharmacy. She ingested the crushed tablet for breath and collapsed on her bed. She was pronounced dead in the ED. The victim and boyfriend had extensive knowledge of opioid pharma- cology, as they were both post-doctoral fellows in phar- maceutical sciences. They frequently concurred in opioid addiction and compulsive behaviors. The boyfriend explained that they routinely purchased tablets on-line from pharmacies located overseas and, that day, used a never-before-opened shipment of 920 tablets of buprenorphine (without naloxone) purchased from a pharmacy based in the Philippines. They had crushed and dissolved one 2 mg tablet of buprenorphine and separated the solution into two syringes, each contain- ing 1 mg buprenorphine in 3 mL of solution, purging the air from the syringes before use. They each intended to use only one of the syringes. No other drugs/ETOH were consumed prior to the injection. Case discussion: The police confiscated what remained of the syringe and analysis revealed no buprenorphine. The medical examiner reported hyperperfused lungs with mucus plugs, eosinophilic infiltration and bronchial hypertrophy. Post mortem comprehensive toxicology screening was positive for naloxone 22 ng/mL only. Heart blood buprenorphine was negative. Heart blood tryptase was markedly elevated at 179 ng/mL (normal value < 10 ng/mL). Elevation of tryptase is useful in confirming the diagnosis of anaphylaxis triggered by medications or agents, especially if they were injected. The cause of death was anaphylactic reaction compli- cating asthma. The manner of death was accident. Conclusion: This case report underscores the importance of thorough investigation and complete autopsy including toxicology in determining the cause and manner of death.

143. Place of Use in Those Presenting with Acute Recreational Drug Toxicity – An Interna- tional Comparison Wood DM1, Yates C2, Greene SL3, Puiguirguier J2, Dargan P1 1Clinical Toxicology, Guy’s and St Thomas’ NHS Foun- dation Trust, London, UK; 2Hôpital Son Dureta, Palma, Mallorca, Spain

Background: Self-reported use of recreational drugs is higher amongst those who frequent night-time related venues, which include pubs/bars and discos/nightclubs. Additionally, use may occur in the home environment either prior to or after attending a late-night venue. There are cultural differences in the types of night-time venues between different geographical regions. Methods: Data was collected on all presentations to the Emergency Department (ED) relating to acute recre- ational drug toxicity at a large inner-city hospital in London, UK and Palma, Mallorca from January 1 to December 31, 2009 inclusive. The following data was extracted from the ED notes for each presentation: age; sex; and place of use [home, public place, pub/bar, nightclub, sauna (gay-sex related venue), police custody/prison or other]. Data was compared between the two centres appropriate statistical analyses. Results: There were 126 presentations at the Mallorca centre and 602 at the London centre. Individuals were older in Mallorca (35±5.9 years old in London (30.6±8.1 years), p = 0.0003, with a greater proportion of males in London (83.9%) compared to Mallorca (73.0%), p = 0.004. There was no difference between London and Mallorca in the proportion of individuals having used the drugs at home (36.8 vs. 34.4%, p = 0.6) or in police custody/prison (2.2 vs. 4.4%, p = 0.28). However there were significantly more individuals in Mal- lorca presenting from public places (38.9 vs. 16.2%, p < 0.0001) and pubs/bars (16.7 vs. 4.8%, p = 0.0005). Con- versely, there were more presentations in London relating to drug use in nightclubs (29.8 vs. 3.3%, p = 0.0001).

WITHDRAWN
whereas 11.4% of presentations in London related to use within this environment (p = 0.0008).

Discussion: There are differences in place of recreational drug use prior to presentation between the two centres, which may reflect differences in culture between them (e.g. more late-night bars in Mallorca compared to London where there are more discos/night-clubs). An interesting phenomenon shown here is the relatively high prevalence of toxicity associated with drug use in gay sex saunas in London. This information needs to be considered when planning of provision of pre-hospital healthcare services for the management of acute recreational drug toxicity.

144. Cocaine Associated Oculomotor Nerve (CN III) Palsy With Pupil Involvement
Foster M, O’Malley GF.
Albert Einstein Medical Center, Philadelphia, PA, USA

Background: We report a case of acute cocaine-associated unilateral oculomotor nerve (CN III) palsy, with involvement of the pupil in a hypertensive 33-year-old female presenting with double vision, ptosis and mydriasis of the left eye. Case report: The patient was hypertensive, alert, orientated, and neurologically normal except for isolated left oculomotor nerve palsy resulting in passive deviation of the eye downward and outward with an ipsilateral dilated, unreactive pupil. Symptoms began the morning after a cocaine binge. CT scan, MRI/MRA and cerebral angiography were negative for infarct or aneurysm. All serum lab tests were unremarkable and a calculated peak plasma level of methylphenidate was estimated to be 1,456–1,878.9 ng/mL. This peak plasma level is approximately 73–93 times the therapeutic plasma level. Supportive therapy and close monitoring aided in this patient’s complete recovery. Conclusion: Clinicians should be aware of the lethal toxicity associated with methylphenidate abuse. Rapid identification of ingested toxin and aggressive supportive treatment are essential in the recovery of the patient.

145. Methylphenidate Toxicity from Intraocular Injection of Oral Tablets
Petzel R,1 Eppert H.2
1 Loyola University Medical Center, Maywood, IL, USA; 2 College of Pharmacy, University of Tennessee, Knoxville, TN, USA

Introduction: Methylphenidate is a central nervous system (CNS) stimulant widely used for the treatment of attention-deficit hyperactivity disorder (ADHD) in both children and adults. Methylphenidate is structurally related to methamphetamine. Intraocular use can cause euphoria, which has led to a long history as a drug of abuse. Serious toxicity can result leading to death. Though methylphenidate abuse is widespread, there are few published case reports of IV toxicity from oral tablets. Case report: A 29-year-old male patient with a history of hepatitis C presented to the emergency department (ED) with a chief complaint of chest pain, shortness of breath, and loss of sensation in the extremities. The patient reported that 7–8 h prior to presentation, he crushed 35 methylphenidate 20 mg tablets, suspended the tablets in water, and injected the suspension into an antecubital vein. The tablets were verified by the pharmacist as methylphenidate hydrochloride 20 mg. The patient’s affect was extremely agitated and fearful. Initial vital signs included a blood pressure of 147/69 mmHg, pulse 158 beats per minute, 26 respirations per minute, and an oral temperature of 101.2°F. The initial electrocardiogram revealed sinus tachycardia. Reported labs showed a methylphenidate level of 45.5 ng/mL, total creatinine kinase 1,483 U/L, creatine kinase-MB 8.8 ng/mL, myoglobin 108 ng/mL and lactic acid 2.8 mmol/L. Ice packs and a cooling blanket were applied, and the patient received lorazepam 2 mg and isosornaic fluid resuscitation with reported improvement. The patient was admitted to the intensive care unit for monitoring, treatment and evaluation. He remained hypotensive and was discharged home. Follow-up several weeks later noted continued subjective improvement but persistent double vision and ptosis requiring the patient to wear an eye patch for comfort and to ameliorate the diplopia. Patient consented to be photographed in hospital and at follow-up. Discussion: CN III palsies involving the pupil are negative for other causes of isolated oculomotor nerve palsies. After several days in hospital the pupil paralysis persisted although pupillary involvement in diabetes-associated CN III palsies is usually secondary to direct trauma or compression of the nerve. Patient continued subjective improvement but persistent double vision. After several days in hospital the pupil paralysis persisted. CT scan, MRI/MRA and cerebral angiography were negative for infarct or aneurysm. All serum lab tests were unremarkable and the suspicion was changed without further complication. Case discussion: This patient presented classic signs of methylphenidate toxicity, including rhabdomyolysis. Based on methylphenidate kinetics, a calculated peak plasma level of methylphenidate was estimated to be 1,456–1,878.9 ng/mL. This peak plasma level is approximately 73–93 times the therapeutic plasma level. Supportive therapy and close monitoring aided in this patient’s complete recovery. Conclusion: Clinicians should be aware of the lethal toxicity associated with methylphenidate abuse. Rapid identification of ingested toxin and aggressive supportive treatment are essential in the recovery of the patient.

146. Relationship of Acetaminophen Psi Parameter and Hepatotoxicity Secondary to Acute Acetaminophen Overdose in Thai Population
Chomchara S, Anunormsawan T, Chomchara C, Phiyub P. Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok Thailand

Background: Psi (Greek letter Ψ) – parameter (Ψ), a toxicokinetic parameter that takes the acetaminophen level ([APAP]) and onset of NAC therapy into account and quantifies the hepatotoxic potential to achieve therapeutic paracetamol level, is proposed and found to be predictive of hepatotoxicity in acute acetaminophen overdose patients treated with intravenous NAC [Ann Emerg Med 2005; 46(3):263–71]. The purpose of this study is assessing the relationship of Ψ to predict hepatotoxicity in Thai population with acute acetaminophen overdose. Method: This is a retrospective study of patients who presented to Siriraj Hospital with acute paracetamol overdose during January 2004 to June 2009. The inclusion criteria included [APAP] analyses within 4–24 h post-ingestion. [APAP] above the treatment line of Rumack–Matthew Nomogram and treatment with intravenous NAC. Acetaminophen concentrations that were drawn after 4 h post-ingestion were calculated into the level at 4 h using the Ψ half-life value. Ψ was calculated using the Ψ-calculator provided with original publication. Hepatotoxicity signified AST or ALT levels higher than 1,000 U/L. Univariate analyses were performed with two-tailed chi-square test when appropriate. Multivariate analyses were performed with backward stepwise logistic regression. Results: One hundred and forty-six patients, aged 13–64 years [mean 24.31 and standard deviation (SD) 8.02], were enrolled. The mean (SD) of [APAP] at 4 h post-ingestion was 312.04 (161.43) mg/L. Mean (SD) of NAC onset was 9.96 (5.68) h. Mean (SD) of Ψ was 2.75 (3.49) (mmol/L × h). Univariate analysis revealed [APAP], onset of NAC therapy and Ψ as statistically significant predictors of hepatotoxicity secondary to acute acetaminophen overdose treated with intravenous NAC in the Thai population, in addition to the Canadian population in the original work.

147. The Elimination of Medicare Consult Codes and the Impact on Bedside Toxicology Consult Services in the United States as of January 1, 2010
Wiegand TJ,1 Wynne K,2 Petry T,1 Bosse J,1 Lombard K.2 1 Maine Medical Center & the Northern New England Poison Center, Portland, ME, USA; 2 Maine Medical Partners, Portland, ME, USA

Background: Medicare Current Procedural Terminology (CPT) billing codes are a list of identifying codes and descriptive terms used for reporting medical services. They are used in conjunction with specific diagnosis codes (International Classification of Diseases – ICD) in preparing reimbursement claims for insurers. As of January 1, 2010 Medicare will not reimburse CPT consult codes. Subspecialty services such as bedside toxicology consults have to implement replacement codes in order to receive reimbursement for Medicare patients. Methods: In the table below 2009 and 2010 CPT codes are compared in a crosswalk technique. We also calculate reimbursement rates and relative value units (RVU) affected by the Medicare changes. Results: Move horizontally across rows to compare. Inpatient consult codes (99251-99255) crosswalk to subsequent visit codes (99221-99223) for the first two levels of service and then initial visit codes for the next three levels (99221-99223). The initial admitting service uses a modifier with their code. Outpatient (99241-99245) ED consult codes crosswalk to ED consult codes (99281-99285). Conclusions: It is anticipated that private insurance groups will also eliminate CPT consults.
148. Wikipedia Information for Toxicologic Emergencies: How Reliable Is It?

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Background: Online resources such as wikis have become increasingly popular sources of information. Wikis allow users to enter and edit content. Wikipedia is an unrestricted general information wiki. Wikipedia is often among top results returned from web search engines. Lay public and healthcare professionals may utilize this resource for toxicologic information. No current literature compares the information in Wikipedia with traditional subscription toxicology references and no literature evaluating how often toxicologic information in Wikipedia is updated. Methods: NPDOS 2007 data was used to determine the number of times any drug involved in exposures and fatalities was mentioned. Twenty-two specific medications most commonly involved in exposures were selected for review. Toxicologic information was divided into four categories: Mechanism of Toxicity, Toxic Dose, Symptoms of Toxicity, and Treatment. A grading scale was developed that would allow objective grading by each evaluator. Content was compared between Wikipedia and Posinindex on a single date in 2009 and repeated 12 months later in 2010 to check for updates or corrections. Posinindex was selected as a common professionally updated subscription reference utilized by healthcare professionals. The purpose was to compare the wiki content with a traditional database, not to determine appropriateness of Posinindex information. Each substance selected was reviewed by both authors to reach agreement. Only information in Posinindex that was different from the substance was included for comparison.

Results: Wikipedia did not provide significant toxicologic information. Only 1 of 22 substances had information in all four categories. There was one instance of incorrect information found in Wikipedia (phenytoin to treat refractory dysrhythmias due to amitriptyline toxicity). No entries mentioned Poison Centers or the national 800 number. Digoxin was the only entry that was updated 12 months later. Additional symptoms of toxicity and a recommendation not to administer Digoxin to patients with heart rate <60 bpm were added. Conclusion: Wikipedia contains limited toxicologic information. One case had erroneous information. Wikipedia was not significantly updated or corrected during a 12 month period.

149. Transplant of Multiple Organs After Suicide by Acetaminophen Overdose and Self-Inflicted Gunshot Wound

Sutter ME, Owen KP, Daily M, Albertson TE.
University of California Davis, Sacramento, CA, USA

Background: There are a shortage of organs available for transplant, and therefore many transplant centers are including poison related deaths. Few reports of organ donation after acetaminophen overdose exist. We describe the case of a 17-year-old male who had a simultaneous lethal poisoning to the head and upper body due to an acetaminophen overdose. Case report: A 17-year-old male was brought to the emergency department after a self inflicted gunshot wound to the head. His mother reported a recently purchased bottle of acetaminophen, which was missing 20 g. Upon arrival to the hospital, the patient was intubated without medication. He had a systolic blood pressure of 130 mm Hg and a heart rate of 90 beats per minute. A respiratory rate of 16 via bag assisted respirations and a temperature of 36.5°C. Physical exam showed a single penetrating wound to the right temporal bone. The remainder of his physical exam was consistent with brain death. CT scan of his brain demonstrated a non-survivable head injury. Initial laboratories showed a hemoglobin, 11 g/dL; platelets 218 x 10^9/mm3; sodium 138 mEq/L; potassium 2.9 mEq/L; chloride 104 mEq/L; bicarbonate 22 mEq/L; blood urea nitrogen 12 mg/dL; and creatinine 0.96 mg/dL. ALT was normal at 20 IU/L and INR was 1.26. Acetaminophen level drawn at arrival was 134 mg/L with unknown time of ingestion. N-acetylcysteine (NAC) therapy was initiated. On the second day his acetaminophen level declined to <10 mg/L but ALT increased. On the third day his acetaminophen level fell to <10 mg/L but ALT remained elevated. On day 2 organs were recovered and transplanted into six different recipients. The heart, lung, pancreas, liver and both kidneys were functioning well at 6 months.

150. Ultrasound Visualization of Ingested Tablets in Human Volunteers

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1University of Southern California, Los Angeles, CA, USA; 2University of California, San Diego, San Diego, CA, USA

Background: Currently, no reliable technique exists to visualize tablets in the stomach following acute ingestions. X-rays and CT scans do not show many types of medications. In addition, both modalities involve radiation exposure. Ultrasound (US) can be performed bedside and does not emit radiation. We performed a study to evaluate the ability of US to visualize ingested tablets in human volunteers. Methods: Two emergency physicians (EM) with US experience were blinded to subjects. Fasted volunteer subjects over 18 y/o were randomized to either 1) ingest three tablets (250 mg ofibuprofen) or 2) 500 mL water only. Both physicians scanned the abdomen to visualize tablets in the stomach. Results: Fifteen subjects, 12 male and 3 female, participated with mean age 35.5 y/o (21–53) and mean weight 75.6 kg (54.6–97.7). Nine randomized to ingest tablets and six to water only. Of the tablets ingested, 100% were visualized on the first US. Of the water control group, only 33% were visualized. Ultrasound was able to visualize tablets in the stomach following acute ingestions. The patient’s transaminases failed to change over the first 24 h. Surrogate markers such as acetaminophen half-lives were utilized to assess the risk of the donor organs while balancing optimal time of organ procurement without jeopardizing the other organs. Further prognostic testing needs investigation.

152. Toxic Deaths by DNR?

Bryant SM,1 Aks SE.2
1Illinois Poison Center, Chicago, IL, USA; 2Toxikon Consortium, Cook County Hospital (Siroger), Chicago, IL, USA

Background: DNR (Do Not Resuscitate) orders become complicated in the overdose setting. This series reports controversial DNR statuses in the context of poisons. Case series: 1) A 66-year-old DNR male presented with an acetaminophen (APAP) overdose (OD) (219 mcg/mL). IV NAC was administered however he expired of respiratory arrest (without intubation). 2) An 89-year-old female presented >24 h after an APAP OD (88 mcg/mL). She became hepatotoxic with an INR of 3.6 but had a normal renal index. Preorsors such as non-alcoholic steatohepatitis (NASH) were present but she wasn’t intubated in light of a family decision to make her DNR on day 2. She expired that night. 3) A 60-year-old female ingested 40 naproxen & unknown tablets. She was intubated and became hypotensive & hypoxic, but in light of an existing DNR status she was not intubated. 4) A 75-year-old male with an initial pH of 6.9 & EG level of 69 mg/dL. His BG began to lower between 50 and 80 mg/dL and the family made new DNR orders in poisoned patients presents ethical dilemmas. A DNR wish in such patients has proven to be controversial. Conclusion: We report six cases of DNR orders related to poisoned patients which highlights the challenge & debate concerning an important topic.
153. Which N-acetylcysteine Protocol is Associated with Better Outcomes?
Sivigliotti MLA, Langmann C, Yarema MC, Juarink DN, Johnson D, Lycker DA, Thompson M, Green TJ, Dart RC, Rumack BH. Queen’s University, Kingston, ON, Canada
Background: The three N-acetylcysteine (NAC) protocols in widest use differ with regards to route (iv vs. po), dosing intensity (300 vs. 490 mg/kg during the first 24 h) and pattern (continuous vs. q4 h dosing). It remains unclear whether any of these differences affect efficacy. Methods: Using a large, structured medical records review of patients hospitalized for APAP poisoning in 34 Canadian hospitals from 1980 to 2005, we studied the association between initial NAC protocol administered and peak INR, classified as ≤1.7, 1.8–4 and >4. Results: Of 11,987 hospitalizations, 4,075 were treated with NAC and had sufficient laboratory data to model outcomes (peak INR >1 in 177, and 2–4 in 247 cases). There was a mild imbalance between groups in favour of the higher PO group, which had slightly younger patients and lower APAP AT risk scores. After adjustment, the more dose intensive but intermittent protocols were associated with developing more severe coagulopathy, with the following cumulative odds ratios [95% CI]: 72 h Po 2.7 [1.4, 5.1], 48 h IV 2.9 [1.5, 5.6] when compared with the 20 h IV group. The model fit was satisfactory (AUC 0.86), and the findings were similar using generalized logistic regression without assuming proportional odds. Conclusions: Initiating the 20 h IV protocol was associated with lower peak INR among all overdose types. While we cannot preclude confounding by severity, it appears unlikely that higher risk patients were systematically started on the higher dose protocols. Continuous rather than intermittent NAC dosing may also account for the difference. These findings provide some reassurance to clinicians who continue to use the continuous rather than intermittent N-AC dosing. They also account for the difference. These findings provide some reassurance to clinicians who continue to use the continuous rather than intermittent N-AC dosing protocol, even for late presenting and chronic overdoses. Some reassurance to clinicians who continue to use the continuous rather than intermittent N-AC dosing protocol, even for late presenting and chronic overdoses.

154. Acetaminophen-Cysteine (APAP-CYS) Protein Adducts Can Be Detected After Repeated Supratherapeutic Ingestion Of Acetamino- phen (APAP) Even In The Absence of APAP-Induced Hepatotoxicity
Kreishah A,1 Cantrell FL,2 Vo H,1 Vazquez A,1 Purification,1 Tran D,1 Clark R,1 Tomaszewski C.1 University of California San Diego, San Diego, CA, USA; 2 California Poison Control System, San Diego, CA, USA. Background: The safety of flavumazine for use in poisoned patients has been controversial. Concerns about precipitating seizures have limited its use. Objective: To determine the incidence of adverse events (AE), specifically seizures, in a poison center population administered flavumazine. Methods: The California Poison Control System database was retrospectively searched from 2000 to 2009 for all cases involving flavumazine use. Data collected included: patient age and sex, adverse reactions (defined as tremor, agitation, seizure or death), substances ingested, and mental status (unresponsive, drowsy, or alert) before and after flavumazine. Two toxicologists determined if the ingested substances were pro-convulsant. Results: One thousand and ninety-two patients were analyzed. One hundred and twenty-three were excluded due to missing data. Data for 1,037 patients were analyzed. Mean patient age was 39 years (range 3 months – 92 years). Fifty-six patients (5.4%) had an adverse event including: tremors (n = 40, 0.4%), agitation (n = 38, 3.7%), and seizures (n = 14, 1.4%). One patient died after ingestion of pro-convulsant APAP and dexamethasone, and subsequent development of intractable seizures. Three seizures occurred in patients who had ingested benzodiazepines without concomitant ingestion of pro-convulsants (1 patient < 6 years of age, 2 patients > 18 years of age). Three hundred and eighteen patients ingested a pro-convulsant drug. Three hundred and ten of these did not have a seizure while eight did. Development of seizures was significantly increased with the ingestion of pro-convulsant drugs (OR 3.01, 95% CI 1.03–8.74). Four hundred and twenty-four (41%) of the patients who received flavumazine had an improvement in their mental status (improved from unresponsive or drowsy to alert). Of the 1,037 patients, 71 of these were ≤6 years of age and 1 of these had a seizure. Sixty-two patients who ingested a pro-convulsant drug developed agitated and none developed seizures. Conclusion: Flumazenil administration among a poison center population resulted in improved mental status in >40% of patients while resulting in few, although concerning, adverse effects. Use of flumazenil in patients who had ingested a pro-convulsant drug was associated with a three-fold increased incidence of sei- zure. The use of flumazenil administration in this population is cautioned.

155. Revisiting Flumazenil Use Among Poisoned Patients
Kreishah A,1 Cantrell FL,2 Vo H,1 Vazquez A,1 Purification,1 Tran D,1 Clark R,1 Tomaszewski C.1 University of California San Diego, San Diego, CA, USA; 2 California Poison Control System, San Diego, CA, USA. Background: Flumazenil is the drug of choice for sedation in patients discharged following sedative drug overdose. Objectives: To determine the incidence of adverse events specifically seizures, in a poison center population administered flumazenil. Methods: A poison center database was retrospectively searched from 2000 to 2009 for all cases involving flumazenil use. Data collected included: patient age and sex, adverse reactions (defined as tremor, agitation, seizure or death), substances ingested, and mental status (unresponsive, drowsy, or alert) before and after flumazenil. Two toxicologists determined if the ingested substances were pro-convulsant. Results: One thousand and ninety-two patients were analyzed. One hundred and twenty-three were excluded due to missing data. Data for 1,037 patients were analyzed. Mean patient age was 39 years (range 3 months – 92 years). Fifty-six patients (5.4%) had an adverse event including: tremors (n = 40, 0.4%), agitation (n = 38, 3.7%), and seizures (n = 14, 1.4%). One patient died after ingestion of pro-convulsant APAP and dexamethasone, and subsequent development of intractable seizures. Three seizures occurred in patients who had ingested benzodiazepines without concomitant ingestion of pro-convulsants (1 patient < 6 years of age, 2 patients > 18 years of age). Three hundred and eighteen patients ingested a pro-convulsant drug. Three hundred and ten of these did not have a seizure while eight did. Development of seizures was significantly increased with the ingestion of pro-convulsant drugs (OR 3.01, 95% CI 1.03–8.74). Four hundred and twenty-four (41%) of the patients who received flavumazine had an improvement in their mental status (improved from unresponsive or drowsy to alert). Of the 1,037 patients, 71 of these were ≤6 years of age and 1 of these had a seizure. Sixty-two patients who ingested a pro-convulsant drug developed agitated and none developed seizures. Conclusion: Flumazenil administration among a poison center population resulted in improved mental status in >40% of patients while resulting in few, although concerning, adverse effects. Use of flumazenil in patients who had ingested a pro-convulsant drug was associated with a three-fold increased incidence of seizures. The use of flumazenil administration in this population is cautioned.

156. Complete Recovery of Cognitive Functions in Patients Discharged Following Sedative Drug Overdose
Dassanyake T1; Michie PT2; Jones A2; Carter G,1 Whitey I,1 Mallard T1.1 The University of Newcastle, Callaghan, NSW, Australia; 2University of Western Sydney, Penrith South DC, NSW, Australia; 3Calvary Mater Newcastle, Hunter New England Health, Waratah, NSW, Australia Background: Overdose with sedative drugs accounts for the majority of deliberate self poisonings. In Australia, the majority of these patients are discharged from hospitals within the first 24 hours following overdose. There is no evidence on the cognitive status of these patients even though sedation is a usual complication to their daily functioning. The objective of this study was to examine whether sedative drug overdose is associated with cognitive impairment which is still evident at the time of discharge. Methods: Seventy-four patients with sedative drug overdoses (benzodiazepines, opioids or antipsychotics) and 43 with non-sedative overdoses (SSRIs, SNRIs or paracetamol) were assessed on discharge from hospital on a variety of cognitive models adjusting for potential confounders. The Sedative Group had poor executive functions and was more impulsive in decision-making. Drug group significantly interacted with age in predicting measures of psychomotor speed and working memory. As both sedative and non-sedative drugs may affect these functions in older adults but not in the young. The presence of a cognitively impairing psychiatric illness and younger age also emerged as significant predictors of executive impairment and impulsivity, respectively. Conclusions: Patients with sedative drug overdose are likely to be impaired in multiple cognitive domains important for daily functioning, even after being declared clinically recovered. These effects are very likely to wear off eventually; however, it remains to be investigated whether the residual cognitive impairment adversely affects their daily functions (e.g. driving) in the immediate post-discharge period.

Table for Abstract 154

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<th>Subject</th>
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LOQ, Limit of quantification.

Background: Concerns have arisen regarding the safety of OTC cough/cold medication use in children. An ongoing multi-system surveillance model was developed to monitor adverse events (AE) associated with cough/cold drugs. Methods: Cases were identified from five sources: NPDS, FDA/AERS, English medical
literature, news/media reports and manufacturer internal safety reports. Case inclusion criteria: age <12 years, exposure to 21 cough/ingredient, 21 AE which occurred: Cough; The Motivational Safety Surveillance Team met quarterly to determine causal relationship of each AE to each reported ingredient, to estimate dose and therapeutic intent, and to identify contributing factors. Analysis started in 3Q08 when all detection systems were active. Results: The Team reviewed 879 cases with event dates of 3Q08-4Q09. A total of 711 (81%) cases were determined to be related to >4 cough/ingredient: 707 non-fatal and 4 fatal (2 deaths in 3Q08, 1 in 4Q08 and 1 in 1Q09). 48% of children were age 2 to <4 years. While the majority of related cases were accidental or unattended ingestions (66%), 146 (21%) of related cases involved therapeutic intent (drug administered to treat an illness). Of the therapeutic intent cases, 51% were estimated at supratherapeutic dose, 41% therapeutic dose and 8% unknown dose. Most adverse events were not serious and none resulted in death.

Most common reported root causes for therapeutic intent exposure were wrong dose administered, exposure to combination products and exposure to multiple cough/cold products. Conclusions: Surveillance of AEs associated with cough/ingredient exposure in children may require different strategies due to the high percentage of cases involving therapeutic intent. This suggests that interventions targeting prevention of unintentional overdose may be effective in reducing preventable dosing errors involving OTC cough/cold products.

158. Integrating Poison Center Operations to Facilitate a Statewide H1N1 Flu Hotline
Florida Poison Information Network Center, FL, USA

Background: The FL Department of Health, Office of Emergency Operations (FDOH-EO) requested FPICN’s assistance in providing H1N1 vaccine information to healthcare professionals through a dedicated state-wide hotline. Subsequently, FDOH-EO tasked FPICN with managing all public and health professional calls reporting vaccine adverse effects (ADE). Methods: FDOH-EO outsourced the hotline to a community-based call center to handle calls from lay public. Health professional callers seeking vaccine information selected a hotline option that routed the call to FPICN and directed the questions to an ancillary nurse who approved service to answer these queries from health professionals. Questions not found in the script were triaged to PCC administrative staff. FPICN’s Call Tracking System was updated with new fields, codes and reports to track and analyze questions from the hotline. Once the H1N1 vaccine was released, FPICN began triaging and managing all ADEs arising from vaccine administration through a new public hotline option. These public and health professional calls were directed to, and managed by regular SPI staff. FPICN then provided data access and information for state and county health department (CHD) VAERS reporting efforts. FDOH-EO was able to log into FPICN’s web-based reporting/VAERS module, run reports and forward ADE’s by county to the CHDs daily. CHDs had access to ADE reports and full access to FPICN case records, allowing follow-up and appropriate VAERS reporting. FPICN generated GIS maps (total call and ADE) for weekly reports to the State. Results: FPICN handled 1,729 questions from health professionals and managed/reported 425 vaccine ADEs in a 6 month period. Discussion: The integration of the FDOH-EO and FPICN operations allowed a smooth transition in patient management from the State’s H1N1 flu hotline. There was no apparent impact on the FPICN’s ability to handle normal poison calls. Conclusion: Poison centers have abilities that include public health operations to provide effective and efficient utilization of statewide resources during a statewide public health event.

159. Building Advocacy Support Through Technology
Dance V, Moran G
Illinois Poison Center, Chicago, IL, USA

Background: The Poison Center needed to engage and maintain support and build advocacy with the general public and healthcare professionals that use the services of the poison center to sustain its funding stream when the state legislators/governor made significant cuts in the state funding. Methods: The Poison Center used a strategic integration of traditional communication tools with emerging technology which included blogging, Facebook, econtacting, and most significantly, an online tool that generated messages to key stakeholders (federal and state elected officials). All other communication methods helped mobilize our advocacy efforts and directed supporters to take action using the online tool (CapWiz). Constituents simply needed to enter their email contact information, voting district, and home address for verification, to initiate a call to action letter. Each letter was e-mailed to both the elected state legislator and the governor requesting rein-statement of funding for our Poison Center. The letter identified the value of the Poison Center to tax payers making note of the history, quality of service, and the outcomes of deaths and savings that the Poison Center achieved. The effort was originally executed to stop further reductions on the FY2010 budget and has been continued to sustain funding for the FY2011 budget. Results: In 1 quarter over 2,500 people joined our Facebook page; more than 1,000 weekly readers see our information blog; and most significantly, over 2,500 total letters to date have been electronically sent to the desks of state legislators urging them to maintain the funding for the Poison Center. This exceeds by 200% the number of handwritten/mailed letters mailed by our support groups. The use of multiple communication tools built an army of energetic advocates who generated a 50% increase in the number of online responses sent in any previous year. Conclusion: The use of technology to educate and bring the force of an advocate to bear upon the lawmakers that control the funding of the Poison Center, not only resulted in positive results will occur. Based on previous and con- tinued use of these tools along with our approach to rally our advocates in an on-going manner, our Poison Center has been able to sustain its funding for the current year, and is garnering active support for the next fiscal year budget vote.

160. My Baby Drank Bleach LOL?: NF(WCUTM)?
Ryan ML,1 Arnold TC,2 Ryan CC,1
1Louisiana Poison Center, Shreveport, LA, USA; 2LSU Health Sciences Center, Shreveport, LA, USA

Background: The telephone has been the mainstay method of contact for poison centers. Advances in technology now provide us with a myriad of methods to access information and stay in “real-time” contact. Text messaging is one method that has exploded in popularity. As poison centers seek new avenues to communicate we wanted to determine if text messaging was a viable way to interact with people request- ing assistance. Methods: We compared the time required to manage an initial call using two separate call scenarios by telephone and then by text messag- ing utilizing smart phones over a 3G network. The first scenario involved a parent calling in reference to a child who had ingested a silicone gel pack. Three sep- arate calls to three different specialists in poison infor- mation in our center were made on three different days. The same scenario was repeated in the same manner using smart telephones and text messaging. A second, slightly more complicated case was also used for comparison. In the second scenario a parent was calling to inquire about a child who was found with an open bottle of a combination cough/cold/medication. The same methods were used to compare aver- age management time of the initial call by telephone and by text messaging. Results: In the first scenario involving a silicone gel pack the average time to manage the case by telephone was 3 min and 48 s. The average time to manage the case by text messaging was 11 min and 16 s. For the second scenario involving the cold medication the average management time by telephone was 5 min and 59 s. The average time to manage the second scenario by text messaging was 33 min and 2 s. Conclusions: While the majority of natural disasters and other situations when telephone communications, both landline and cellular, are not func- tional but text messaging is still possible. Poison centers can easily provide assistance to individuals by text message during those times. Utilizing text messaging on a daily basis will require an increase in manpower to accommodate the tremendous increase in time required to manage calls by this method.

Schaper A,1 Diesel H,1 Wyley S,2 Duarte-Davidson R,2 Bronstein AC,2
1Poisons Centre, Gottingen, Germany; 2Health Protection Agency, Oxford, UK; 3Rocky Moun- tain Poison & Drug Center, Denver, Health, Denver, CO, USA

Background: Epidemic health events may be due to inadvertent illnesses or part of larger incident involving accidental or deliberate chemical release. Poison centers (PCs) receive information first hand involving both human and animal exposure data on suspected and confirmed events. To date, no centralized system was available to communicate information on chemical health threats throughout the European Union (EU). In Europe, the European Commission (EC) has partially funded a consortium of six EU PCs (in six countries) to develop an Alerting System for the detec- tion of chemical health Threats (ASHIT). The project developed from the Rapid Alert System for CHEMical health threats (RAS-CHEM). Methods: RAS-CHEM, a web-based system, has evolved over the last 30 months. RAS-CHEM is able to collect and analyze 19 data and free text fields, enabling EU PCs and other users to exchange and disseminate information on chemical substance, clinical effects (CEs) and event alert level. Results: RAS-CHEM was evaluated by enter- ing 37 historical and simulated events from 14 coun-tries: scenarios (n = 3); and recording mass intoxica- tions (n = 8) that included the Bhopal release, the Halabjia Kurdistan attacks in Iraq and the Tokyo subway sarin attacks. The chemical classes included: gaseous (n = 2 mass intox.); liquid (n = 9), solid (n = 4), radioactive material (n = 9) and unknown (n = 5). Symptoms associated with these events included: respiratory (n = 13), neurological (n = 6), gastrointestinal (n = 4), local effects (n = 3) and miscellaneous (n = 11). The alert level was “for infor- mation” (n = 21), “urgent” (n = 6) and “very urgent” (n = 10). Conclusion: Testing demonstrated that PC case data can be entered into RAS-CHEM and shared with a variety of users across the EU to aid the detec- tion, management and response to potential chemical public health threats. CE's can be readily categorized and events ranked by public health threat. RAS-CHEM has been specifically designed to be integrated into other EU Rapid Alert Systems [i.e. rapid alert system for dangerous consumer products (RAPEX)] and other international systems. The further development of RAS-CHEM has demonstrated the importance of PCs, and that they can play a key role as sentinels for the detection of chemical health threats.

162. Reduction over Time in RADARS(R) System Poison Center Opioid Abuse/Misuse Rates Associated with Prescription Monitoring Pro- grams
Reifler L,1 Droz D,2 Bucher-Bartelson B,1 Bailey JE,3 Schnoll S,1 Dart RC,1
1RADARS(R) System Poison Center Group,1 Rocky Mountain Poison & Drug Center, Denver Health, Denver, CO, USA; 2Ohio Hospital Association, Columbus, OH, USA; 3Pinney Associates, Bethesda, MD, USA

Background: Most states have implemented Prescrip- tion Monitoring Programs (PMPs) in an attempt to curb
164. Coming Soon to a Poison Center Near You!

Lopez G1, Wright N2, Geller RJ1, Oloni AG3

1Georgia Poison Center, Grady Health System, Atlanta, GA, USA; 2Emory University, Atlanta, GA, USA

Background: Picking up a telephone to call for poison advise is the way business has been conducted for over 50 years. The traditional call center model has worked well for our past three generation of care-takers; however, times are changing. Ask any parent of a “tweener,” and they’ll tell you (pardon me . . . IM you, text you, Tweet you, or Facebook you) that no one calls anymore just to say hello! How are we as a network of pc’s addressing these communication opportunities? Our PC decided to take this challenge head on by introducing “Live Chat” to our website and allow patients to securely and safely get help with questions. As part of our on-going QA activities, daily Customer Satisfaction surveys are administered to gain invaluable insight to the services we provide. Monthly, roughly 200 such surveys are completed on topics ranging from how we performed on the call to how we can improve delivery of our service. From the period March 1–April 1, we added two questions to the survey to find out the following: a) If you needed to contact us again, and the technology was available, which would your preferred method of contacting us be and b) How likely would you be to use that method? Results: During the 1 month survey period, 313 patients agreed to participate in the survey, 197 (63%) were completed. When asked which method care-takers preferred using to contact us again, 146 (74%) chose to recall our pc by phoning in their problems. Surprisingly, over 25% of respondents chose an emerging technology (texting, email, live chat, video chat) and were either VERY LIKELY/LIKELY, 44 (80%) to use that method in the event a new call were to be placed to the center. Conclusion: In addition to the traditional “call-in” model which our poison center has relied upon for the past 40 years, we’ve added the nation’s first “Live Chat” option for both health screenings and delivery of our service to the lay public. We believe that this option complements our current way of how people get a hold of us and keeps us up within striking distance of emerging technologies andtranslate our current services as well as the technology behind it, call types and patient satisfaction will be shared.

165. Tennessee Poison Center Response to TVA Fly Ash Spill

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Background: On December 22, 2008 one of the retaining walls on the fly ash ponds at the Kingston TVA fossil fuel power plant gave way releasing approximately 5 million cubic yards of fly ash into nearby neighborhoods and waterways. An estimated 200 people were living in the area and may have been exposed to the fly ash. The Tennessee Department of Health did a health assessment which demonstrated little to no risk. However, local residents still had many questions and concerns that the health assessment did not answer. A medical toxicology evaluation process was needed for this disaster. Methods: TVA contracted with Oak Ridge presented Universities (ORAU) to develop a medical toxicology evaluation process for the affected residents. ORAU then contracted with the poison center to develop the actual process. Three medical toxicologists through a literature review and consensus process developed an evaluation process to address the need for history, physical exam, and laboratory evaluation that addressed the potential high risk exposures at the spill site. Results: A history and physical form was developed; the history form was published online so patients could download and complete the form prior to evaluation. The physical exam was designed to detect potential dermal toxicologist. A chest radiograph and pulmonary function tests were included. Basic laboratory evaluation included complete blood count, basic metabolic profile, and urinalysis. Screening for components of the fly ash was performed by obtaining urine tests for arsenic, barium, beryllium, thallium, and vanadium and serum/blood tests for aluminum, arsenic, chromium, cobalt, copper, nickel, and selenium. Conclusions: Successful partnering with statewide institutions allowed the poison center to develop health screening tools for victims of a regional disaster. These tools will help provide for individualized medical evaluation of victims and allow for group data analysis as a public health assessment.

Table for Abstract 164

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source. The lab results from the blue bottle have not been reported. Conclusion: The PC’s relationship with our state public health department and a state AG veteran in law enforcement appropriately addressed this concern, quickly addressing this concern, averting a potential public-health scare and providing answers to a farmer in need.

167. Correlation Between Availability of Ethylene Glycol/Methanol Levels and Increased Utilization of Medical Services
Scharman EJ, Durback-Morris LF.
West Virginia University, Charleston, WV, USA
Background: A previously published abstract found that 39 and 25% of teaching hospitals polled in the U.S. could measure MEOH and EG levels respectively. In WV, only two hospitals can measure one or both. The purpose of this study was to determine the number of EG and MEOH exposed patients who incurred an increase in utilization of medical services because levels could not be obtained in timely manner. Methods: All cases of EG and/or MEOH ingestion reported to the WVPC that were managed in a hospital between January 1, 2003 and December 31, 2009 were reviewed simultaneously by two investigators to ensure 100% agreement. Results:Victims of ingestion included 10 substance-related and 7 non-toxic ingestion. The data were reviewed; 117 met inclusion criteria. Thirty-nine percent of patients (n = 46) were reviewed. Thirteen patients not meeting the definition for increased utilization of services were discharged from the ED without levels despite a history of a toxic ingestion. Conclusions: Increased utilization of medical services occurs when hospitals cannot measure EG/MEOH levels; this occurred in 1/3 of cases. WVPC that were managed in a hospital between January 1, 2003 and December 31, 2009 were reviewed; 117 met inclusion criteria. Thirty-nine percent of patients (n = 46) were reviewed. Thirteen patients not meeting the definition for increased utilization of services were discharged from the ED without levels despite a history of a toxic ingestion. Conclusions: Increased utilization of medical services occurs when hospitals cannot measure EG/MEOH levels; this occurred in 1/3 of cases. Method: We compared the definition for increased utilization of services when hospitals cannot measure EG/MEOH levels; this occurred in 1/3 of cases.

168. A Tale of Two Gas Leaks: A Teleworking Poison Center Maintains Operation During a Crisis
Hon SL.1 Lopez GP,1 Geller RJ.2
Georgia Poison Center, Atlanta, GA, USA; 2Department of Pediatrics, Emory University, Atlanta, GA, USA
Background: Teleworking employees have the ability to work from a remote location without having to travel into a central location. For our regional poison center (PC), teleworking qualified, certified specialists in poison and emergency medicine supported work arrangements to meet various staffing needs. Our teleworking abilities were put to the test during two recent PC evolutions. Report: One morning, the PC received word from the building’s security director that an evacuation would take place due to an underground gas leak within the building. The PC complied with the evacuation by releasing all non-essential employees to home, sending all SPIs with teleworking privileges to home, and directing all non-teleworking SPIs to the hospital’s cafeteria to stand by until the building reopened. Administration set up a command center within the cafeteria, using our laptops, access to the hospital’s secure WiFi, and communicating with other SPIs via email and instant messaging. We allotted 1.5 h for our teleworking SPIs to travel home, while all calls into our PC were diverted by area code and diverted to 3 surrounding, cooperating PCs. Quick scheduling changes were made, requesting later teleworking SPIs to start early and an extra teleworker to increase coverage. Once the evacuation was declared in progress and transferred back to our PC, where teleworkers were able to answer all incoming poison emergencies remotely for 6 h until we were allowed back into the building. Two months later, a second gas leak occurred in the same building. Similar actions were taken. The time in which calls were transferred to surrounding PCs decreased by 30 min, mainly due to better emergency planning learned from the first evacuation. Conclusions: The preparedness level minimized stress on our neighboring PCs and maintained response to incoming calls. These events proved the ability to have 6 teleworkers at a time of peak call volume.

169. A PCC Phone System: Who Is Abandoning Who?
Kalin L, Noble T.
Iowa Statewide Poison Control Center, Sioux City, IA, USA
Background: It is optimal for a PCC to look at abandoned calls and determine whether we abandon before the caller does, and how likely is it that the caller object to a recorded greeting (vendor noted a 2–5% caller abandonment rate, which is less than the average abandonment rate in the Midwest). In 2005, an initial recorded greeting message was implemented to improve efficiency through skill-based routing. This added functionality unexpectedly coincided with an increase in our call AR. The objective of this study was to reduce call AR to <5% of offered calls. Methods: An extensive retrospective evaluation of our telephone system and analyzing reports, staffing patterns, and call metrics (wait time, average speed of answer), was conducted over a twelve-month period. Call data reports showed the majority of people hung up within 10–12 s which, according to the vendor, indicated either the greeting was too long or the caller objected to a recorded greeting (vendor noted a 2–5% caller abandonment rate, which is less than the average abandonment rate in the Midwest). In 2005, an initial recorded greeting message was implemented to improve efficiency through skill-based routing. This added functionality unexpectedly coincided with an increase in our call AR. The objective of this study was to reduce call AR to <5% of offered calls. Results: To our surprise, caller abandonment increased instead of decreased. Calls answered by SPIS who were available when caller hang up in the middle of a call were compared with the same calls answered by SPIS who were not available when caller hang up in the middle of a call. The most dramatic increase in the AR policy occurred post-crisis. Conclusions: Providing the ability to telework qualified, certified SPIS minimized the impact on a PC’s ability to answer incoming calls during a crisis.

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1New Jersey Poison Information and Education System, New Jersey Medical School, University of Medicine and Dentistry of New Jersey, Newark, NJ, USA; 2New York City Poison Center, New York, NY, USA
Background. Body packers, or mules, are individuals who ingest large quantities of illegal drugs to transport them. Many seek medical care for abdominal pain, in ability to pass packets, side effects from drugs, etc. Recently, questions arose regarding a hospital’s/physician’s legal responsibility for reporting such individuals. Further, if drug is removed during surgery or naturally expelled, is the physician/hospital legally required to inform police, etc.? Importantly, as well is the method to dispose of such contraband. Methods: A survey was sent to the Attorney General and Directors of the Poison Control Centers in each of the 50 states and the US. Questions focused on the legal responsibility of hospitals/physicians as pertains to the reporting of body packers. Results: Surveys (full or partial responses) were returned from 28/51 (54.9%) Attorney Generals and 35/68 (51.4%) Board of Medical Examiners. Of Attorney Generals, 6 noted physicians/hospital s are legally obligated to report body packers and 13 noted there was no obligation to report. When not an obligation to report, 3 indicated it would be a HIPAA violation to report and 7 indicated it would be not. When notification of authorities was not required 10 noted that there is no guidance on how the drugs should be disposed of and no one indicated there was guidance. Of the Board of Medical Examiners, no one noted that the physician/hospital was legally obligated to report body packers and 8 indicated there was no obligation to report. When not an obligation to report, 2 indicated it would be a violation of HIPAA to report it and 1 indicated it would not be. HIPAA was not required 8 indicated that there is no guidance on how the drugs should be disposed of and no one indicated there was guidance. Discussion: It is optimal for a PCC to look at abandoned calls and determine whether we abandon before the caller does, and how likely is it that the caller object to a recorded greeting (vendor noted a 2–5% caller abandonment rate, which is less than the average abandonment rate in the Midwest). In 2005, an initial recorded greeting message was implemented to improve efficiency through skill-based routing. This added functionality unexpectedly coincided with an increase in our call AR. The objective of this study was to reduce call AR to <5% of offered calls. Results: To our surprise, caller abandonment increased instead of decreased. Calls answered by SPIS who were available when caller hang up in the middle of a call were compared with the same calls answered by SPIS who were not available when caller hang up in the middle of a call. The most dramatic increase in the AR policy occurred post-crisis. Conclusions: Providing the ability to telework qualified, certified SPIS minimized the impact on a PC’s ability to answer incoming calls during a crisis.
172. Trends in Healthcare Utilization of PCC Services
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Background: Technological changes over the last ten years have greatly increased the availability and accessibility of information to healthcare professionals (HCPs). However, it is extremely important to know which substances are most likely to result in poor outcomes. The aim of our study is to examine, retrospectively, changes in healthcare professional utilization of our PCC services. Our null hypothesis: Utilization of PCC services by HCPs has not changed over the last ten years.

Methods: Toxicall2 (Version 4.6.58) data from our archived cases was analyzed from the years 2000 to 2009. Defined data searches for each month of each year included the following parameters: Call type – Exposure, Species, Human, Relationship to Patient – (MD, OHP, RN, RP), and Medical Outcome – (Moderate, Major, and Death). Defined data searches were also performed for each year and a month to determine the change in HCP exposure calls involving children less than 5 years of age. ANOVA and Post Hoc testing were utilized to analyze the data adjusted for the overall rate of HCP exposure calls involving children less than 5 years of age. The ANOVA analysis showed a highly significant increase over time; Post Hoc testing showed that the numbers of HCP calls in 2009 was significantly greater than all previous years with the exception of 2008. Results showed significant increases in HCP calls, as well as increases in non-adjusted exposures resulting in more severe medical outcomes; however, calls from HCPs were not found to be of any worse outcome. Changes in HCP calls involving children less than 5 years of age were not found to be significant. Conclusions: Although the availability of alternative sources of information, our PCC continues to be consulted on the increasing number of intentional poisonings presenting for care.

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Background: The vast majority of exposures reported to U.S. poison centers result in no or only minor effects. However, it is extremely important to know which substances are most likely to result in poor outcomes. The purpose of the study is: 1) To identify the top hazardous substances reported to poison centers in the U.S., and 2) To explore trends of reported hazardous substances.

Methods: Retrospective analysis of the American Association of Poison Control Centers’ (AAPCC) National Poison Data System (NPDS) published Annual Reports between 2006 and 2008 was performed. Data from each generic substance category listed in Table 22 of the NPDS Reports was analyzed. Hazard factor was used to assess substance hazard severity. Hazard factors were calculated using the following formula: Hazard factor = [(M + Dy)/N]*NF, where M is the count of major effects, D is the count of deaths, and N is the count of single exposures in each generic category listed in Table 22. Data were then normalized (NF) from the overall rate of events and deaths during the 3 year study period. Some generic substance category names in Table 22 changed over time. Generic substance categories that were different over time were reviewed individually for best match. After manual review, those generic substance categories that were not present throughout the study period were removed from the analysis. There were seven drugs and three non-drugs in the top 10 most hazardous substances. The seven drug categories were: neuromuscular blocking agents, ionizamid, GHB and analog/precursor, heroin, methadone, nitrorussipide, and other antidepres-

174. Poison Center Reporting of H1N1 Vaccine Exposure: Analysis of Department of Health
Forrester MB,1 Aragon T,1 Samples-Ruiz M,2 Borys DJ.2
1Texas Department of State Health Services, Austin, TX, USA; 2Central Texas Poison Center, Temple, TX, USA

Background: Prior to its distribution, there was concern about the safety of the H1N1 vaccine. In an attempt to identify any adverse reactions after H1N1 vaccination, as possible, the Texas Department of State Health Services (DSHS) sought to identify H1N1 vaccine exposures reported to the Texas Poison Center Network (TPCN) and create a protocol to assign the PoisIndex code 5304095 (symptomatic illness). The TPCN staff met and created a protocol where poison center staff would assign the American Association of Poison Control Centers recommended PoisIndex codes 6540789 or 6540797 to all H1N1 vaccine calls. An automated anomaly alert was created in the National Poison Data System that would report all TPCN human exposures with PoisIndex code 6540789 or 6540797 to TPCN staff. The TPCN staff would review the alerts and report all influenza vaccine exposures to the DSHS Immunization Branch. In addition, a DSHS epidemiologist would periodically review the TPCN database for all records with mention of H1N1, flu vaccine, or influenza vaccine and report all influenza vaccine exposures to the DSHS Immunization Branch. Results: During October 2009–January 2010, 24 H1N1 vaccine exposures were reported to the DSHS Immunization Branch. Twenty (83.3%) were identified through the automated alerts generated by the procedure while 8 (38.3%) were assigned the PoisIndex code 5304095 (symptomatic parenteral exposure) and 2 (8.3%) because they were coded as information calls. Seventeen (70.8%) were managed on site, 5 (20.8%) were already at/en route to a healthcare facility, 4 (16.7%) were referred to a healthcare facility, and 1 (4.2%) was the management site was unknown. The medical outcome was 3 (12.5%) no effect, 8 (33.3%) minor effect, 7 (29.2%) not followed but minimal effects possible, 2 (8.3%) unable to follow but potentially toxic, 2 (8.3%) exposure probably not responsible for effects, and 2 (8.3%) unknown. Conclusion: The TPCN was able to report H1N1 vaccine exposures to the DSHS. Most of the cases were managed on site without serious outcome. Conclusion: Poison centers may serve as a useful source for monitoring adverse reactions after vaccination for state health departments.

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1Tennessee Poison Center, Vanderbilt University, Nashville, TN, USA; 2PoisIndex Edinburgh, Edinburgh, UK

Introduction: Poisons Centers internationally have separately developed computer support systems to assist their poison information specialist. These systems are often used by frontline health professionals in clinical evaluation. As small systems in the context of a US Poisons Centre. Methods: A US Poison Center was provided with access to the UK data base TOXBASE (TP); SPIs were asked to use the system and compare it to other methodologies used (Poisindex, PI) when answering inquiries for a five period of time. Results showed that the American Association of Poison Control Centers (PI) was used to assess the ease of use, comprehensiveness, and alignment with the standard advice protocols used in the U.S. Results: In the period of study in question, no different exposure inquiries were compared. These represented a wide range of pharmaceutical and non-pharmaceutical exposure calls. Despite no formal training, SPIs found information on the two systems (PI, TP) to be 65.5% and 75.4% respectively (P > 0.05). Conclusion: SPIs rated the ease of use, comprehensiveness, and alignment with the standard advice protocols used in the U.S. SPIS preferred the American Association of Poison Control Centers (PI) to the British Toxbase system (TP).

176. Determining Triage Guidelines for Pediatric Exposures to Ondansetron
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1University of California–San Diego, San Diego, CA, USA; 2San Diego Division, California Poison Control, San Diego, CA, USA

Introduction: 5-HT3, receptor antagonists are widely regarded as first-line agents for the treatment and prevention of nausea and vomiting because of efficacy and favorable safety profile. Adverse events after over-the-counter use are typically mild and the standard-dose exists to guide the management of these cases, particularly in large overdoses – even though obtundation, seizures, and serotonin syndrome have been reported at doses greater than 5.6–6.4 mg/kg. A retrospective chart review of the California Poison Control System was performed indexing ondansetron exposures in children less than 6-years-old. Patient age, sex, weight, 5-HT3 antagonist dose, route, maximum exposure, milk, and intervention dose.

Discussion: There were 284 exposures reported to poison centers during the study period, 177 (62.3%) were noted to be co-ingestions. The standard-dose exists to guide the management of these cases, particularly in large overdoses – even though obtundation, seizures, and serotonin syndrome have been reported at doses greater than 5.6–6.4 mg/kg. A retrospective chart review of the California Poison Control System was performed indexing ondansetron exposures in children less than 6-years-old. Patient age, sex, weight, 5-HT3 antagonist dose, route, maximum exposure, milk, and intervention dose.

Conclusion: The results of this study suggest that inpatient treatment with ondansetron is safe and effective for children with mild to moderate gastrointestinal distress. The standard-dose exists to guide the management of these cases, particularly in large overdoses – even though obtundation, seizures, and serotonin syndrome have been reported at doses greater than 5.6–6.4 mg/kg. A retrospective chart review of the California Poison Control System was performed indexing ondansetron exposures in children less than 6-years-old. Patient age, sex, weight, 5-HT3 antagonist dose, route, maximum exposure, milk, and intervention dose.

Results: Of the 118 cases identified, we were able to estimate the doses in 71 cases, which ranged from 0.08 mg/kg to 4.84 mg/kg. Of the 71 cases, two children with co-ingestions were removed from the analysis. Of the remaining 69 cases, only 3 developed symptoms, which were vomiting, diarrhea, and drowsiness; none of whom required hospitalization. Conclusion: Ingestions of up to 3.5 mg/kg of ondansetron in children less than 6-years-old produced either mild or no symptoms in our study. Ingestions less than this amount may not require hospital evaluation.
and rimantadine) for influenza treatment or prophylaxis and use neuraminidase inhibitors (oseltamivir and zanamivir) instead. This investigation examined whether the patterns of neuraminidase inhibitor exposures reported to poison centers changed after the CDC treatment recommendation guidelines were released. Methods: A retrospective analysis of exposures to six regional poison centers during 2000–2008 was conducted. Cases were all reported adamantane and neuraminidase inhibitor exposures. The distribution of exposures was determined for each year and for the distribution during 2000–2005 was compared to that during 2007–2008. Results: adamantanes decreased from 84.6% of total exposures in 2000 to 17.3% in 2008 while neuraminidase inhibitor exposures increased from 15.4% in 2000 to 82.7% in 2008. Adamantanes accounted for 65.7% of the exposures during 2000–2005 but 17.5% of the exposures during 2007–2008 (rate ratio 0.27, 95% confidence interval 0.18–0.39). Discussion: Poison center data demonstrated a decrease in the proportion of antivirals prescribed for influenza represented by adamantanes after 2006. This would suggest that the CDC health alert was effective in disseminating treatment recommendations for influenza to physicians. Conclusion: Trends in antiviral medication exposures reported to poison centers is consistent with what has been released by the CDC for preferred treatment. This study provides evidence of the important role that poison centers may serve in evaluating the utility of public health recommendations in changing healthcare practices.

178. In-House Communication: Importance of Interpersonal Communication in Poison Centers

Crouch BI, Ellington L, Planalp S, Rothwell E, Teemant K. University of Utah, Salt Lake City, UT, USA

Background: Poison Control Center (PCC) personnel face many challenges in communicating with callers and the public, and each other. The purpose of this study was to identify interpersonal communication issues that affect the work environment within PCCs. Methods: As part of a larger questionnaire study distributed electronically to members of the AAPCC to assess communication training needs for PCCs, three questions were included to assess interpersonal communication within the work environment: 1) How important is interpersonal communication within your center to a positive work environment? (1–7, not at all to extremely important); 2) How disruptive do interpersonal conflicts in your work (1–7 = not at all to extremely disruptive) and 3) What communication issues do you find most disruptive to your work? (free text response). Descriptive and qualitative content analyses were used to identify themes in responses. Results: A total of 539 responses were received, from SPIs, directors, medical directors and other staff. Interpersonal communication within the PCC center was rated as extremely important to a positive work environment (mean = 6.37, SD = 1.02; 62.3% rated as “extremely important”). Interpersonal communication was rated as less than moderately disruptive on average with a great deal of variability (mean = 3.33, SD = 1.74). Free-text responses were received from 335 (62%) respondents. Categories were poor interpersonal communication (n = 104; 31%) background noise (n = 96; 29%); poor work procedures (n = 51; 15%); poor management communication (n = 38; 11%); gossip (n = 26; 8%); lack of communication (n = 17; 5%); rude to callers (n = 15; 5%); and non-cooperating professionals (n = 11; 3%). Conclusion: Several types of interpersonal communication issues were identified by PCC personnel as disruptive to their work. These issues are being addressed within PCCs. Increasing awareness to interpersonal communication issues that are potentially disruptive and developing strategies to improve the communicative environment may enhance job satisfaction and performance of PCC personnel.

179. Communication Patterns at a Poison Control Center During Surge vs. Non-Surge Periods

Latimer S, Ellington L, Poynton M, Reblin M, Bennett H, Crouch BI, Caravati EM. University of Utah, Salt Lake City, UT, USA

Background: One challenge Specialists in Poison Information (SPIs) face is to maintain effective communication during stressful circumstances – such as periods of high call volume. Surge conditions may evoke dropped calls, longer wait times, errors in triage, and evaluation or recommendations, which may relate to SPI communication. SPIs may become stressed by the pressure of high call volume which may influence call interactions and subsequently affect the health outcome for callers. The objective of this study was to examine how communication patterns change under surge conditions. Methods: A sample of human exposure calls from 1 July to 31 December of 2008 was selected. Call data was collected via a call logger and an electronic data base. Surge periods were defined a priori as busier than 99% of all other 30 min periods and non-surge periods as slower than 70% of all other 30 min periods resulting in a sample of 42 surge and 1,430 non-surge cases. Digitized phone recordings for these cases were downloaded and communication was coded using the Rotter Interaction Analysis System (interrater reliability r > 0.80). Results: Preliminary analyses confirmed case characteristics for the study sample did not significantly differ from the larger call population. Regression analyses revealed fewer statements made by both SPIs and callers during surge periods (p < 0.10). There were no significant differences in caller communication behaviors for calls occurring during surge vs. nonsurge periods. SPIs asked more closed-ended questions during surge (p < 0.01), but SPI emotional responsiveness, relationship statements, open-ended questions, clinical information and recommendations did not differ. Post-hoc power analyses revealed adequate power to detect differences. Conclusions: Our results indicate SPI tendency to be economical with speech during surge times. A positive aspect of our null results is that despite the potential pressure due to surge work, SPIs were able to maintain high levels of emotional responsiveness. This suggests that SPIs are able to maintain quality communication in time-pressured circumstances.

180. Efforts to Improve SPI Coding Accuracy

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Background: The quality and validity of data generated by poison centers has been questioned due to limitations in how the data is passively collected and not being able to quantify or verify its accuracy. Another limitation is that specialists of poison information (SPIs) are generally more concerned with managing an exposure and providing the appropriate recommendations and information to callers while placing less importance on the accuracy of their coding. In order to improve the accuracy of the SPI’s data entry, we instituted a new measure to our quality assurance program. Methods: Each month 100 closed exposure cases are randomly selected for review with an equal distribution as to the original “dotted fields section.” The exposure route, reason, clinical effects and therapies from the “notes section” are documented by the SPI reviewer. The reviewer’s findings are then compared to the original “dotted fields section.” Any inconsistencies are noted as an error omission. Results: During Year 1, there was inconsistent improvement amongst the SPI staff despite repeated efforts to improve awareness and education on NPDS coding guidelines in each staff meeting. In outbreak, first reported in 2008, several previous recommendations were made to reduce the risk of or manage infection such as frequent washing of hands with soap and water or hand sanitizers and use of anti-virals such as prophylaxis and infections. This investigation examined whether the H1N1 outbreak changed the pattern of exposures reported to poison centers. Methods: This retrospective study used a sample of human exposure cases collected by a state-wide poison center system. The monthly number of exposures during 2006–2009 was determined for the following exposures: total exposures, cough/cold medications, neuraminidase inhibitors, amantadine drugs, adamantane drugs, hand sanitizers and vaccines, and hand sanitizers. The monthly number of exposures in 2009 was then compared to that reported in 2006–2008. Results: Monthly total exposures reported in 2009 were similar to previous years. Monthly cough/cold medication exposures in 2009 were lower than in previous years for every month except August–October. Monthly amantadine exposures were similar to 2006–2008. Monthly neuraminidase inhibitors in 2009 were higher than previous years for April–December. Monthly influenza vaccine exposures were higher in 2009 in September–December. Although hand sanitizer exposures were higher in every month in 2009 than previous years, the difference was greater during April–December. Discussion: After the H1N1 outbreak was first reported, the number of neuraminidase inhibitor, influenza vaccine, and hand sanitizer exposures reported to poison centers increased. A similar trend was not observed for the number of exposure, cough/cold medications, and amantadine exposures. These exposures might be of limited use as surrogates for conducting infection surveillance because even those exposures that increased would likely only do so after an influenza outbreak and is already reported elsewhere. Conclusion: A public health emergency such as an influenza outbreak might affect the types of calls poison centers receive beyond the primary focus of the emergency.
182. Pattern of Novel Influenza A (H1N1) Virus Calls Received by Texas Poison Centers

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Background: On April 24, 2009, the media reported an outbreak of a novel Influenza A (H1N1) virus. Since then, H1N1 has sickened millions and resulted in thousands of deaths in the US. This investigation describes the pattern of H1N1 calls received by Texas poison centers during the initial weeks of the outbreak. Methods: All H1N1 calls added to the six Texas poison centers’ common database during April 24-May 31, 2009, were identified, and the distribution of cases by selected factors was determined. Results: A total of 183 H1N1 calls were identified. Of these calls, 168 (91.8%) were handled in English and 15 (8.2%) were handled in Spanish. Ninety-eight (53.6%) involved mention of individuals with symptoms that made the caller think they might have H1N1; 85 (46.4%) of the calls were information only calls. The poison centers began to receive H1N1 calls on April 24, with the number of calls increasing to a peak of 25 calls on April 30. The number of calls decreased over the next several days and once again reached a peak of 5-6 before resolving the decreasing trend. The region with the highest H1N1 call rate was West Texas followed by South Texas and the Rio Grande Valley, the regions with the highest rates of probable H1N1 cases. Discussion: The majority of H1N1 calls were handled in English, and most involved symptoms that made the caller suspect they might have H1N1. The poison centers began to receive calls on April 24 with the increasing outbreak was announced, with the number of calls increasing over the next few days before declining. The observed increase in the number of calls seen on May 5 coincided with the day state health department altered its H1N1 hotline automated message telling callers to contact Texas poison centers when the hotline was not available. The highest call rates from those regions coincided with the highest rates of H1N1 cases. Conclusion: It is not unusual for poison centers to receive calls during a disease outbreak such as influenza; thus, it is important that they anticipate these calls and plan accordingly by coordinating with public health agencies on appropriate messaging and disease management options. The majority of calls are likely to come from those areas most heavily affected by the outbreak.

183. Residential Use of Carbon Monoxide Detectors

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Background: Unintentional carbon monoxide (CO) poisoning results in thousands of calls to poison centers and hundreds of fatalities each year. Many of these exposures may be preventable through the correct use and placement of CO detectors (CO-Ds) in the home. The Consumer Product Safety Commission (CPSC) recommends that CO-Ds powered by battery or with battery back-up be installed near the bedrooms in each sleeping area of the home. The National Fire Protection Association (NFPA) recommends that CO-Ds be installed in a central location outside of each sleeping area and on every level of the home. Manufacturer’s manuals contain additional product specific recommendations on placement and maintenance. The purpose of this study was to assess the residential use of CO-Ds in two neighboring states that have not mandated their use. Methods: Households were randomly selected throughout Nebraska (NE) and Wyoming (WY). An adult resident in each home was surveyed regarding the use of CO-Ds in their home. At least partial responses were obtained from 212 NE and 210 WY residences. At the end of the survey respondents were offered educational literature on CO poisoning and CO-Ds. Analyses were performed to estimate the proportion of residents protected within each location by homes that were equipped with CO-Ds, met CPSC and NFPA guidelines for residential use of CO-Ds, and had their CO-D manual(s). Estimated 95% confidence intervals (95% CI) were calculated for these proportions. Results: In NE 56.8% (95% CI 50.7, 62.7) of homes and in WY 53.3% (46.6, 60.0) of homes were equipped with at least one CO-D. However, in NE only 39.7% (32.1, 47.8) of equipped homes met CPSC and 20% (14.3, 27.2) met NFPA guidelines. Similarly in WY 44.5% (35.6, 53.9) of equipped homes met CPSC and 34.5% (26.3, 43.8) met NFPA guidelines. In both states the homes surveyed in both states had their CO-D product literature. When offered, 28.4% of NE respondents and 28.5% of WY respondents wanted educational literature mailed to them. Conclusion: More than half of the homes surveyed in both states were equipped with CO-Ds, however less than half of these homes complied with CPSC guidelines and less than one third complied with NFPA guidelines. This indicates a potential educational need that can be addressed by poison centers, which in turn may help reduce the overall incidence of unintentional CO poisoning.

184. SPI Perceived Case Severity Impacts Poison Center Communication

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Background: Health care provider communication impacts patient satisfaction and outcomes. Provider perceptions of case severity have been found to influence communication. However, the extent to which perceived case severity may be particularly influential for Specialists in Poison Information (SPIs) whose assessments are based on one-time, brief phone interactions. The objective of this study was to determine how SPIs’ initial perceptions of case severity impact their call communication. Methods: SPIs rated perceived clinical severity at the time of call on a 1–5 Likert scale (89% completion rate). Human exposure calls from 1 year were selected from a PCC database based on SPI severity ratings (n = 1,198 high/moderate; n = 258 low severity calls). High severity calls were oversampled to ensure adequate numbers for a parent study. Descriptive call data was collected via a call logger and an electronic case database. Digitized phone recordings for each case were downloaded and call communication was coded using the Rotter Interaction Analysis System (coder reliability r > 0.80). Results: Preliminary analyses confirmed that case characteristics (caller age, sex, relation to patient, intentionality of exposure) for the study sample did not significantly differ for high vs. moderate vs. low severity cases. Call length did not significantly vary based on SPI severity ratings. Regression analyses showed no difference in caller communication based on SPI perceived severity ratings for high vs. moderate vs. low severity cases. SPIs rated perceived clinical severity at the time of call on a 1–5 Likert scale (89% completion rate). Human exposure calls from 1 year were selected from a PCC database based on SPI severity ratings (n = 1,198 high/moderate; n = 258 low severity calls). High severity calls were oversampled to ensure adequate numbers for a parent study. Descriptive call data was collected via a call logger and an electronic case database. Digitized phone recordings for each case were downloaded and call communication was coded using the Rotter Interaction Analysis System (coder reliability r > 0.80). Results: Preliminary analyses confirmed that case characteristics (caller age, sex, relation to patient, intentionality of exposure) for the study sample did not significantly differ for high vs. moderate vs. low severity cases. Call length did not significantly vary based on SPI severity ratings. Regression analyses showed no difference in caller communication based on SPI perceived severity ratings for high vs. moderate vs. low severity cases. Regression analyses showed no difference in caller communication based on SPI perceived severity ratings for high vs. moderate vs. low severity cases. Regression analyses showed no difference in caller communication based on SPI perceived severity ratings for high vs. moderate vs. low severity cases.

185. Copper Sulfate Toxicity: Young Teenagers Interested in Gathering Information and Giving Specific Advice

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Background: Copper compounds are widely available as fungicides, fertilisers, and animal supplements, however some salts such as the sulfate can be corrosive and systemically toxic. The objective of this study was to determine how SPIs’ initial perceptions of case severity impact their call communication. Methods: SPIs rated perceived clinical severity at the time of call on a 1–5 Likert scale (89% completion rate). Human exposure calls from 1 year were selected from a PCC database based on SPI severity ratings (n = 1,198 high/moderate; n = 258 low severity calls). High severity calls were oversampled to ensure adequate numbers for a parent study. Descriptive call data was collected via a call logger and an electronic case database. Digitized phone recordings for each case were downloaded and call communication was coded using the Rotter Interaction Analysis System (coder reliability r > 0.80). Results: Preliminary analyses confirmed that case characteristics (caller age, sex, relation to patient, intentionality of exposure) for the study sample did not significantly differ for high vs. moderate vs. low severity cases. Call length did not significantly vary based on SPI severity ratings. Regression analyses showed no difference in caller communication based on SPI perceived severity ratings for high vs. moderate vs. low severity cases. Regression analyses showed no difference in caller communication based on SPI perceived severity ratings for high vs. moderate vs. low severity cases. Regression analyses showed no difference in caller communication based on SPI perceived severity ratings for high vs. moderate vs. low severity cases. Regression analyses showed no difference in caller communication based on SPI perceived severity ratings for high vs. moderate vs. low severity cases. Regression analyses showed no difference in caller communication based on SPI perceived severity ratings for high vs. moderate vs. low severity cases.

186. Recommendations for Structured Activities in Major Industrial Accidents Involving Chemicals

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Background: Since 1990, more than 60 chemical accidents with more than 2,000 victims have been recorded based on the cases of poisonings reported by physicians in Germany. The acquisition and analysis of these accidents has shown that in addition to a systematic documentation and analysis, the activities in major industrial accidents involving chemicals should be coordinated from the very beginning. Method: All major accidents reported to the BfR-Documentation Centre for Poisonings and Products (§16e Chem Law) since 1990 were retrospectively reviewed with practitioners, policemen, firemen, staff of poison centres and others were asked to suggest structured action steps in case of major industrial accidents. Results: Following a major escape of chemical substances it is important for the responsible persons to get, as soon as possible, an overview of the situation, initiate rescue and protective measures and inform the population affected. Decisions on the approach in cases of major industrial accidents are made by a crisis committee. Rapidly available and proper medical care and the protection of the population, immediate and responsible (risk) communication between the various institutions and responsible bodies involved have to take place. The experience has led to a structured action time table with five phases: I) Rescue Phase: As early as possible, II) First inventory/first measures: Within the first hour/hours, III) Detailed recording of the situation/exposure monitoring: Start on the first day, IVa) Measures to reduce exposure/ IVb) Standard-
Clinical Toxicology vol. 48 no. 6 2010

Abstracts

187. Diphenhydramine Ingestion in the Pediatric Population: A Certified Regional Poison Information Center Experience

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Introduction: The current consensus guideline for pre-hospital management of diphenhydramine ingestions in children younger than 6 years of age include referral to the ED in those who ingest 7.5 mg/kg or 300 mg or greater. A definitive minimum toxic dose is unknown. We report our experience with diphenhydramine in this age group to further elucidate outcome based on these criteria. Methods: Data were collected from an AAPCC Certified Regional Poison Information Center. The study was IRB approved. All diphenhydramine ingestions in patients younger than 6 years of age reported over a 10 year period (2000–2009) were analyzed. Only cases with documented, known amounts of diphenhydramine were included. Medical outcome and patient weight, if available, were recorded. Descriptive statistics were used to characterize the data. Results: A total of 873 cases were identified, and 636 cases (73%) met the inclusion criteria. There were no severe or fatal outcomes associated with the exposures. In patients with definitive clinical outcomes, the mean weight-based ingestion was 7.98 mg/kg, with a median amount of 7.5 mg. The maximum ingestion in the study was 300 mg, with a mg/kg dose of 27.52. Conclusion: These data demonstrate that even with wide ranges of diphenhydramine ingestion, clinical effects were negligible. The current consensus based guidelines recommend referral to the ED for ingestions of 7.5 mg/kg or greater. Our analysis of 10 years of data indicates that this guideline may likely much larger than the current guidelines recommend.

188. Investigating the Reliability of Substance Toxicity Information Found on the Internet in Pediatric Poisonings

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Background: The popularity of the internet makes it an ideal tool for the search and dissemination of mass amounts of information. A concern remains that the information could be unreliable and guide medical decisions in potentially life-threatening situations, including pediatric poisonings. The purpose is to determine the reliability of the internet as a resource for information about a potentially toxic ingestion for children less than or equal to 5 years old. Methods: We surveyed parents of pediatric patients at UCSF Children’s Hospital and UCSF pediatric urgent care as to their internet access and use, as well as the search engines and terms that they would use in possible poisoning scenarios. This information was used to emulate parent performed internet searches for the 11 most common substances involved in pediatric poisonings. A panel of poison control experts evaluated and assessed the research results for accuracy and reliability of the website information. The websites were deemed reliable on two standards. First standard was based on if they recommended to call the poison center or to use an Internet Drug Information Center (DID). The second standard was that if the website provided adequate and appropriate information to manage the poisoning without outside consultation from a healthcare provider or poison center. Results: The results of 21 parent surveys were included. The majority, 15 (71%) used the internet daily, with Google and Yahoo being the most commonly used search engines. Seven (39%) of the parents were somewhat to very likely to utilize the internet during a poisoning scenario with prescription medications involving their child. Over 27, 38% of the websites met the first standard and no websites met the second standard. The majority of websites provided information about the toxic potential (67%), ingredients (71%), and symptoms (75%) for a poisoning. However, very few provided information on the toxic dose (13%), management site of home vs. hospital (22%), or first aid (26%). Conclusion: Some parents are likely to use the internet to obtain information in the event of a poisoning involving their child. The information provided on the internet for substances involved in poisonings is variable and often incomplete.

189. Impact of Pill Identification Calls on Poison Control Center Volume: Influence of a Policy on Controlled Substances

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Background: The impact of pill identification calls (pill ID) on Poison Centers has been significant in the past 5–10 years. Poison Centers have devised a variety of approaches for dealing with this increased workload. We examined 8 years of Poison Center data from a rural state to determine the impact of pill IDs. In addition, a new policy was implemented whereby public calls for pill IDs that involved controlled substances were identified only if they recommended to call the poison center. Descriptive statistics were used to characterize the data. Results: A total of 22,641 calls were analyzed. Only cases with documented, known information on controls cases were deemed reliable on two standards. First standard was that if the website provided adequate and appropriate information to save health care dollars. There is little published data on the time required to manage a call. We studied call time for four call types: Exposure (E), Health Care Facility Exposure (HCFE), Information (I) and Drug Identification (ID). Methods: Talk Time and Call Time were measured for 654 calls in April 2009 by eight non-clinical staff using stopwatches (Total Time = Talk Time + After Call Time). Six hundred and fifteen met quality criteria and formed the convenience sample. Time was measured by live recording (L-R). Calls were taken by Agents: specialists in poison information (SPIs) and poison information providers (PIPs). The process was valid through “Time of Day (ToD)” and Talk Time to call time obtained from our Avaya Call Management System v14.0. Call time measures (Type, Agent, ToD, Talk Time, L-R) were examined using bivariate and multivariate least squares methods applied to linear or logarithmic (proportional) models as appropriate. For log models, geometric means [95% CI] provided point estimates and statistical analyses used SAS JMP. Overall, 615 cases, 21 SPIs handled 470 (76%) and 7 PIPs handled 145 (24%). Most, 557 (91%) were from live and 58 (9%) from recordings. Both Talk Time and Total Time were log-normally distributed and statistical analyses were carried out using the log models. Final models for both Talk and Total Times included only Call facility (HCF) users of poison centers (PCs) might be using alternate information sources for managing poisonings. Methods: We examined HCF Human Exposure Calls (HCF-HECs) and HCF Information Calls (HCF-ICs) for day by the last 2000 (2000 through 2009) for secular trends (over Time) after accounting for Day of the week to account for seasonal patterns (Month), and 29 US holidays (Holiday). We compared these results. Increase and doubling time (DT = ln(2)/ln(slope) and 95% confidence interval (CI) were calculated from logarithmic (proportional) models for the same parameters. Results: Day, Month, Holiday and Time) using SAS JMP v6.0.0. HCF-ICs, however, did not show a steady increase (over the last decade, rather a clear “inverted U" shape (second order) relation with Time with the peak occurring during 2005. These relations were likewise HSS. Conclusion: After accounting for the variation from Day, Month and Holiday, HCF-HECs (14.8% of all ICs) are declining since about 2005. Although HCF folks are calling more frequently for exposure, they may well be seeking alternative sources of poisoning management information. In contrast, HCF-ICs (2.88% of all ICs) are declining since about 2005. These results illustrate the use of a multivariate statistical model of the NPDS call to answer a specific question. This approach may have application to PC surveillance, staffing, and funding.


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1Uniformed Services University of the Health Sciences, Bethesda, MD, USA; 2Rocky Mountain Poison and Drug Center, Denver Health, University of Colorado School of Medicine, Denver, CO, USA; 3New Jersey Poison Information & Education System, New Jersey Medical School, University of Medicine and Dentistry of New Jersey, Newark, NJ, USA

Introduction: The last decade has seen a dramatic increase in easy access to medical and toxicological information on the internet. We hypothesized health care

Table for Abstract 190

<table>
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<th>Type of call</th>
<th>Total calls (calls/day)</th>
<th>Average (calls/day)</th>
<th>Percent of all calls</th>
<th>Increase [95% CI] (%/year)</th>
<th>Doubling time [95% CI] (years)</th>
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<td>10.5 [19.3, 20.1]</td>
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Type and Agent. Distinguishing between SPl-PiP did not improve the model fit, but differences among the 28 Agents were statistically significant (p < 0.0001). Conclusion: As expected, HCFE calls took the most time, followed by E, I, and DID. A limitation was that our SPIs manage multiple calls simultaneously and cannot always chart after each call. Call timing data is valuable to PC managers to build staffing models, evaluate performance and determine service cost and pricing.

192. Antidote Stocking in Denver Metro Hospitals
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1Department of Emergency Medicine, Denver Health, Denver, CO, USA; 2Rocky Mountain Poison & Drug Center, Denver Health, Denver, CO, USA
Background:Poisonings and drug overdoses can be successfully treated when antidotes are administered in a timely fashion. The Antidote Summit Authorship Group published updated guidelines for stocking of antidotes in 2009. The objective was to examine whether hospitals in metropolitan Denver possess adequate antidote stocks according to these new guidelines. Methods: Fourteen antidotes were selected for evaluation from 24 recommended for stocking: 10 antidotes were excluded from our survey because they were multi-purpose antidotes and likely universally stocked. For crotalid envenomation and cyanide toxicity, 2 antidotes were listed but stocking only one was required. Surveys were sent to pharmacists at 28 local hospitals between January and February 2010 asking for their current stocks of the 14 selected antidotes. Results: Eleven of 28 (39%) hospitals responded to the survey. A fully stocked pharmacy would have adequate supplies of 12 antidotes since 2 were redundant. None had adequate stocks of 12 recommended antidotes. The 11 respondents had adequate stocks for an 8-h treatment course for a mean of 7 of 12 antidotes (58%) and for a 24-h treatment course for a mean of 6 of 12 antidotes (50%). The most commonly stocked antidote was the cyanide antidote kit (amyl nitrite, sodium nitrite, sodium thiosulfate) and all hospitals had adequate supplies for 24-h courses. N-acetylcysteine was the second most stocked antidote, with all hospitals possessing supplies for an 8-h course and 10 of 11 (91%) possessing supplies for a 24-h course. The least commonly stocked antidotes were crotalidatoxin antivenin (Wyeth Pharmaceuticals, no longer in production) and calcium trisodium edetate (Wyeth Pharmaceuticals, no longer in production).

193. Is Quetiapine Really QTiapine or Ktiapine?
acetylcysteine were available. local hospitals did not meet recommended guidelines for...spectrum of institutions and thus their stocking practices...hospitals responding to this survey represented a broad...no longer in production) and calcium trisodium edetate (Wyeth Pharmaceuticals, no longer in production) and calcium trisodium edetate (Wyeth Pharmaceuticals, no longer in production).

194. Fatal Lamotrigine Overdose
French LK, McKeown NJ, Hendrickson RG.
Oregon Poison Center, Portland, OR, USA
Background: Lamotrigine is a phenyltriazine used for the treatment of epilepsy and bipolar disorder, and in overdose may lead to sedation, seizures, and QRS widening. Previous reports have suggested a dose-response relationship between QTc and lamotrigine dosage, such that lamotrigine overdose may lead to a lengthened QTc. Our data show an inverse linear relationship between QTc and dose (p = 0.0003) but not QTc and...previously. Patients presenting after quetiapine overdose may have prolonged QTc, and serum magnesium, and estimated quetiapine...elderly patients and...of quetiapine were identified and the charts abstracted. ECG data, including QTc, serum potassium concentration (K), serum magnesium, and estimated quetiapine dose...acetylcysteine were available. local hospitals did not meet recommended guidelines for...spectrum of institutions and thus their stocking practices...hospitals responding to this survey represented a broad...no longer in production) and calcium trisodium edetate (Wyeth Pharmaceuticals, no longer in production).

195. Venlafaxine Overdose Leading to Delayed Cardiotoxicity
Minns A, Schneir A, Clark RF.
University of California, San Diego, San Diego, CA, USA
Background: Venlafaxine is a nontricyclic antidepressant that inhibits serotonin and norepinephrine reuptake with weak inhibition of dopamine reuptake. Toxicity from venlafaxine is lower than that occurring with tricyclic antidepressants, although higher than SSRIs, and likely due to sodium channel blockade. Case report: A 52-year-old male presented to the ED after acutely ingesting an unknown quantity of his extended-release venlafaxine tablets (75 mg tablets) and cutting his wrists. On initial exam, his temperature was 36.6°C, HR 122 bpm, BP 144/100 mmHg, RR 20, and O2 saturation 100% on a non-rebreather facemask. He was confused and had multiple superficial lacerations to the volar aspect of his right forearm, which were not actively bleeding. His neurologic exam was significant for clonus and hyperreflexia without rigidity. ECG demonstrated sinus tachycardia with a rate of 114 bpm, QRS interval 104 ms and QTc interval 471 ms. His serum acetylcaminophen concentrations were concentrations were 1.8 mg/mL and he had a measurable salicylate level of 6 mg/dL. Some time drugs of abuse immunoassay screen was positive for THC, opiates and acetaminophen, but was negative for cumber antidepressants. He was monitored in the ED and various medications were initiated. Seven hours after his presentation, his mental status quickly deteriorated, he developed convulsions and required endotracheal intubation. Following the seizure he developed a wide-complex tachycardia on the monitor. A repeat ECG at that time demonstrated a sinusoidal rhythm. CPR was initiated for a PEA arrest. He was successfully resuscitated however expired later that evening. Premortem serum samples were analyzed for venlafaxine and a metabolite. The post-mortem and premortem samples demonstrated venlafaxine concentrations of 2,800 and 3,200 ng/mL respectively. Case discussion: Previous reports suggest venlafaxine may not have the same potential for sodium channel toxicity manifested by the TCAs. However in animal models, venlafaxine reduces the sodium channel conduction rate. Prolongation of the QTc interval has also been demonstrated in human series. It is likely that the ingestion of extended-release products in this case led to delayed toxicity. Conclusion: Clinicians need to be aware of the potential for serious cardiotoxicity with venlafaxine overdose and the potential for delayed toxicity with extended-release products.

196. Massive Venlafaxine Overdose Resulting in Abdominal Compartment Syndrome
Colle JB, Stellpflug SJ.
Hennepin Regional Poison Center, Minneapolis, MN, USA
Introduction: Venlafaxine is an anti-depressant known to cause cardiotoxicity. We present a case of a massive venlafaxine overdose (OD) resulting in cardiogenic shock and subsequent abdominal compartment syndrome.

Case report: A 27-year-old male presented to the ED 4 h after taking 210 tabs of 75 mg venlafaxine extended release (total ingestion 15,750 mg) and 9 tabs of bupropion 150 mg. He was intubated on arrival. Phenylephrine and vasopressin infusions were started for hypotension. Her HR was 150 and her QTc was 588 ms, which was treated with 2 g of Magnesium sulfate. Hypotension persisted despite 7 L of normal saline and the above pressors. She then developed a wide-complex tachycardia (QRS 160 ms) which was treated with sodium bicarbonate. An echocardiogram revealed a subendocardial transmural myocardial infarction with an ejection fraction of 45% and a subendocardial transection of the septum. Epinephrine and norepinephrine were added. Intra-aortic balloon pump therapy was added to the four pressors, yet her cardiogenic shock did not improve. She developed fulminating hepatic failure, DIC, and a GI bleed. An abdominal ultrasound demonstrated low flow in the inferior vena cava, portal veins, and mesenteric veins. An abdominal CT scan revealed diffuse bowel wall thickening. Because of the patient’s clinical decompensation, paralytic ileus, and severe pressures and concern for ischemic bowel and abdominal compartment syndrome, laparotomy was performed...
197. Perineal Dermatitis from Citronella Lamp Oil Ingestion
Kao L, Furbee B.
School of Medicine, Indiana University, Indianapolis, IN, USA
Background: Dermal exposure to hydrocarbons can result in defatting dermatitis. We report an intentional hydrocarbon ingestion resulting in perineal desquamating dermatitis. Case report: A 42-year-old female with a history of bipolar disorder was witnessed ingesting approximately 600 mL of citronella lamp oil. She was brought immediately to the emergency department where she was awake and conversant. She reported that she drank the citronella because she thought she was a torch. She was admitted for observation and monitoring of respiratory status. On hospital day 2 she developed dermatitis, involving strongly of citronella. She developed erythema over the perineum with blistering and desquamation (photo available). Burn and Dermatology services were consulted. A rectal tube was placed and her dermatitis was treated with soft soap washes, zinc oxide and desondine ointment. This was replaced by bacitracin ointment as the lesions improved. The rectal tube was removed once her diarrhea resolved. The patient’s hospital course was complicated by aspiration pneumonitis requiring ventilator support for 12 days. She was transferred to a psychiatric facility 2 h after she was witnessed to be well. Fam- ily and vital signs remained unchanged, and a video EEG was noted, lower extremity reflexes were hyperactive, Nystagmus and muscle rigidity were absent. Tremor persisted. By day 10 she was extubated but amnestic to questions appropriately, and admitting to ingesting 30 mg of 60.6 h; she gradually improved return- ing to baseline by day 9. Discussion: In this patient with a solitary XR-LTG concentration confirmations confirmed apparent first order elimination with a prolonged t1/2 that correlated with clinical toxicity. Conclusion: Significant prolonged encephalopathy can occur with XR-LTG overdose. The apparent t1/2 may be as long as 60 h.

198. Neurologic Recovery Following 7 Days of Coma from Baclofen Overdose
Kao L, Furbee B.
School of Medicine, Indiana University, Indianapolis, IN, USA
Background: Baclofen overdose has been reported to produce coma lasting several days. We report a case of exceptionally prolonged coma lasting a full 7 days following baclofen ingestion. Case report: A 51-year-old female was found unresponsive by her family with a suicide note nearby. She had access to cloraze- pate, paroxetine, baclofen, digoxin, isotrode ditrinite, furomeidn, phenytion, and phenobarbital. On presenta- tion to the emergency department, she was comatose, flaccid, and hypotensive. The patient was intubated and mechanically ventilated. The patient was intubated and mechanically ventilated. Dopamine was started. Laboratory values including phenobarbital and phenytion levels and a CT of the brain were normal. Because baclofen was suspected, a serum baclofen concentration (approxima- tely 15 h post ingestion) was sent. EEG showed dif- fuse slowing without seizure activity. Dopamine was weaned off after 24 h. No sedatives or paralytics were administered. After 5 days of flaccidity and coma, the possibility of brain death was discussed with the family. On hospital day 7 the patient began to withdraw from baclofen-induced coma. Baclofen levels may be useful in confirming the diagnosis. Maintaining supportive care is imperative in the comatose patient if baclofen overdose is suspected.

199. Incidence of Rising Acetaminophen Levels after Acute Overdose with Anticholinergic or Opioid Coingestants
Kirschner RL,1 Rasmussen ML,2 Lubbert JM,2 Schaecher M,2 Barthold CL,1
1University of Nebraska Medical Center, Omaha, NE, USA; 2Nebraska Regional Poison Center, Omaha, NE, USA
Background: The Rumack-Matthew nomogram has long been used to determine the need for acetylsy- teine therapy based on a single acetaminophen (APAP) level drawn 4–6 h after overdose. In recent years, a number of published case reports have documented late rises in APAP level after overdose, with xenobiotics that slow GI motility. Some poison centers routinely recommend a 4 h level be followed by a 7–8 h level if opioid or anticholinergic coingestants are involved. Methods: A retrospective review of records from a single poison center between January 1, 2003 and February 28, 2010 was undertaken to estimate the incidence of delayed peak APAP levels. Inclusion criteria were acute APAP overdose with anticholinergic or opioid coingestants for which multiple APAP levels were available. The end point was rising APAP level, or a level below the treatment line followed by one above the line. Results: One hundred and ninety cases were included. Twelve were expected to APAP-opioid combina- tions; 178 were APAP-anticholinergic exposures (some with opioids as well). Nine of the 190 (4.7%) had rising APAP levels. One of these remained below the treatment line; the other eight were treated with acetylcysteine (3 IV, 5 po), and none developed hepa- totoxicity. All nine had taken APAP-diphenhydramine combinations and none of these had known opioid coingestants. Conclusions: In patients with anticho- linergic coingestants, the incidence of delayed APAP peak after acute overdose may approach 5%. When these patients have a h APAP level that is detectable but below the treatment line, a repeat level should be considered before final disposition.

200. Severe Prolonged Encephalopathy from an Intentional Lamotrigine Overdose with Significant XR-LTG and Prolonged Serum Concentrations
Hernandez SH1, Habib S2, Howland MA3, Hoffman RS,1 Nelson LS
1New York City Poison Control Center, New York, NY, USA; 2University Medical Center, Medical School, Queens, NY, USA; 3St. John’s College of Pharmacy, Queens, NY, USA
Background: Lamotrigine (LTG) is well-tolerated in therapeutic doses, undergoes first order kinetics with a plasma drug half-life of 22–36 h, and is highly metabolized mainly via UGT1A4. At 2.5 mg/kg/day, steady-state serum LTG concentrations are approximately 2.5 μg/mL. However, the toxicodynamics and toxicokinetics are incompletely appreciated. We describe the toxicokinetics in a massive extended-release (XR) LTG overdose with exceedingly high concentrations and prolonged encephalopathy. Case report: A 40-year-old woman ingested 6 g of XR-LTG. PMH included gloublastoma multiforme, seizures, and depression. She was recently admitted for a clonazepam and quetiapine overdose; both drugs were subsequently discontinued. On the afternoon of admission, she was discharged and consented for 30 mg (200 mg) XR-LTG, 21 (2 mg) dexamethasone, and 30 (20 mg) famotidine. Within 24 h after discharge she presented to the ED, aroousable to voice, answering questions appropriately, and admitting to ingesting 30 mg XR-LTG. Vitals signs were: BP, 109/67 mmHg; HR, 82/min; RR, 15/min; 100% SpO2; RA, T, 97°F orally. Physical exam and initial laboratory studies, including a urine screen for abuse screen, were unremark- able. A head CT was consistent with her previous sur- gery. Within 6 h of observation she developed agitated delirium, mutism and was unable to follow commands. Nystagmus and muscle rigidity were absent. Tremor was noted, lower extremity reflexes were hyperactive, and retinal temp was 99.1°F. Lorazepam controlled her agitation. Although all meds were discontinued except dexamethasone, she developed catatonia. Lab values and vital signs remained unchanged, and a video EEG was unremarkable. A serum LTG concentration col- lected 5 days post ingestion was 49.5, 40.5 μg/mL at 6 days, 29.3 μg/mL at 7 days, and 16.5 μg/mL at 9 days (apparent t1/2 of 60.6 h); she gradually improved return- ing to baseline by day 9. Discussion: In this patient with a solitary XR-LTG concentration confirmations confirmed apparent first order elimination with a prolonged t1/2 that correlated with clinical toxicity. Conclusion: Significant prolonged encephalopa- thy can result from XR-LTG overdose. The apparent t1/2 may be as long as 60 h.
202. Amitriptyline Overdose in a Patient with a Pacemaker
University of Pittsburgh Medical Center, Pittsburgh, PA, USA
Background: After a tricyclic antidepressant (TCA) ingestion, serial EKGs are monitored for cardiac toxicity via QRS prolongation. Since morbidity best correlates with QRS duration, EKG monitoring is standard practice for TCA toxicity evaluation. In this case report, we describe the difficulty in monitoring a patient with a ventricular pacemaker who was witnessed an amitriptyline overdose. Case report: A 55-year-old man with a history of CABG and AICD/pacemaker was witnessed by police to have ingested about 30 × 25 mg tabs of amitriptyline as they broke down the door at his home. Due to his decreased mental status and episodes of desaturation, he requiring intubation and was transferred to our hospital. In our emergency department, initial vital signs were temp 37.0°C, HR 81/min, BP 140/72 mmHg, RR 16/min SaO2 100% on 100% FiO2. Electrolytes, BUN, creatinine, complete blood count, and chest X-ray were unremarkable. He had a serum ethanol level of 150 mg/dL at time of ingestion, but undetectable salicylates and acetaminophen levels. An EKG displayed a ventricular paced rhythm with a QRS of 162 ms and QTc of 518 ms. A drug screen (via gas chromatography/mass spectroscopy) demonstrated amitriptyline and a small trazadone peak. Three hours after ingestion, the patient’s heart rate fell to 61/min and blood pressure dropped to 65/52 mmHg. EKG showed a QRS of 162 ms and QTc of 518 ms. He was treated with IV sodium bicarbonate boluses with immediate improvement of his blood pressure and heart-rate. He was placed on a IV sodium bicarbonate and norepinephrine infusion. The next day the norepinephrine and bicarbonate infusion were stopped with no signs of cardiac instability. His QTc improved as the patient improved. The patient’s hospital stay was complicated by aspiration pneumonia, but he was transferred to psychiatry on hospital day 6. Case discussion: To our knowledge, there are no reported case reports of TCA toxicity in a patient with an implanted pacemaker. Looking at the QRS and QTc trends, it appears that hemodynamic instability correlated best with the QTc rather than the QRS duration. Conclusions: In addition to monitoring the clinical status, this case describes the importance in monitoring the QTc, rather than the QRS trend, in patients with ventricular pacing after TCA toxicity.

203. Severe Iron Poisoning Resulting in Successful Liver Transplantation in a Teenager
Rangan C,1 Nordi S,1 Cantrell L.3
1Childrens Hospital Los Angeles, Los Angeles, CA, USA; 2Kieck School of Medicine, University of Southern California, Los Angeles, CA, USA; 3California Poison Control System, San Francisco Division, California Poison Control System, University of California, San Francisco, CA, USA
Background: A 15-year-old girl with fulminant hepatic failure requiring liver transplantation after suicidal overdose of iron pills. Case report: Fifteen-year-old female intentionally ingested 900 ferrous sulfate 325 mg enterico-coated tablets starting 5 h and ending 1 h over a 24 h period. Estimated elemental iron ingestion was 30 mg/kg. Vomiting started within 1 h. Initial vital signs were normal. KUB showed radio-opacities.
Serum iron level was 48 mcg/dL (ref range 60–170 mcg/dL) and INR 1.1 at 3–4 h after overdose. Poison center recommended whole bowel irrigation with PEG-ELS titrated up to 2 L/h. Urine toxicology and pregnancy screen were negative. Acetaminophen and salicylate levels were not measurable. 8 h later, labs revealed repeat serum iron level 739 mcg/dL; serum bicarbonate 9, with a urine gap of 33. See Table 2 for additional labs. Poison Center recommended defer-oxamy at 10–15 mg/kg, aggressive IVF hydration, and repeat iron level, electrolytes, coagulation measurements, and blood gas. Bicarbonate drip with KCl was started for acidemia. IVF 1/2 NS was running at only 100 mL/h for 4 days. She continued with intermittent vomiting, without hematemesis. Urine was “brick red” after starting deferoxamine. On day 3 she was transferred to a tertiary pediatric ICU, developed altered mental status, hepatorenal syndrome, coma, and increased intracranial pressure necessitating intubation and ventriculostomy. Hepatic biopsy revealed necrosis in all hepatic zones, most significantly in the peri-portal regions. On day 9, mental status improved, and she received a cadaveric liver transplant. One year out transplantation, she remains stable. Case discussion: This case represents the lowest reported peak serum iron level resulting in fulminant hepatic failure with successful liver transplantation. Aggressive IVF hydration was not performed adequately in this case. Conclusion: High mortality rate of severe iron poisoning necessitates aggressive supportive care. Hepatic failure obviates early consideration of liver transplantation.

204. Utilization of Intravenous Levocarnitine: Retrospective Evaluation and Comparison in Acute Valproic Acid Toxicity
Aaronson PM, Sollee DR, Kunisaki TA, Schauben JL.
Florida/USVI Poison Information Center, Jacksonville, FL, USA
Background: Intravenous levocarnitine has been shown to reactivate the urea cycle; thereby, correcting valproic acid (VPA)-induced hyperammonemia and improving mental status. To date, there are no known human studies other than anecdotal reports that suggest favorable outcomes with the use of IV levocarnitine in the setting of acute VPA toxicity. Methods: A retrospective cohort analysis was conducted to evaluate all consecutive patients with documented VPA ingestion at our poison center database of acute and acute-on-chronic VPA exposures between 2002 through 2009. For this study, patients who received IV levocarnitine were compared to a control group that had at least two serum VPA and ammonia (NH3) levels greater than 100 μg/mL and 35 μg/dL, respectively. Results: A total of 86 patients were evaluated, 43 who received IV levocarnitine compared to 43 cohort controls. The median time-to-discharge was 84 h for IV levocarnitine versus 37 h for the control; in addition, the median time-to-mental status resolution was 45 h for IV levocarnitine group versus 24 h. A confounding variable of higher NH3 levels was detected in the IV Levocarnitine group; consequently, after adjustment no statistical difference was found in either time-to-discharge (p = 0.287) or time-to-mental status resolution (p = 0.108). It was noticed that the mean time to initiate IV levocarnitine was 28 h. Interestingly, time-to-peak NH3 levels was consistent in both groups (p = 0.935) with a median of 24 h (95% confidence interval 21–34 h). Correlation of increase VPA or NH3 levels with mental status derangement was not found (r = 0.9 and 0.15 correspondingly). This partial correlation was consistent in both VPA and NH3 levels (r = 0.38). Conclusion: This study did not show a difference in medical clearance or mental status outcomes between groups. However, limitations of restrictive bias, inconsistent use of known dosing methods of IV levocarnitine should be considered. These results warrant a prospective evaluation of IV levocarnitine and its place in therapy, in addition, continued characterization of hyperammonemia relative to acute VPA toxicity.

205. Prolonged Absorption from a Sustained-Release Verapamil Preparation with Detection of Serum Levels and Their Response to Intralipid
Armenian P, French D, Neerman C, Olson KR, Wu AHB
San Francisco Division, California Poison Control System, University of California, San Francisco, CA, USA
Background: We report a case of severe verapamil toxicity, with documentation of serum verapamil levels before and after Intralipid (IL) administration. Case Report: A 47-year-old woman was found in the ED with hypotension and complete heart block 3 h after intentional overdose of 6 g sustained-release verapamil. He was intubated but gut decontamination was not done. He was treated with atropine, glucagon, calcium, multiple vasopressors (norepinephrine, dopamine, epinephrine, vasopressin, and nesiritide) and hypernuslinemia euglycemia (HIE) therapy. Twelve hours after ingestion, transvenous pacing was initiated, with mild improvement in hemodynamics. Nineteen hours after ingestion, two 100-mL boluses of IL were given followed by a 500 mL IV drip over 30 min. The contribution of IL to improved hemodynamics was unclear due to multiple other drugs being administered at the same time. Twenty-eight hours after ingestion, hypotension reoccurred as the insulin infusion was being tapered, and another 100 mL IL bolus was given followed by a 150 mL IV drip over 15 min. At the same time, the insulin drip was increased with improvement in the mean arterial pressure. On Day 5, the patient became hypotensive when weaning the insulin and calcium drips. On Day 6, the insulin drip was discontinued and on Day 7, the calcium drip was stopped. By Day 10 hours after ingestion, transvenous pacing was initiated, and on Day 16, the insulin drip was stopped. By Day 20, it was discovered that verapamil levels had increased from the therapeutic range of 1 to 4 ng/mL to 177 ng/mL. The patient then had a prolonged absorption from the sustained-release formulation, as characterized above.

Table for Abstract 203

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*On continuous FFP infusion.

206. Gastric Lavage – An Audit of Current UK Practice
Dyas J, Krishna CV, Aldridge GL, Thompson JP. National Poisons Information Service, Cardiff, UK
Background: Gastric Lavage (GL) has been used for over 200 years as a form of gastro-intestinal decontamination following ingestion of poisons. More recently, there has been written on its efficacy and safety. Does it still have a role to play in modern emergency medicine? This study was undertaken as an audit of current practice and belief regarding GL in UK hospital to tepoeds. A questionnaire was sent to all UK hospitals and those having Accident and Emergency departments were invited to respond. Six standard questions and a free-text box for comments

Clinical Toxicology vol. 48 no. 6 2010

Abstracts
sought to establish whether departments believed they had appropriate equipment available to perform GL, whether adequately skilled personnel were available on a 24/7 basis, how often GL was performed in their department, and if they had appropriate equipment available to perform GL. Seventy (38%) said they did not have skilled personnel available at any time. Forty-three (50%) hospitals did not have this personnel available 24/7. One hundred and sixty-nine (95%) departments responding have never or rarely performed GL, only five departments were doing GL once a month or more. Thirty-four (19%) of those departments performed it once a month. Forty-three departments stated that GL had not been performed for at least 5 years. Only 27 GL’s have been performed in the UK within the last 5 years, of these within the last year and only two within the last half of the month. Adverse events reported included trauma in two cases and death in one patient as a result of tension pneumothorax. Conclusion: From this audit it is clear that gastric lavage is rarely used in managing patients with overdose in modern emergency medicine and consequently a significant proportion of emergency patients with overdose will no longer maintain adequate equipment or have staff with the necessary skills available on a 24/7 basis. Poisons Centres may need to take into account the availability of skilled staff and equipment when providing management advice on poisoning.

207. Pharmacokinetic Modeling of Lithium Elimination During 67.25 Continuous Hours of High Flux Hemodialysis

Treysman L,1 Meehan TJ,1 Schlieben DJ,3 Ducre B,4 Erickson TB.5

1Department of Emergency Medicine, University of Illinois–Chicago, Chicago, IL, USA; 2Toxikon Consortium, Cook County Hospital (Stroger), Chicago, IL, USA; 3Nephrology Associates of Northern Illinois, Naperville, IL, USA; 4Illinois Poison Center, Chicago, IL, USA

Background: We report a case of a patient who underwent 67.25 h of continuous traditional hemodialysis (HD) after an intentional overdose of extended-release lithium (ERLi), and provide pharmacokinetic (PK) data on the drug. A 38-year-old female was referred from a center for chronic lithium therapy arrived in the emergency department (ED) approximately 1 h after an acute intentional ingestion of 200 tablets of 300 mg ERLi; initially slightly sedated, she was intubated and transferred to the hospital where continuous HD was initiated. We report one of the longest continuous HD sessions for management of lithium poisoning, which is the longest reported HD session for management of toxicology. This can result in substantial serum lithium concentrations. Unfortunately, estimation of total body lithium content was not possible. The patient was referred to our center, and a 67.25 h continuous HD session was initiated. The initial serum lithium concentration was 3.1 mEq/L and so HD was initiated. The patient was continued on HD for 67.25 uninterrupted hours, with serum lithium determinations every 2–4 h. The only adverse reaction to HD was a drop in hemoglobin from 14.2 to 11.6 mg/dL. After two consecutive lithium levels <1.0 mEq/L, HD was terminated and the patient extubated with discharge to inpatient psychiatry with no neurologic deficits. Case discussion: We present a case of acute-on-chronic ERLi poisoning which was treated with 67.25 h of traditional high-flux HD. Typical HD sessions last from 4 to 8 h, which is standard practice for HD in the setting of poisoning. Given this prolonged duration, we also sought to calculate the PK parameters of half-life and elimination, and compare them to previously published standards. From the peak level of 5.5 mEq/L at approximately 4 h post-ingestion to the trough of 0.8 mEq/L, 45 h of HD had elapsed. This results in an elimination constant of 0.043, and a calculated half-life of 16.23 h. Compared to previous studies, the K is similar; however, our patient’s case is more chronic. Conclusion: The longest case of HD for lithium poisoning was 67.25 h. During HD, the patient demonstrated cardiovascular stability. HD is the longest reported HD session for management of lithium poisoning.
lavage was accomplished with 4 L of saline and only a few fragments were recovered. A second radiograph showed a clump of tablets near the gastro-esophageal junction and three fragments in the duodenum. Syrup of Ipecac (SOI) was given on hand and the Poison Center recommended its use. One ounce (30 mL) of SOI was given and vomiting quickly ensued. Recovered 38 iron tablets in clumps. A third radiograph showed a marked hemoglobin loss (from 11.9 to 2.9 g/dL). The patient remained asymptomatic and was discharged after 18 hours post ingestion. **Case discussion:** A patient presented with a significant likelihood of developing iron toxicity. Syrup of Ipecac was used after gastric lavage failed to remove a large clump of iron tablets. The patient required less than 24 h of treatment and monitoring. The serum iron level remained well below the toxic level. **Conclusions:** Although it was now covered by several medical groups, Syrup of Ipecac remains a potential tool for use in the health care setting for the decontamination of potentially toxic ingestions when other decontamination modalities are either ineffective or not indicated.

212. Flumazenil Use in Benzodiazepine Overdose in the UK: A Retrospective Survey of NPIS to 2008
Veirainah A.1 Dyas J.2 Routledge PA.2 Thompson JP.2 1NPIS Edinburgh (Scottish Poisons Information Bureau), Edinburgh, UK; 2National Poisons Information Service (Cardiff), Cardiff, UK

Flumazenil is an effective benzodiazepine (BDZ) antago-

214. A Review of Bedside Toxicologic Experience with Phystigmine and Flumazenil
Rasimas JJ.1 Sachdeva K.2 Salama AM.1 Helmick TJ.2 Donovan JW.2 1Penn State College of Medicine, Hershey, PA, USA; 2Pinnacle Health Toxicology Center, Harrisburg, PA, USA

**Background:** Expertise in medical toxicology affords opportunities for targeted interventions to ameliorate side effects. For example, the use of flumazenil, an effective BDZ antagonist, is limited by its potential to precipitate seizures. The approach of UK clinicians to the use of flumazenil has not been systematically studied or reported so far. Complicated cases of poisoning in the UK are referred to the National Poisons Information Service (NPIS) for advice. Details of enquiries to the NPIS are recorded in the UK poison information database (UKPID). Using UKPID, we present data on 2 years of UK experience with the use of flumazenil in the management of BDZ OD. Between 2007 and 2009 there were 4,504 enquiries to the NPIS relating to overdoses involving BDZ. Sixty-five of these patients were definitely administered flumazenil (60 prior to enquiry and 5 others on toxicologists’ recommendations), including many who had also ingested procon-

216. Mining Social Media for Trends and Sentiments about Poisoning and Poison Control Services
Simoneon I, Hamm K, Heard SE. University of California San Francisco, San Francisco, CA, USA

**Background:** Increasingly, consumers get and give advice about health through social media. Social media offers millions of volumes of raw and unfiltered information about the public’s health. Topics pop up, gain momentum and fade away, engaging thousands of participants in multiple real-time conversations. Our objective was to conduct a cross-sectional survey and discuss how social media discussions could provide information on how consumers view poisoning and discuss their experience of a PCC, and if social media could provide an entry point for public health interventions or other poison control services. **Methods:** With the help of a service that specializes in aggregating multiple streams

side effect was anxiety, which emerged in fewer than 10% of patients. They responded sufficiently to psycho-

215. Lipid Therapy for Severe Bromadiolone Toxicity
Bardsley CH.1 Petzel R.1 Kahn S.1 McMullin M.2 1Loyola University Medical Center, Maywood, IL, USA; 2NMS Labs, Willow Grove, PA, USA

**Background:** Bromadionone is a lipophilic, vitamin K antagonist, superwarfarin that produces prolonged coagulopathy. Lipid therapy (LT) has been used as a new antidote for severe cardiotoxicity and CNS toxicity from lipophilic agents. This is the first report of LT for superwarfarin or other anticoagulant. **Case report:** A 76 kg man ingested 12.5 g of bromadionone in a suicide attempt. One day (D) later he ingested an additional 8.75 g bromadionone and 48 g acetami-

213. Early Use of High Dose Insulin-Glucose Euglycemic Clamp: One Step Beyond Metabolite Overdose
Murphy NG.1 Green RS.1 MacDonald S.2 Zed PJ.1 Bona DR.1 Sheppard KA.1 1WK Regions Poison Centre, Halifax, NS, Canada; 2Department of Emergency Medicine, Dalhousie University, Halifax, NS, Canada

**Background:** High dose insulin-glucose euglycemia (HIE) has been described in the literature as a successful rescue therapy for calcium channel blocker (CCB) and mixed CCB/beta blocker ingestions when usual resuc-

**Table of Contents**

**Abstracts**

**Clinical Toxicology** vol. 48 no. 6 2010

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of information from the social and traditional web for brands and marketers, we monitored, aggregated and sorted hundreds of thousands of blog sites, online discussions, Twitter feeds and news articles for terms related to PCCs. Words used in conjunction with PC were also sorted and ranked to determine context and yield information about sentiment. Results: In a 3 month period, including National Poison Prevention Week, the term “poison control” appeared in 1,100 blog posts, 428 comments on blog sites, 860 forums, –160 Twitter feeds, and 91 news articles. The week prior to NPPW, “PCC” appeared in 73 blogs, 77 forums and 7 Twitter feeds and 11 news articles. During NPPW there were 140 blog posts, 72 forum discussions, –100 Twitter feeds and 20 news articles. Conclusion: Nearly a third of mentions appeared to be irrelevant references (rock band, lyrics, humorous remarks about bad cooking). Remaining mentions skewed neutral or negative in sentiment, revealing that people’s experience with a PCC was generally positive, but needing the service produced a negative sentiment. Term such as “parenting fail” and “bad parent” were common. The social media “space” offers significant opportunities for understanding how consumers consider and relate to poisoning and the experience of using a PCC. Such insights can help identify marketing strategies and shape efforts.

217. Efficacy of a Poison Prevention Educational Program for Preschool Children
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Background: This study aimed at assessing the effectiveness of a school-based poison prevention educational program for preschool children. Methods: One hundred and thirty-six preschool children (70 boys and 66 girls) regularly attending el Maadi national school, Maadi, Cairo, Egypt, (representing 6 classes – 3 classes Kg-1 & 3 classes Kg-2), were included as research subjects. A 5 day program was designed and applied to fulfill the following objectives: identification of the common Poisons/non-Poisons items, identification of the common forms of poisons (solids-liquids-sprays-gases), identification of dangers of poisons on our bodies and role of a trustable parent (parents-teachers-doctors), identification of the role of ambulance and poison control centers (PCC) and identification of how to act in unsafe emergency situations. Results: The present study proved the efficacy of an educational poison prevention program for preschool children as shown by the ability of children to significantly fulfill the all objectives of the research by the end of program. Conclusion: It is recommended that such program is to be generalized nationwide to help to prevent or minimize the risk of poisoning of such vulnerable group of age (preschool children).

218. Poison Center-Directed Medication Take Back Event
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Background: Medications are a common source of both intentional and unintentional poisonings. As a source for abuse, misuse, and poisonings, unused medications should be removed from homes immediately upon discontinuation. Unfortunately, many residents elect to store medications in the home for prolonged periods of time; particularly if they are concerned about the environmental consequences of disposal by flushing or placing in the garbage. Our poison center organized a community-wide take-back event as a poison control center (PCC) education effort. We will describe the results of this event. Methods: The poison center collaborated with our school district for volunteer support, planning and marketing to parents through school-wide distributed flyers. A proposal was presented to our city commission to facilitate participation of our police department. Safety officers from our host institution were recruited to assist with development of a site safety plan and to coordinate waste disposal through our host’s existing waste management contractor. The Drug Enforcement Administration and the State Board of Pharmacy were consulted regarding legal aspects of the event. Ninety volunteers were recruited through the School of Pharmacy and through the School District. A mandatory 1-h training session was provided for all volunteers. A 4-h, drive-through event was conducted at two sites on opposite sides of our city. Results: Two hundred and ninety-six households participated in the event. Nineteen hundred and sixty-three pounds of medications were collected and disposed of with 59% consisting of non-controlled substances, 30% OTC medications, 8.5% controlled substances, and 2.5% unknown. Surveys revealed that the media event was not available to participants, 55% would have the medications, 16% would have thrown them in the trash, 9% would have flushed them, and 20% would have done “other” (taken to pharmacy, doctor’s office, etc.). Conclusion: Conduction of this medication take back event resulted in the removal of medications from homes, thus removing these as a source for intentional and unintentional poisonings. Participation of various community partners with common goals resulted in conduction of a successful medication take-back event. Future events and alternate models for event-conduction are in development and will be expanded to include events throughout our poison center service region.

219. A Poison Center’s Development of a Media Campaign to Address Trends of Herbal Incense Abuse
Ragone SP,1 Geller RJ,2 Lopez GP,1
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Background: Multiple media outlets routinely contact regional poison centers for their toxicology expertise when preparing a report on current events dealing with poisonings. This report describes a successful collaboration between a poison center and multiple mass media outlets that created a real-time release of this poison information to the public, health care professionals, and policy makers who would be treating patients with this toxic exposure. Case report: In late 2009 and early 2010 this regional poison center had noticed an increase in calls about symptomatic patients presenting to ED’s after smoking various herbal incense products labeled “not for human consumption” (“incense”). After recognizing the epidemiologic implications of this toxic trend, the poison center contacted the media in an attempt to increase awareness of the public, government, and health care professionals. These public relations efforts also highlighted the information for legislators, permitting them to introduce state legislation to ban the sale of this toxic analog to the public. Case discussion: This illustrates the proactive role that the poison center can take in the event that a toxic trend is discovered. By rapidly developing a mass media campaign, the poison center was able to reach a large population and ensure that the correct information was released. Conclusion: The public relations effort increased the awareness involving a dangerous new trend in illicit substance abuse, highlighted the information for legislators to ban the sale of this toxic substance to the public, and increased the number of calls to this poison center related to this issue.

220. Assessment of Toxicology Knowledge in Fourth Year Medical Students
Windels D,1 Heard K,2 Druck J,3 Buchanan JA,2
1University of Colorado Denver School of Medicine, Aurora, CO, USA;2Rocky Mountain Poison & Drug Center, Denver Health, Denver, CO, USA

Background: Pharmacology and toxicology are core content knowledge for physicians. Medical students should have an understanding of general pharmacology and basic treatment of poisoning. The objective of this study was to measure the knowledge of fourth year medical students (MS4) on these topics. Methods: A multiple-choice survey (15 questions) was administered to MS4. Questions were grouped into three categories: treatment of poisoning, pharmacokinetics and pharmacologic effects. Students were grouped in by intended specialties: pharmacologic intense (anesthesia, emergency medicine, internal medicine, pediatrics and psychiatry); less pharmacologic intense (dermatology, OB-GYN, ophthalmology, pathology, physical medicine/rehabilitation, radiology and surgery); or no specialty recorded. Students were also grouped by completion of a clinical pharmacology and/or toxicology elective or neither elective. Groups were compared using ANOVA. Results: A total of 108 of 136 students completed the survey. Students completing the toxicology elective had higher mean scores than those taking neither elective; however, the scores for pharmacologic intense specialties were not different from less pharmacologic intense specialties. Discussion: Performance on this test appears to be improved by completing a toxicology elective. Performance was not clearly higher for students planning on a pharmacologic intense specialty, limitation of this study sampled a small population and covered minimal material. Conclusion: Data from this study suggests MS4 are lacking in core content knowledge related to toxicology. This information may assist in development of required courses focused on toxicology may improve performance.

221. Prescription for Change. Training Evaluation Paving the Way to Success
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Background: The feedback received from survey evaluations can be used to help target community outreach and strengthen community partnerships. Evaluations can be used to help target community outreach and enhance future program development. Methods: The Poison Center used post-cards, e-mail list servers and website postings to promote a 3-h training on poison center services and medication abuse for community partners. The training addressed the scope of the prescription medication abuse problem, national and local data, teaching guidelines, prevention strategies and available resources. The participant survey consisted of open-ended questions and a 5-point Likert scale rating. A certificate of completion was given to participants after the evaluation was submitted. The evaluation data were analyzed.
Syncope/seizure (female) 443
Syncope/seizure (male) 222
Syncope in the Emergency Department

233. Cybersuicide with “Homemade Valium”
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Background: The use of the internet to research methods to commit suicide (“cybersuicide”) has been well described. Many websites advocate the use of a variety of medications ranging from ubiquitous compounds like acetaminophen to more esoteric substances. We report a cybersuicide involving “homemade Valium.”

Case Report: A previously healthy 30 year-old female graduate chemistry student text-messaged a friend that she had taken 40 g of “homemade Valium” in a suicide attempt. By the time emergency services had responded, the patient was found to be unresponsive at home. Upon arrival to the hospital, she experienced cardiopulmonary arrest and was successfully resuscitated. Fluamazine was not administered. The patient was treated with aggressive supportive care including mechanical ventila-
tion, fluid resuscitation, multiple vasopressors, how-
ever, expired on hospital day 2. Postmortem blood was analyzed for acidic, basic and neutral drugs as well as volatiles and cyanide. The results revealed the presence of bromisovalum and lorazepam. Quantitative measurements were not determined.

Results: Upon examination of the decedent’s computer, she appears to have been influ-
cenced by online information. The guidebook: The Complete Manual of Suicide. In this text, the suggested lethal dose of bromisovalum is 20 g. Bromisovalum is a sedative-hypnotic agent that has been used outside of the United States since its development in 1908. While fatal self-poisonings have rarely been described in countries where this drug is sold, none have been reported in the United States. The decedent was not taking any medications and there was no record on the decedent’s computer or in her laboratory of her obtain-
ing either the drugs or their precursors. It is unclear whether the two medications were purchased or synthe-
sized by the patient. Of note, the precipitating event for the decedent’s suicide might have been the suicide of her laboratory partner 6 months prior with cyanide obtained from their laboratory. Conclusion: This case is a sad reminder that internet suicide resources with detailed instructions are readily accessible. Clinicians need to be aware of these suicide resources, as they may be faced with managing an unusual poisoning.

234. Coalition Building Aimed to Increase Poison Center Awareness Among Elementary School Nurses
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Background: In 2009, the South Texas Poisoning Preven-
tion Coalition was formed with a focus on educating elementary school nurses about poisonings, and how to distribute poison prevention information to students and parents on utilizing their local poison center (PC). Methods: A coalition membership form was completed by 108 school nurses which contained ques-
tions on school demographics, and knowledge regarding PC awareness and PC phone number. Nurses were able to indicate how they had heard about the PC by checking all of following eight categories that applied; this letter is the first time, 911, phone book, pharmacy, phone sticker, magnet, newspaper, or other. Results: Out of 108 school nurses, 82% were aware of the national phone number used to contact their local PC, whereas, 18% were unaware. When asked about the usefulness of these elementary schools represent, this coalition

Conclusion: Only 7 (13%) of patients with a history of methadone use exhibited SLS. ECGs were obtained in over half of these patients, with 75% exhibiting prolonged QTCs. The discharge of two of patients with prolonged QTCs and the absence of ECG ordering on patients with SLS suggest a lack of awareness of QTC prolongation due to MTD by ED physicians.
227. EpiPen® Accidental Injection – 134 Cases over 10 Years
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Background: Over the past 10 years, various treatment approaches for EpiPen® accidental injection have been proposed. To discover a viable protocol for therapy based on outcomes, we reviewed 134 cases of accidental EpiPen® injection from a 10-year period. Case series: Areas reviewed were: site of injection, symptoms; treatment; management site, and outcome. The following data was tabulated: location of injection: thumb – 73 (55%), finger – 34 (25%), hand – 17 (13%), thigh – 7 (5%), deltoid – 1 (0.7%), foot – 1 (0.7%), ankle – 1 (0.7%); Symptoms (at the injection site): blanching – 66 (49%), pallor – 10 (7%), cyanosis – 17 (13%), edema – 14 (10%), bleeding – 12 (9%), pain – 64 (48%), tingling – 16 (12%)..

Conclusions: Logging of items collected at a medication take back event provided information regarding unused medications. Analgesics ranked highly as collected medications in all categories (OTC, non-controls, controls). This information may now be used to consider possible policy change and prescribing practice changes. For instance, perhaps analgesics should be prescribed at lower quantities with refill options and it appears that cardiovascular agents often remain unused. This information also might be utilized in the development of studies to further investigate the underlying reasons for unused medications.

Symptoms n Percent
Drowsiness 6 100
Fatigue 6 100
Unbalanced/ataxia 5 83
Dizziness 5 83
Weakness 5 83
Numbness 4 67
Headache 3 50
Anxiety 3 50
Tingling 3 50
Altered taste 3 50
Dry mouth/throat 3 50
Agitation 2 33
Giddiness 2 33
Muscle twiching 2 33
Increased appetite 2 33
Nausea 2 33
Shortness of breath 2 33
Palpitations 2 33
Altered mood 1 17
Chills 1 17
Excess sweating 1 17
Vomiting 1 17
Loss of appetite 1 17
Numbness 1 17
Itching 1 17
Burning eyes 1 17
Itching eyes 1 17

Average duration = 6.25 h (range: 3–10 h); Average onset = 93 min (range: 30 min–3 h).

228. Acute THC Poisoning from Pot Brownies: Joint Law Enforcement and Public Health Investigation
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Background: The Los Angeles County Public Health Department was notified by the Los Angeles Police Department of a food-borne illness cluster associated with brownies purchased 1 day ago from a church bake-sale. The brownies were purchased by a teacher, who brought them to work share with coworkers at a preschool. Case report: Five teachers at the preschool ate the brownies. The purchaser did not partake in the brownies, because she “did not like chocolate”; however, her adult son ate one brownie. All six victims experienced symptoms. The principal at the school notified the pastor at the church, where the brownies were allegedly purchased. The pastor called LAPD, noting that the church never held a bake-sale. LAPD was sent to the school, and interviewed the victims and the purchaser. Public health officials used a standard foodborne disease questionnaire to interview the six exposed persons. Two preschool teachers sought medical attention on the day of symptoms. Both were asymptomatic by the time they were seen by their physicians. One teacher had serum and urine toxicology screening sent to an outside laboratory. Leftover brownies at the school were sent to both Public Health and LAPD for potential additional testing. Serum, urine, and food testing was all positive for THC/marijuana. Case discussion: Reported symptoms and targeted laboratory studies swiftly concluded marijuana-laced brownies as the cause of these symptoms. Joint investigation by law enforcement and public health resulted in a prompt response to an unusual food-borne illness cluster. Conclusion: Multi-agency response to toxicological cluster illnesses is an efficient use of resources and enhances inter-agency lines of communication that may benefit future public health & epidemiological investigations.

229. Evaluation of a Plasma GC/MS Toxicology Screen in an Emergency Department
Attwood RJ, Wagner A, Baudoin MR, Escalante P, Langman LJ, Sztajnkrycer MD, Rudis MI, Mayo Clinic, Rochester, MN, USA

Background: Qualitative toxicology screening tests in the emergency department (ED) are of limited utility. We investigate the potential utility of a rapid turn-around, unstructured plasma GC/MS screen for the presence of a broad-range of common contaminants. Methods: a) Gas chromatography/mass spectrometry (GC/MS) assay, in the ED setting. Results: The assay was performed on 170 patients. Patients were classified into 3 categories: (1) those in whom the GC/MS assay identified a previously suspected drug and 2) the test ruled out a previously suspected drug were also recorded. Results: The time from lab ordered to result presented was 1 h 54 min. Sixty-nine percent of patients had a result available in the EMR prior to being discharged from the ED. The majority of patients had a benign clinical course. 1/170 were discharged home from the ED, 52/170 were medically cleared and transferred to a psychiatric facility. Of the patients (37/170) who were admitted for medical reasons, most (34/37) were admitted to general medical floors and a minority were ICU admissions (3/37).

230. The Toxicology Investigators Consortium (ToxIC) Registry – Establishing Its Viability
Kleinschmidt K, Wax P, Nelson L, Bird S, Bret J,1 Langman LJ, Sztajnkrycer MD, Rudis MI,1 Langman LJ, Sztajnkrycer MD, Rudis MI,1
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Background: In 2009, ACMT’s ToxIC group established that 10–15,000 patients are directly evaluated each year by medical toxicologists; either at the bedside or in the clinic. It may be feasible to obtain a large volume of data on exposure and experience. Therefore, starting in January 2010, a trial registry of direct consultations was initiated. Objective: To determine if a national ToxIC case registry that includes cases cared for directly by medical toxicologists on a web-based platform would be feasible. Methods: A web-based on-line, HIPAA compliant database was created that is accessible via the ACMT website. The database balances sufficient data collection to allow case insight with minimal time for case upload. Data elements include: Location of encounter (ED, inpt, ICU, outpt.), Age, Encounter type (ADR, Pharm vs. NonPharm agent exposure, Environmental, Occupational, Envenomation, Lab data interpretation, Organ failure), Agent classes (e.g. antipsychotics, metals, pesticides), Specific agent names, Clinical syndromes (e.g. acute lung injury, agitation, hyperthermia, rash), & Treat- ment (e.g. albuterol, dialysis, Chelation, pyridoxine, liver transplant, pacemaker). Complete case information is maintained on the investigators’ institutional computers and is deidentified other than a unique code that facilitates later identification. Results: On January 15, 2010, four centers began pilot data collection. On March 1, 2010, seven more centers were added. As of April 30, 2010, 309 cases are in the ToxIC database. Time required to enter data is ~1 min/pt. The data elements continue to evolve. Conclusion: The ToxIC registry is a viable tool to identify cases that medical toxicologists see in direct consultation at multiple sites across the country. Following identification in the database, access to the case details will provide complete clinical records of consultations seen by medical toxicologists. The database development provides a potential new toxicsurveillance source for research, education, healthcare, and public health.
231. Postmortem Redistribution of delta-9-tetrahydrocannabinol (THC), 11-hydroxy-THC (11-OH-THC), and 11-nor-9-carboxy-THC (THCCOOH) in human fresh blood.
Holland MG,1 Schweppe DM,2 Stoppacher R, Gillen S,3 Huestis MA.4
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Introduction: Post-Mortem Redistribution (PMR) is a well-described phenomenon in forensic toxicology for drugs with lethal effects in overdose amounts. THC is commonly implicated in driving under the influence of drugs (DUID) cases and in fatal injured drivers. Since THC is rarely if ever a cause of drug OD death, no investigation of potential PMR of 9-THC and metabolites THC-OH and THC-COOH (THCA) in human blood has been reported to date.

Methods: Nineteen consecutive cases from the Ondonga County Medical Examiner’s Office (Syracuse, NY) with positive urine drug screen for THC were sampled with matched heart and femoral postmortem bloods. Free THC, THC-OH and THCA were analyzed by GCMS from the cases. In addition, antemortem specimens were available for testing in three cases. Results: Ten cases had quantifiable concentrations of THC and THC-OH; all 19 were quantifiable for THCA. Heart: femoral blood ratios averaged 1.54 for THC (range: 0.3–3.1), 1.63 for THC-OH (0.3–2.7), and 1.78 for THCA (range: 0.5–3.0). These results suggest modest postmortem redistribution to the central blood following death for all three cannabinoids. These ratios were not statistically significant, although there was a significant difference for THCA (p < 0.05). Antemortem (AM) serum was available for three cases; AM values exceeded PM values regardless of sampling site. Discussion: THC and its metabolites exhibit some PMR, with a trend toward more PMR in proportion to hours since death when sampled. Two cases varied from the overall trend, as they showed relatively high concentrations of all analytes in peripheral blood as compared to central blood. Ratios, which did not vary by sex, age, race, or cause/manner of death, were remarkably similar between analytes. Given the high Vd of THC (~4–14 L/kg), high pKa, and lipolytic, increased PMR was expected compared to the more polar metabolites; however, this was not observed in these specimens. To our knowledge, this is the first report of THC PMR, providing evidence that the solubility of Bupivacaine and Bupropion in Octanol. Two hundred microliter were used for confirmation samples were mixed and incubated for 1 h at room temperature. Two hundred microliter were used for confirmation of the total serum carbamazepine concentration. Then the samples were centrifuged (2,000 G, 25°C) using a filter with a molecular weight cutoff of 30,000 Da for 1 h. The carbamazepine concentration in the ultrfiltrates corresponded to the unfractionated carbamazepine concentration. The total and unbound serum concentrations of carbamazepine were measured in triplicate by fluorescence polarisation immunoassay and the mean and standard deviation were calculated.

233. Partition Constant of a Drug May Help Predict the Clinical Efficacy of Liquid Respirant for Toxicological Emergencies
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Background: Intralipid® infusion is useful in reversing cardiac and central nervous system toxicity of anesthetic drugs, and recent reports suggest utility for other drug overdoses. Although the mechanism of action is poorly understood, its predominant effect likely results from extraction of lipophilic toxins from aqueous plasma and its effects on drug partition. In this setting, the partition constant of a drug is determined by its partition constant (Log P), a measure that estimates the distribution of a drug to hydrophobic compartments such as lipid to water. The purpose of this study was to relate the kinetics of DEG metabolites with the development of anion gap in these animals was 17.5 ± 0.8 at 0 and 8 h, respectively. Correlational analysis showed that blood HEAA concentrations correlated strongly with the decrease in blood bicarbonate concentrations (r = 0.88) and with the anion gap (r = 0.71). These results indicate that the acidosis observed with DEG toxicity is not as severe as that produced by ethylene glycol or by methanol. These studies have demonstrated unequivocally for the first time that the acidosis produced by DEG results from the accumulation of HEAA in the blood. This project is supported by the American Chemistry Council.

234. In Vitro Testing of Plasma Protein Binding of Carbamazepine in Relation to Serum Concentration
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Introduction: The mainstay of treatment of carbamazepine poisoning is supportive care and administration of multiple doses of activated charcoal. However, in rare cases of massive overdose, hemodialysis for enhanced elimination has been used, postulating that protein binding decreases with high carbamazepine levels. The aim of our study was to test this hypothesis in an in vitro setting. Methods: Nine hundred and fifty microliter serum samples from donors were mixed with a definite dose of carbamazepine solutions in ethanol/water (50:50) to obtain samples of 1,000 μL with carbamazepine concentrations of 0, 10, 16, 20, 26, 50, 75, 100, 126 and 150 μg/mL. All samples were mixed and incubated for 1 h at room temperature. Two hundred microliter were used for confirmation of the total serum carbamazepine concentration. Then the samples were centrifuged (2,000 G, 25°C) using a filter with a molecular weight cutoff of 30,000 Da for 1 h. The carbamazepine concentration in the ultrfiltrates corresponded to the unfractionated carbamazepine concentration. The total and unbound serum concentrations of carbamazepine were measured in triplicate by fluorescence polarisation immunoassay and the mean and standard deviation were calculated.

Results: The free fraction of carbamazepine in relation to the total serum carbamazepine concentration is shown in the table. The free fraction increased from 10.1% in the sample with the lowest serum carbamazepine concentration (5.2 μg/mL) to 78.5% in the sample with the highest concentration (165.4 μg/mL).

Discussion: In severely poisoned patients, serum carbamazepine concentrations are usually >40 μg/mL. We demonstrated that at this concentration, the free fraction of carbamazepine is already considerably increased as compared to therapeutic concentrations. Conclusion: As this in vitro analysis demonstrated a decrease in protein binding from 89.9 to 21.5% with increasing carbamazepine serum concentrations, patients with massive carbamazepine overdose might benefit from hemodialysis for enhanced elimination. In vivo measurements are needed to confirm our observations.

235. Coma After Intentional Ingestion of a Hand Sanitizer in a Child
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Background: Alcohol-based hand sanitizers (ABHS) have found increased use as alternatives to hand washing. They are generally considered benign ingestions in children and have only been reported to cause major toxicity in adults who have intentionally ingested them. Case report: A 3-year-old girl was playing unsupervised at home when she was noted to have difficulty walking and slurred speech. The child fell to the floor and her mother believed that she saw the child’s eye roll back. The child was brought to the ED. On initial evaluation, the child was obtunded, cyanotic and unresponsive. Vital signs: HR-119 R-29 T-35.2 BP-109/91. Physical exam was normal for eyes deviated upward to the right and cold extremities with poor peripheral pulses. Otherwise it was unremarkable. Initial VBG: pH = 7.34 pCO2 = 46 torr. Electrolytes were WNL. Head CT and CSF were normal. A blood EtOH level was 164 mg/dL. Investigation of the home revealed an empty bottle of ABHS (65% EtOH). As her mental status improved, she was able to respond to questioning and confessed to ingesting the ABHS. Repeat EtOH level in 2 h was 127 mg/dL. The patient was discharged the next day at baseline.

Case discussion: This case is the first reported case of an intentional ingestion in a child of an ABHS resulting in severe toxicity and the highest blood EtOH level found in such a patient. Several published reports describe the abuse of ABHS’s by adults intentionally seeking a substitute for alcohol.
their usual sources of EtOH. However, children generally ingest these products unintentionally and rarely have any significant effects. Miller et al., described 1,846 exposures to these products reported to the Texas Poison Center Network in children <6 years old. Of these exposures covering a 2-year period, 93% had no effects and 6% had minor effects. Only 20 cases had moderate effects and none reported a major effect such as coma or death. Conclusion: This case illustrates that intentional ingestions in young children can occur and a blood EtOH level may be an appropriate measure to test case children presenting with altered mental status consistent with an ingestion of a sedative-hypnotic agent.

236. Accidental Lamotrigine Overdose in a 20-Month Old
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Background: As an adjunctive agent for epilepsy starting at age 2, severe toxic effects from lamotrigine have been limited to a few case reports. There is only one prior case report of a similar adverse event in a child (a 19-month old with a 1-h level of 20.3 mg/mL). To our knowledge, our case is the highest confirmed accidental pediatric ingestion to date. Case report: A previously healthy 20-month-old boy was transferred to the pediatric department 30 min after his mother noted the child had an ataxic gait and altered mental status. She found her lamotrigine bottle spilled on the bathroom floor with 10×150 mg tablets missing. En route to the ED, the child had two episodes of emesis and a “seizure” lasting 15 s with “whole body” jerking and incontinence. Initial vital signs were Temp 36.6°C, HR 105–112/min, BP 112–57 mmHg, RR 22/min, SaO2 99% on RA. He was treated with serial IV lorazepam doses. Venous blood gases, EKG, head CT, abdominal X-ray, labs, BUN and creatinine were unremarkable. A drug screen (via gas chromatography/mass spectroscopy) revealed no co-ingestants. He was admitted to the PICU where his symptoms worsened. He would suddenly sit up from a prone position, develop tonic-clonic activity in his legs and arms for 10–15 s, and then suddenly fall back asleep. He would avoid eye contact and cry incontinently during these episodes. He was treated with additional doses of lorazepam and rehydration. A lamotrigine level 11 h after admission was 30.5 mg/mL (therapeutic <4 mg/mL). His symptoms improved overnight and resolved by morning. The child was transferred to the general floor the next day. The child was discharged home with no complications. In-depth review of lamotrigine toxicity reveals that seizure-like activity is rare, but reported. Toxicity and blood levels correlate poorly. Base on our findings and the findings of the one prior case report, children may be more susceptible to the toxicity at lower doses. Case conclusions: Our case report describes this unique toxin-induced in a child. From our experience, toxicity rapidly improves after good supportive care with benzodiazepines and IV fluids.

237. A Case of Accidental Life Threatening Sodium Azide Exposure
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Background: Sodium azide is a highly toxic derivative of hydrazoic acid, commonly used in air bags. It is also used in the production of metallic azide explosives & as a preservative in science laboratories. Serious or fatal poisonings have been reported via ingestion of a few grams of sodium azide. Effects include potent vasodilation (possibly because it produces nitric oxide) leading to severe hypotension & hypoxia. We report a presumed unintentional minimal exposure resulting in life threatening signs & symptoms. Case report: A graduate student in a university science lab was working unglowed with sodium azide. Later, at home, he ate a sandwich with unashed hands. Within 20 min, he became nauseated & vomited. He presented to ED at 30 min post exposure with a blood azide level of 120 µg/mL. He also had a hypotensive, tachycardic, hypothermic, & 628,000 white blood cells. Initial CT showed injuries consistent with a major head injury. He was intubated for respiratory depression and severe hypotension. Despite aggressive resuscitation efforts, the child deteriorated, despite treatment with vasopressors & IV fluids. EKG showed signs of cardiacogenic shock & he developed pulmonary edema. He exhibited hypoxemia, hypoglycemia, & hypokalemia & remained on a ventilator overnight. An intraaortic balloon pump was inserted & his condition improved. Hydroxocobalamin was also administered 2 days post exposure with no residual effects. Case discussion: Sodium azide poisoning has occurred following accidental or intentional ingestion of colorless, tasteless laboratory solutions. Hydroxocobalamin may be of theoretical benefit. Conclusion: Hydroxocobalamin may decrease the inhibition of the mitochondrial enzyme cytochrome-c oxidase caused by sodium azide. Hydroxocobalamin could be of potential benefit in patients with life-threatening sodium azide poisoning.

238. Severe Hypermagnesemia from Acute Epsom Salt Administration
North SP,1 Chen J,2 Clark R.3 1University of Southern California, Los Angeles, CA, USA; 2Navy Hospital Balboa, San Diego, CA, USA; 3University of California, San Diego, CA, USA
Background: Hypermagnesemia is a potentially lethal condition affecting cardiovascular and nervous systems. Loss of deep tendon reflexes (DTR), respiratory depression, paralysis, coma, electrocardiographic (EGK) changes, hypotension, heart block, and asystole can be seen. Hypermagnesemia is rare following acute ingestions. We present a case of acute hypermagnesemia following Epsom salt (magnesium sulfate) administration. Case: Eleven-year-old male presented 45 min post ingestion of 16 cups of Epsom salt, overnight sleep, headache, nystagmus, seizures, coma, hypothermia, cardiac dysrhythmias, tachycardia, cyanosis, pulmonary edema, acidosis, & cardioregulatory arrest. It is also a cellular poison, inhibiting cytochrome oxidase & interfering with energy generation in the mitochondria. Therefore, it is somewhat similar to cyanide. Sodium azide poisoning can be difficult to treat. The traditional antidotes for cyanide toxicity, nitrates & sodium nitrites, have been limited. Hydroxocobalamin was used & may be of potential benefit in the future.

239. ED Referral is Unnecessary After Unintentional Pediatric Ingestion of Common Topical Liniments
Kostic MA, Grinnan DD. Wisconsin Poison Center, Milwaukee, WI, USA
Background: Topical liniments such as Ben Gay®, Icy Hot®, Thera-gesic®, and Flexall® contain up to 30% methyl salicylate. Unintentional pediatric ingestion of less than 5 mL could theoretically result in toxicity (>150 mg/kg of ingested salicylate) assuming 100% bioavailability and using an aspirin conversion factor of 1.3978. There are no previous reports of severe pediatric poisoning from ingestion of such topical balms. We attempted, using our poison center database, to assess the value in ED referral and salicylate levels after such exposures. Methods: Descriptive analysis of one poison center’s Toxcalc® database, queried for all unintentional ingestions of topical liniments in children (<6 years) from December 1999 through February 2010. We excluded cases involving Oil of Wintergreen (98% methyl salicylate) due to its known significant toxicity. Subgroups included those referred to an emergency department (ED), and those for whom a salicylate level was drawn. Results: Our search yielded 727 actual or potential ingestions involving children containing methyl salicylate. Standard poison center follow up guidelines were followed. No outcome more serious than “minor effect” was noted in any. The most frequently coded outcome (310 cases) was “no effect.” There was only one ED: age range 6 months–4 years (mean 2 years). All were asymptomatic at discharge. Of these, 48 had serum salicylate levels drawn. Only five had detectable salicylate levels ranging 2.8–11.1 mg/dL. None of the 72 children required specific treatment, and no negative outcomes were identified. Conclusion: In our review of over 10 years of experience from a single poison center, unintentional pediatric ingestion of methyl salicylate containing methyl salicylate did not lead to salicylate toxicity. ED referral and serum levels are unlikely to be necessary. These findings are likely attributed to the drug’s poor palatability and low oral bioavailability.

240. Seizures from Lidocaine Poisoning in Two Patients Resulting from Medication Dosing Error
Rangan C, Fogelman S, Santos M. Los Angeles County Department of Public Health, Los Angeles, CA, USA
Background: The Los Angeles County Department of Public Health (LADPH) was notified about two patients who experienced generalized tonic-clonic convulsions from ingestion of drug placed in children’s medicines. Case report: Pt #1 was a 19-year-old female. Anesthesia was given at 14:43 – fentanyl 100 mcg IV; propofol 120 mg IV; and lidocaine 0.5% 10 cc × 4-paracervical injections (40 cc total). Pt #2 was a 26-year-old female who received identical anesthesia at 16:00. Within 3 min, each patient developed nystagmus for <5 s, followed by generalized tonic-clonic convulsions. Both patients were given SLO2 by FM and midazolam 2 mg IV with resolution of convulsions. EMS was called. Both patients were taken to local ED and recovered with observation. Pt #1 had a blood lidocaine level of 4.2 mcg/mL, drawn 88 min after lidocaine injection. Pharmacological extrapolation corresponded to an estimated lidocaine peak level of 8–12 mcg/mL. Convulsions occur at blood lidocaine levels of 6 mcg/mL or greater in published case reports. Case discussion: Lidocaine levels did not correlate with recorded dose given to the patient. Public health toxicologist and nurses coordinate a visit, when possible, of regulatory officials and representatives of the L.A. office of the FDA. Faulty procedures were noted: inadequate record-keeping for lidocaine stocking, dispensation, Lot™, and syncope monitoring. Both patients were unfamiliar with 2% lidocaine instead of the intended 0.5% concentration, resulting in fourfold overdoses. Medication dosing error correlated with the lidocaine level of 4.2 mcg/mL. Conclusion: This case raises questions whether lidocaine for etiologic use can be considered safe.
with the vascular system. These patients may have experienced similar a phenomenon. USFDA confirmed 1.98–2.03% lidocaine concentrations in syringe residua.

Local studies found anesthesia-related procedures at the clinic until completion of audit and overhaul of pharmacy practices. Conclusion: Case illustrates high risk of medication error in local facilities lacking formal protocols for anesthesia, and the benefit of multi-agency intervention to correct these problems.

241. Two Cases of Intoxication in Children after Accidental Ingestion of Alcohol-Based Liquid Hand Sanitizer
Reed RR, Michels JE, Richardson WH
Palmetto Poison Center, University of South Carolina, Columbia, SC, USA
Background: Alcohol-based liquid hand sanitizers (LHS) are widely used by adults and children to disinfect hands. Containing a high percentage of ethanol, many popular brands have an ethanol content of 62–65%. Accidental ingestion in children has been found to rarely cause clinical symptoms other than mild gastrointestinal effects or oropharyngeal irritation. There have been no reported cases of intoxication with serious complications following accidental ingestion in children. We report two cases of intoxication in two 4-year-old patients. Case Report: Case One: A female presented to an urgent care center with a history of ingesting an estimated 6 ounces of alcohol-based LHS. The physician described the child as “floppy” but responsive. Approximately 60–90 min after ingestion, the patient’s blood glucose was 107 mg/dL, and blood ethanol level was 221 mg/dL. The patient was transferred to a tertiary care facility and admitted to a pediatric ICU. The child recovered after overnight observation in the PICU. Case Two: A father called the Regional Poison Center (RPC) after his child ingested an unknown amount of alcohol-based LHS. Although the father stated the ingestion had occurred 15 min prior to calling the RPC, he denied the inclusion criteria. Age: 3.8 years. The caller was instructed to take the child to the closest ED. Labs drawn in the ED approximately one hour after contacting the RPC revealed a blood glucose of 121 mg/dL and blood ethanol level of 200 mg/dL. Repeat blood ethanol an hour later was 190 mg/dL. The patient received intravenous fluids and ondansetron 2 mg IV due to vomiting while in the ED. The child was admitted for overnight observation and discharged the following day.

Discussion: The two cases presented are the first to report intoxication in children after accidental ingestion of alcohol-based hand sanitizer. Fortunately, typical symptoms other than mild gastrointestinal effects and oropharyngeal irritation were reported. This is the first study of the toxic effects of LDA overdose by children and the first study of the toxicity of a double dose. No child had a moderate, severe, or fatal effect (0%; 95% CI: 0–12.5%). Children who ingest a double dose of LDA may be safely observed at home. More research is needed to determine an appropriate referral dose.

242. Clinical Effects and Outcomes Following Unintentional Double Dose of Lisdexamfetamine (Vyvanse®) in Pediatrics
Chundru PG,1 Morgan DL,2 Borys DJ.1
1Central Texas Poison Center, Temple, TX, USA; 2Scott and White Healthcare, Temple, TX, USA
Background: Lisdexamfetamine (Vyvanse®) (LDA) is a prodrug of dextroamphetamine approved in 2007 for the treatment of attention deficit hyperactivity disorder. LDA is long-acting and is usually dosed only once a day ranging from 30–70 mg/day. Double dose frequently results in an amount ingested greater than any published effects. However, if larger exposures occur there is potential for increased taste and mouth irritation resulting in little or no clinical effects. Fortunately, typical symptoms other than mild gastrointestinal effects and oropharyngeal irritation were reported. This is the first study of the toxic effects of LDA overdose by children and the first study of the toxicity of a double dose. No child had a moderate, severe, or fatal effect (0%; 95% CI: 0–12.5%). Children who ingest a double dose of LDA may be safely observed at home. More research is needed to determine an appropriate referral dose.

243. Ingestion of Model Fuel Containing Nitromethane and Methanol
Spiller HA,1 Ross MP,2 Bosse GM.1
1Kentucky Regional Poison Center, Louisville, KY, USA; 2Tallahassee Memorial Hospital, Tallahassee, FL, USA
Background: In the absence of a rapid methanol blood level, it is difficult to assess the risk from unintentional childhood ingestion of model fuels containing methanol and nitromethane (FMN). Previous reports have documented false elevations of serum creatinine from the nitromethane in these fuels, suggesting this as a readily available marker of significant methanol intoxication. Method: We performed a 2 year retrospective chart review of cases of ingestion of FMN in children. Results: Six children, ages 19 months to 3 years, ingested FMN. All six children were seen in the ED and treated with methanol and creatinine levels (see Table 1). All blood samples for methanol and creatinine were drawn within 3 h of ingestion. Fomepizole was initiated empirically in two patients due to delay in obtaining methanol analysis results. Discussion: Transient elevations of creatinine occurred in four of the six patients. BUN was normal and there was no history of renal impairment in these children, suggesting the elevated creatinine was related to nitromethane ingestion. No child had an elevated methanol level. Conclusion: Elevated creatinine levels are not a reliable marker for elevated methanol levels after unintentional ingestion of FMN.

244. Euglycemia after Late Octreotide Use in Pediatric Glipizide Toxicity
Blume-Odem CM,1 Scalzo AJ,2 Weber J.1
1Massachusetts Poison Center, St. Louis, MO, USA; 2Saint Louis University School of Medicine, St. Louis, MO, USA
Background: Octreotide is a useful antidote indicated when more than one dextrose bolus is an infusion is needed to regain euglycemia from sulfonylurea poisoning. We report the efficacy of late octreotide use in a child with life-threatening hypoglycemia from glipizide ingestion. Case report: A 20-month-old boy was found with GM’s glipizide 10 mg (IR) and metformin 1,000 mg at 0730 h. He was taken to the ED. His parents stated that morning, the child had a 10–15 min tonic/clonic seizure. EMS arrived to an unresponsive child with Accucheck of 37 mg/dL. D50% was given IV. In the ED at 13:35, he was poorly responsive; HR 132, R 26, BP 139/66, core T 97.8°F with a BG of 7 mg/dL. BG increased to 122 mg/dL with a second IV dextrose bolus. PE showed a diminished neurological status, but no additional seizures. Labs: pH 7.30, PCO2 42 mmHg, total HCO3 19.8 mg/dL, albumin 4.4 g/dL, Cr 0.3 mg/dL, UDS negative. During transfer to a tertiary care facility the Accucheck dropped to 30 mg/dL. Despite D50%/NS infusion of 60 mg a D25%/5 bolus (60 mL) was required at 15:46 which resulted in Glucose (mg/dL)/time (h) pairs of 321/15:53; 148/16:19. Toxicology advised octreotide 15 mcg IV (1 mcg/kg), administered at 16:47 h, 19 min after postexposure. Euglycemia maintained 00:16/03:52; 92/17:13. Administration of further dextrose bolus. During PICU admission, the D5%/1 2NS = 2 mcg/kg/100 mL at 70 mL/h was gradually tapered. The child was discharged euglycemic on day 3.

Discussion: Children have minimal glucose reserves, increasing their sensitivity to sulfonlureas. IR Glipizide onset is 1–1.5 h; duration 10–16 h; though delayed and prolonged hypoglycemia in children is possible, necessitating prolonged dextrose therapy. Octreotide is a synthetic analogue of endogenous somatostatin which inhibits insulin secretion to stabilize blood glucose and prevent hypoglycemia. There are no published randomized control trials in pediatrics. Dosing is based on its use in prevention of pediatric hypothalamic obesity: 5 mcg/kg/day in three divided doses. Conclusion: Our case lends efficacy to the use of octreotide in children. Even with delayed administration; octreotide can safely re-establish and maintain euglycemia after glipizide ingestion, thus reducing the need for repeated dextrose bolus/infusion and the labile glucose levels that follow.

245. Pediatric Methadone Overdose with Seizure
Meier KH,1 Mamantov T,1 Arminian P,2 Gerona RR,2 Ruthenberg V.1
1California Poison Control System, University of California–San Francisco, San Francisco, CA, USA; 2Department of Laboratory Medicine, University of California–San Francisco, San Francisco, CA, USA; 3Kaiser Permanente PICU, Oakland, CA, USA
Background: Methadone has rarely been reported to cause seizures, but human reports are poorly documented. We present a case of seizure activity that developed following administration of methadone. Case report: A 4-year-old became sleepy while watching TV with her family. Twenty minutes later she was blue, unresponsive, and her grandmother started CPR. Paramedics noted the girl glucose, pulse, and respiratory depression, which responded to 7 mg/kg/h IV of Dextrose 5%/D5W bolus 285 mg/dL. High flow O2 and 0.5 mg IN naloxone were given with good response. Contaminants of isomorphe, diphenhydramine and methadone were found in the home. In the ED she had miosis, CNS and respiratory depression, which responded to 7 mg IN naloxone (4 mg IN/3 mg IV). The ECG was normal. She was transferred to a secondary HCF PICU. Overnight she had miosis, pruritis, tongue thrusting movements, mild fever. She required naloxone for a drop in SpO2 twice with full recovery of SpO2 and mental status after each dose. About 16 h after index symptom, during a neurology consultation, she developed rhythmic tongue movements and became unresponsive. She was clinically diagnosed with status epilepticus. She received lorazepam IV with no response, followed by sodium pentobarbital IV. Fosphenytoin sodium IV with response and was intubated. Evaluation included a

Table for Abstract 244

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<th>Age</th>
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Abstracts
negative initial urine drug screen, LP and MRI. Patient’s hospital course was protracted by continued seizure activity on EEG requiring additional antiseizure medications (valproic acid, phenobarbital, and phenytoin). Echocardiograms showed slight diastolic dysfunction and wall motion abnormalities in the left ventricular and sulci size, likely caused by global brain anoxia. Discharge medications include triflusal 360 mg po bid, topiramate 25 mg po bid, and phenobarbital 150 mg po bid. He was transferred to another hospital for no episodes of clinical or subclinical seizures since HD 20. Laboratory analysis included an LC-MS TOF seizure panel for common causes of drug-induced seizures, which was negative. Analysis of the remaining metabolites was positive for methadone and EDDP metabolite levels 20 h after presentation were 30 and 33 ng/mL. She was discharged home on HD 35. Discussion: Seizures caused by methadone are a rare toxicity reference. The mechanism by which seizures occur could be due to hypoaxia, but animal data suggest a direct mechanism. Conclusion: This report clearly illustrates that methadone intoxication can cause seizure activity.

246. Insulin Glargine Unintentional Overdose: Monitored Successfully at Home Yunez C,1 Aldosary B,2 Hon S,1 Geller R.1 1Georgia Poison Center, Atlanta, GA, USA; 2Emory University, Atlanta, GA, USA Background: Glargine (G) (Lantus®) insulin is one of the first long-acting insulin analogues, available in the US since 2005. The predictable kinetic profile has resulted in its wide use. Once subcutaneously injected, it forms micro-precipitates with prolonged duration of action but without prominent peaks. A plateau level is achieved within 4 h, continuing for at least 24 h. Case report: A 60-year-old, 110-kg man with type 2 diabetes mellitus, maintained on Humalog® 70/30 (100 IU twice daily) and insulin G (20 U/day) incidentally injected 100 units (five times his usual daily dose) of insulin G by mistake for his Humalog® dose. Fifteen minutes later, he realized his mistake and contacted the poison center. His glucose level at that time was 85 mg/dL with his glucose meter, was 141 mg/dL. Based on the patient’s ability to recognize the symptoms of hypoglycemia, the presence of his wife to observe him, and the availability of his glucose meter, he remained at home to monitor serial blood glucose levels throughout the day and to observe for symptoms. He was advised also to omit all of his insulin doses for 24 h. He ate a normal diet. Throughout the following 24-h follow-up period, he experienced no episodes of hypoglycemia. There have been only six case reports in the literature of insulin G OD; 5/6 cases required dextrose. Conclusion: An unintended OD of insulin G may be monitored at home in some circumstances. Onset of hypoglycemia may present as early as 2.5 h post OD. Prolonged hypoglycemic effect of insulin G in overdose seems to be dose-dependent. In the case of a patient with the highest dose resulted in the longest effect of 106 h.

247. Methadone Associated Cerebellitis Schwarz E, Velez L. University of Texas Southwestern, Dallas, TX, USA Case report: A 2-year-old male with a pna of asthma presented to the ED with fever, respiratory distress. On arrival he had shallow respirations with low sats, wheezing, and a pulse of 140 with BP of 88/58. He received neopenhagen and saturations improved. The hypothermia was treated with a 200 cc bolus of NS. A UDS was positive for methadone. He received a ½ amp of narcan. Despite a reported response, he was intubated and on mechanical ventilation. His temperature was normal. Serum rhubarbing was 1.0 mg/dL. Post intubation ABG was 7.25/38/258. Lytes were reported with an AG of 20, CO2 of 14, and BUN/Cr of 19/1.52. After another 100 mL of NS and ½ amp of narcan his temp was 79/43. He was transported and en route was started on dopamine 10 μg/kg/min, and 1 hour after arrival to our facility his BP was 73/25 with mictonic pupils and flaccid tone. Narcan 1.46 mg IV was given with no reported response. He was brought to the OR for ICP monitoring and received a large ICP bolus immediately afterwards. He was given ativan and started on a narcan infusion at 2 μg/kg/min. Antibiotics were started for aspiration pneumonia. The toxicology service was consulted. The narcan infusion was stopped. Repeat CT scan on hospital day #1 showed cerebellitis. The next few days were characterized by an increase in ICP on home ICP monitor. Hospital day #4 showed watershed infarcts in the basal ganglia and the cerebellum. At that time he had normal pupils, was moving all his extremities, and was extubated. Repeat UDS was positive for methadone and caffeine. At the time of discharge 16 days later, his truncal ataxia had improved and he was able to walk unassisted but still had decreased language skills. Discussion: Two case reports in the literature angiography confirmed the presence of methadone and caffeine in cerebrospinal fluid and cerebellitis. In both the children were found unresponsive, as was this patient. In both cases the patients were hyponatremic and acidic (pH < 7.0). While methadone may cause hypotonia and hypoaxia, but not slow wave sleep, the possibility of hypoxia and hypoaxia may have been responsible for the radiologic/clinical findings. Literature concerning patients with neonatal abstinence syndrome who were treated with methadone does not mention this association. Conclusion: Cerebellitis has been associated with pediatric methadone exposures. It should be considered in those found with hypoventilation, hypotension, and metabolic acidosis.

248. Do Multiple Products Raise the Risk of Adverse Events? An Evaluation of Therapeutic Errors with OTC Products? Bond GR,1 Woodward R.2 1Cincinnati Drug and Poison Information Center, Cincinnati, OH, USA; 2Division of Pediatric Emergency Medicine, Cincinnati Children’s Hospital, Cincinnati, OH, USA Background: Based on case reports, there has been speculation that the simultaneous therapeutic use of multiple products in children, particularly multiple OTC cough and cold products or multiple products containing acetaminophen (APAP), raises the risk of adverse events. Large databases have not been used to analyze this. We sought to compare the outcome of single product therapeutic errors (TE) to that of multiple product errors (MTE) in children. Methods: We used the NPDS database for the years 2001–2008 and looked specifically at children less than 6 years who ingested a pharmaceutical and were seen in an HCF and followed to HCF Level of Care outcome. Results: Of 10,164 TE cases with only a single product, 4,738 cases involved an OTC cough and cold medication (CCM) or acetaminophen (APAP) and 2,028 cases involved an OTC product containing APAP. Of these 2,028 APAP containing cases, 245 (12.1%) received NAC, 91 (37.1%) had some AST elevation >100 IU/L of which 53 (21.6%) had AST >100 IU/L. Of the 4,738 cases involving a CCM or antihistamine, 2,728 cases involving an OTC CCM and 328 cases involving at least one product containing OTC APAP. Of these 328 cases, 34 (10.4%) received NAC, 11 (3.2%) had the AST elevated >100 IU/L of which 5 (14.7%) had AST >1,000 IU/L – none died. Of 616 involving a CCM or antihistamine, 279 (45.2%) had some neurological symptom and 48 (17.2%) of these were admitted to hospital. Between groups, only the rate of APAP deaths and rate of CCM neurological symptoms were different at the 95% CI. Conclusions: Based on this database, APAP related TE involving more than one substance was more likely to result in sequelae. In contrast TE involving at least one antihistamine or CCM with another product is more likely to result in serious sequelae. In those found with hypoventilation, hypotension, and metabolic acidosis, the presence of his wife to observe him, and the Home was searched and no other medications were found. The child’s symptoms resolved and she was discharged home the following day with no sequelae. Discussion: Diphenhydramine toxicity is a common poisoning in children. Toxicity typically presents with signs and symptoms of the anti-muscarinic toxicidrome. Diphenhydramine also has potential sodium channel blocking properties, and therefore it is not surprising it may also cause WCT via fast cardiac sodium channel blockade. The QRS prolongation in a child this age is of particular note because the child’s QRS of roughly 80 ms. One case of WCT in a child from dimenhydrinate exists in the literature, however dimenhydrinate contains, in addition to diphenhydramine, 9-chloroantherylene, a more potent sodium channel blocking agent. Dimenhydrinate toxicity has been described to cause WCT. Thus the above case is unique in that it is the first case of WCT in a child from isolated diphenhydramine ingestion. Conclusion: Wide-complex tachycardia swithout any other signs or symptoms was recognized as a complication of pediatric diphenhydramine overdose, and it appears responsive to hypertonic sodium bicarbonate.

250. Massive Hydroxyurea Overdose in a Child Treated with Gastric Lavage and Activated charcoal Cole JB1, Stefflplug SJ, Moquist KL, Setzer SC,1 Bildenafil E.1 1Hennepin Regional Poison Center, Minneapolis, MN, USA; 2Children’s Hospitals and Clinics of Minnesota, St. Paul, MN, USA Introduction: Hydroxyurea (HU) is used in the treatment of sickle cell disease to increase fetal hemoglobin. This mechanism of action is unknown, however the drug is a known mitotic inhibitor and has been used as an antineoplastic. Pediatric overdoses are extremely rare. We present a case of a child with a massive HU ingestion treated with aggressive GI decontamination. Case report: The mother of a 3-year-old boy with Hemoglobin S disease called her clinic requesting a refill of HU. She wanted the refill because the child had just ingested the entire bottle of the suspension, containing 9 g, though a small amount was spilled. Poison control was contacted and the child was taken to the ED. Gastric lavage was performed and 25 g of activated charcoal was administered. Lavage was completed within 1 h of ingestion. Baseline labs were drawn with a normal serum HU level (WBC) of 27,000 cells/mL. Of note, this child had an baseline leukocytosis between 15,000 and 27,000 cells/mL. The child was discharged after 6 h with no symptoms. Labs were drawn twice a normal sheet period of 4 weeks. In 2 weeks the WBC fell to 10,100 cells/mL, but returned to baseline 14 days later. At no time did the child develop symptoms. Discussion: HU is a mitotic inhibitor, inhibiting the enzyme ribonucleoside-diphosphate reductase, which is a crucial rate-limiting step in the synthesis of DNA, and thus HU causes cell-cycle arrest at the G1-S interface. Myelosuppression is common in adults. This child had a BSA of 0.61 m2 and ingested 9 g for a maximum ingestion of 14.8 g/m2 of HU. HU is rapidly absorbed.
251. Lead Poisoning from Use of Bronze Drinking Vessels During the Late Chinese Shang Dynasty: An In Vitro Experiment

Woolf AD, Lau T, Yu H-YE, Woolf NT, Kellogg M. Children’s Hospital, Boston, MA, USA

Introduction: Bronze drinking vessels famous for their intricate carvings and used by aristocracy in the Chinese Shang dynasty (1555–1145 BCE) are known to have been fabricated with alloys containing soft metallic lead. For example, the famous Shang-period warrior princess Fu Hao could have suffered chronic lead poisoning from such vessels into the fermented grain wines. The lead could have been as high as 85 mg/L. By contrast the containers, before lead was excluded from the manufac-
turing, it is possible the GI decontamination prevented absorption of a toxic amount of lead. Conclusion: GI decontamination should be considered in early present-
ig overdoses of hydroxurea.

252. First Seizure After Consumption of 5-Hour Energy

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Background: Energy drinks represent a 3.5 billion dollar annual industry that specifically targets adolescents and young adults with aggressive marketing campaigns. The health consequences of energy drink use in adoles-
cence are unknown. We report an adverse event in a teenager after consumption of 5-Hour Energy. Case report: A 15-year-old boy presented to the ED for new-
onset seizure activity. Two hours after drinking two bot-
tles of 5-Hour Energy in rapid succession, the patient experienced a witnessed, generalized, tonic-clonic sec-
ture. His past medical history was negative for prior seizues, or head trauma. This was his first exposure to 5-Hour Energy. In the ED, he became post-progres-
sively more responsive, and vomited repeatedly. On return to a normal sensorium, the patient described a persistent headache. His vital signs were significant for a pulse of 120 beats/min, and a blood pressure of 128/69 mmHg. CT of the brain was unremarkable. The patient’s serum chemistries were notable for a potas-
sium of 3.3 mEq/L. Urine drug testing with chroma-
tography/mass spectrometry was positive for caffeine and metabolites, but negative for other stimulants or epileptogenic medications. The patient described drinking the energy drinks in an attempt to modify his sleep schedule before the start of the school year. Case discussion: This patient experienced his first seizure in the setting of energy drink use, and sleep deprivation. He also displayed typical symptoms of caf-
feine toxicity, including vomiting, tachycardia, and hypokalemia. While causality cannot be established in this single case, the criteria of temporal relationship and plausibility are satisfied; more data on the adverse effects of energy drinks in adolescents is urgently needed. Conclusions: Reporting of energy drink-related adverse events is haphazard. We encourage the communication of all potential energy products adverse events to the Food and Drug Administration via MedWatch. Without these data, the FDA will be hard-
pressed to take action, if necessary, in limiting or recall-
ing energy products. MedWatch reporting can be accomplished online at the following website: http://www.fda.gov/safety/MedWatch/default.htm.

253. Massive Acetaminophen Ingestion Resulting in Hepatic Injury Despite Early Use of N-Acetylcysteine

Levine M, Ruha A-M. Department of Medical Toxicology, Banner Good Samaritan Medical Center, Phoenix, AZ, USA

Background: Very large overdoses of acetaminophen (APAP) have been associated with coma and acidosis in the absence of hepatic failure. Treatment with N-acetyl-
cystein (NAC) within 8 h of APAP ingestion is gener-
ally effective in preventing severe liver injury. We present a case of a large APAP overdose with NAC within 4 h with subsequent hepatic injury. Case presentation: A 39-year-old woman overdosed 20 min after a fight with her husband, with the time confirmed by a text message and a purchase receipt for the APAP. For personal use only. 7 days 13,400 113,000 85,000

Conclusion: To our knowledge, we report the first case of transient regional ST segment elevations in a patient with an ibuprofen overdose.

254. Transient Regional ST Elevation Mimicking Acute Myocardial Infarction Following Intentional Ibuprofen Overdose

French AK2, Luce KC2, Oregon Poison Center, Portland, OR, USA; 2Oregon Health and Sciences University, Portland, OR, USA

Background: Life threatening complications from ibu-
profen overdose are infrequent. CNS and GI complica-
tions are the most common clinical findings. We describe a case of a large ibuprofen overdose associated with transient regional ST segment elevations. Case: A 56-year-old female with no known cardiac disease presented 5 h after ingesting up to 200 tabs of 200 mg ibuprofen and alcohol. She became progressively more lethargic and was intubated for airway protection. Initial vital signs were: T 37.5 °C, HR 110 BP 89/43, RR 8. ABG after intubation was: 7.30/42/136/20/-6. A urine drug screen was negative for cocaine and methamphetamine. An ECG, as interpreted by the consulting cardiologist, revealed sinus tachycardia with concave up ST eleva-
tion and J point elevation in the inferior leads and dif-
fuse J point elevation throughout. A comparison ECG was not available. Transsthoracic echocardiogram was negative for wall motion abnormalities. Three sets of troponins were also negative. The patient recovered by the next day and was extubated. Repeat ECG 16 h later showed resolved ST segment elevation. Discussion: In addition to acute myocardial infarction, ST elevation can be seen in acute pericarditis and myocarditis, hypokalemia, Brugada syndrome, pulmonary embolism, and PRINTmetals’ angina. Except in rare cases of multisys-
tem organ failure, isolated cardiovascular effects from ibuprofen overdose have not been reported.

Conclusion: To our knowledge, we report the first case of transient regional ST segment elevations in a patient with an ibuprofen overdose.

255. Delayed Hyperglycemia Following Verapamil Overdose

Wehrheit KW, Rhyee SH. UMass Memorial Health Care, Worcester, MA, USA

Objective: To describe a case of verapamil overdose where hemodynamic instability preceded hyperglycemia by several hours. Case report: A 44-year-old nondia-
betic female presented to the emergency department (ED) following suspected overdose of verapamil, clonazepam, and oxycodone-acetaminophen. Doses and time of ingestion were unknown. On arrival her vital signs were blood pressure (BP) 102/52 mmHg, heart rate (HR) 88 bpm, respiratory rate 22 BTPS, temperature 35.3 °C, ini-
tial serum glucose was 136 mg/dL. Physical exam was significant for somnolence, non-focal neurological exam, dilated and sluggish pupils bilaterally, and normal lung and cardiovascular exams. Laboratory tests were normal except for a serum lipase of 330 U/L and an elevated white blood cell count of 18.9 x 10^3/mm^3 Initial ECG showed an accelerated junctional rhythm at 73 bpm. Serum glucose 2 h after presentation was 100 mg/dL. Her BP dropped to 88/55 mmHg with a HR of 71 bpm 4½ h after presentation; after 2 more hours she had a glucose of
256. Cardiac Insufficiency Monitored by NT-proBNP Following Colchicine Induced Cardiomyopathy
ChiquitoYL, Eyer F, Felgenhauer N, Pfab R, Zilker TR.
Technische Universitaet Muenchen, Munich, Germany
Case report: A 46-year-old man ingested 75 tablets of Colchicum dispar equivalent to 37.5 mg of colchicine in a suicidal attempt. He developed severe gastrointestinal, leucocytosis (9.43 G/L), elevated transaminases (ALT 98 U/L, AST 326 U/L), thrombocytopenia (67 G/L), hypokalaemia (1.3 mg/dL), and dyspnoea (1.71 mmol/L). Thirty-six hours after the intake, concentration of colchicine in serum was 3.7 µg/L. On day 3 leucocytosis (1.82 G/L) and thrombocytopenia (22 G/L) were observed which were followed by severe cardiac conduction abnormalities, from AV conduction delay to complete heart block, have been well-documented in carbacholamine exposure, suggesting similar mechanisms. Urine was positive for oxcarbazepine and prescribed medications—venlafaxine and cetirizine. Conclusion: This is the first report of AV dissociation and accelerated junctional rhythm with oxcarbazepine exposure. Cardiac conduction abnormalities should be considered in oxcarbazepine overdose.

257. Oxcarbazepine Overdose Causing an Accelerated Junctional Rhythm with Atrioventricular Dissociation
Orozco B, Garlich F, Hick J.
Hennepin County Medical Center, Minneapolis, MN, USA
Background: Oxcarbazepine (Trileptal) is a drug that is structurally and functionally similar to carbamazepine. Cardiac conduction abnormalities have not been reported in oxcarbazepine ingestion. We report a case of accelerated junctional rhythm with atrioventricular dissociation following intentional oxcarbazepine overdose. Case report: Forty-one-year-old female presented with altered mental status after a self-reported ingestion of 90,300 mg of tabs of oxcarbazepine over 2 h prior. She arrived with a weak pulse and an irregular rhythm, 72 beats per minute, blood pressure 118/69 mmHg and mild hypotension. Two liters of normal saline were given intravenously with 1 g magnesium, 100 mg of thiamine, 1 mg of folate and 5 mg of droperidol. EKG showed AV dissociation with an accelerated ventricular rhythm at 86 beats per minute. Serum ethanol was 0.46 g/dL, and potassium was 3.4 meq/L, which was treated. At 5 h post ingestion, she spontaneously regained sinus rhythm. The initial oxcarbazepine metabolite level returned at 33.3 mcg/mL. Case discussion: Oxcarbazepine is a newer drug approved for treatment of partial seizures, and also used in bipolar affective disorders and trigeminal neuralgia. It is a structural derivative of the antiepileptic carbamazepine (Tegretol), and similarly exerts its clinical effect by blockade of voltage-sensitive sodium channels. Oxcarbazepine is a pro-drug that is reduced by hepatic enzymes to a pharmacologically active metabolite 10-monohydroxydervi- vate. Sodium hydrosulfite and hypotension have been reported following oral ingestion of oxcarbazepine overdose. This is the first reported case of atrioventricular dissociation in oxcarbazepine overdose. However, cardiac conduction abnormalities, from AV conduction delay to complete heart block, have been well-documented in carbacholamine exposure, suggesting similar mechanisms. Urine was positive for oxcarbazepine and prescribed medications—venlafaxine and cetirizine. Conclusion: This is the first report of AV dissociation and accelerated junctional rhythm with oxcarbazepine exposure. Cardiac conduction abnormalities should be considered in oxcarbazepine overdose.

258. Strychnine Poisoning with Cholinergic Features After Exposure to Cambodian Pesticide
Karter AB, 1Baum C, 1Kerrane B, 1Tomasson A, 1Matthiesen M, 1Unger M, 1Tendler M, 1Clayton J, 2CT Agricul-
2Yale Toxicology, New Haven, CT, USA; 2CT Agricul-
tural Experiment Station, New Haven, CT, USA
Background: Strychnine poisoning typically presents with generalized muscular contractions with intact mental status. We report a case of strychnine poisoning pre-
senting with an initial cholinergic clinical picture after exposure to a Cambodian pesticide. Case report: A 58-year-old Cambodian man ingested a handful of a ground plant-like substance 30 min prior to arrival in the ED. His symptoms were vomiting, drooling, muscle twitching, and difficulty opening mouth due to spasms. Vital signs were HR: 118 bpm; BP: 157/87 mmHg; RR: 15/min. The patient was intubated and received a total of 10 D50 boluses, as well as 3 h of D505 boluses and in this case a solution of D50 was utilized and infused for 39 h. Pertinent initial laboratory studies included WBC 16.9 km/m3, K 2.7 mmol/L, and Mg 2.0 mg/dL. Serum insulin and c-peptide levels drawn 30 h after time of injection were 349 µIU/mL (reference 2–
25 µIU/mL) and ~0.5 ng/mL (reference 1.1–4.4 ng/mL), respectively. Persistent hypokalemia during therapy required aggressive supplementation. After a total 108 h of therapy and 1,686.25 g of glucose infused, the patient’s hypokalemia resolved and sliding scale insulin was restarted. Conclusion: Insulin glargine (Lantus) is a long-acting human insulin analog desirable for its predictable pharmacokinetics and lack of significant peak effect. We present a case of intentional overdose confirmed by serum insulin and c-peptide levels resulting in hypokalemia and prolonged, refractory hypoglycemia. Hypokalemic hypoglycemia can be seen in 1,680 g of glucose infused and continuous glucose infusions may be required in significant insulin glargine overdose in this case a solution of D50 was necessary due to volume overload. In addition to a pro-
teeded course, clinicians might also be aware of issues such as electrolyte abnormalities, hypotonicity of fluids, and volume overload when treating these patients.

260. Ingestions of Prescription Cough and Cold Medications in Children Under 2 Years Reported to Poison Centers
Doyon S, Klein-Schwartz W.
University of Maryland School of Pharmacy, Balti-
more, MD, USA
Background: In October 2007, over-the-counter (OTC) cough and cold medications (CCMs) labeled for children under 2 years of age were volun-
tarily withdrawn. A pre-publication AAPCC NPDPS

Table 1. Ingestions of prescription cough and cold medications in children under age 2 years over time (Table for Auries, and was exubated on hospital day #3. LC/MS analysis identified strychnine 3,200 ppm and propoxur 0.270 ppm. Case discussion: This is a case of strychnine poisoning where the presence of a carbamate compound masked the clinical picture potentially leading to a delay in appropriate diagnosis and treatment. Diff-

ers/100,000 children

<table>
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<tr>
<th>Year</th>
<th>Number of therapeutic errors</th>
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<td>2006</td>
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<td>2007</td>
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<td>2008</td>
<td>328</td>
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Clinical Toxicology vol. 48 no. 6 2010

657
data analysis concluded that, in children under age 2 years, rates of therapeutic errors and unintentional general ingestions involving OTC CCMs declined by 54 and 16% respectively following the withdrawal.

Concerns exist that parents with newly-limited options may have obtained prescription CCMs to treat their children, leading to increases in exposures to these products. Methods: The AAPCC NPDS was queried for exposures to all CCMs in children under the age of 2 years. Prescription CCMs exposures were identified using specific product codes. Therapeutic errors involving prescription CCMs ingestions reported to poison centers from January 1, 2005 to December 31st, 2008 were included. Rates per 100,000 children were calculated using U.S. Census Bureau data. Annual rates are reported as number of cases per 100,000 person-years. For secular comparison, the total number of therapeutic errors reported to the AAPCC NPDS during the same time frame was obtained.

therapeutic errors reported to the AAPCC NPDS during the same time frame was obtained.

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261. Unintentional Victims: Children at Clandestine Methamphetamine Labs
Martin M, Buch K, Chasse T, Judge B.
GRMERC/Michigan State University Program in Emergency Medicine, Grand Rapids, MI, USA

Background: A growing concern for child protective agencies is children of methamphetamine users. It is estimated that children are present at 20% of clandestine drug laboratories and are sometimes forced to assist in methamphetamine production. Methods: Over a 5-year period (2004–2008), we analyzed Hazardous Substances Emergency Events Surveillance (HSEES) data collected by the Agency for Toxic Substances and Disease Registry. Information about acute events involving children was collected, including the number of cases reported involving the substance(s) released, number of victims, number and types of injuries, and number of evacuations. Another source of information was the Clandestine Laboratory Monitoring System (CLSS) of the DEA. The number of children reported in the CLSS are under the control and custody of the Drug Enforcement Administration (DEA). The Maryland Poison Center, the Texas Poison Center Network, and the Arizona Poison Center have been recording this information for managing such exposures and increasing public education.
were used to describe the data. Frequencies and cross tabulations by substance codes for “ethylene glycol” (chemical and collected prospectively using a standard electronic medical database. There were no deaths or likely to occur after ingestion. There were no deaths or outcome.

Conclusions: Propylene oxide over ethanol use increased through 2007. The passed ethanol (n = 252) use in 2002. The rate of fomepizole (n = 361) sur-

decreased and fomepizole therapy increased over time in both adults and children. Fomepizole (n = 361) sur-

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for the decisions they made. Estimated time to com-
plete survey was 5–10 min. We presented a formal lecture on the findings and reviewed management rationales. Children and parent/guardian management guidelines were made as a result of the survey findings. Conclusion: Web-based tools are fre-
quently utilized in many work environments. The use of a web-based survey in a poison center can provide a valuable platform for educational and practice-based applications. Our survey results showed that re-education was needed on some key management issues. Surveys can be non-threatening, cost-effective and fun for participants.

270. Blogging for Poison Centers: The Utilization of Blog Sites to Increase Awareness of Poison Center Services
DeRienzo CA, Michels JE.
Palmeto Poison Center, University of South Carolina, Columbia, SC, USA
Background: Poison Centers (PC) have recently utilized social networking sites such as Facebook and Twitter to provide information about PC services. Followers on these sites can be engaged due to internet accessibility on computers and hand held mobile devices. To increase traffic to Poison Center web sites, popular web pages and blogs can be utilized as a tool for referral. Case report: The Palmetto Poison Center (PPC) in Columbia, SC, USA is a hub for poison prevention efforts and education. It serves as a regional poison center for the Southeast and in conjunction with other Poison Centers and the National Center for Poison Information, provides a comprehensive website with extensive information on over 8,000 agents. The PPC web site includes a blog, which is a frequently updated section of the site that is designed to keep the public informed on current poison prevention issues.

Methods: The Palmetto Poison Center, University of South Carolina, Columbia, SC, USA
Background: For more than 10 years the Federal Institu-
tute for Risk Assessment (BfR), Berlin, Germany; "2BAM Federal Institute for Material Research and Testing, Berlin, Germany

Abstracts

272. Childproof Oil Lamps Are Possible! New Design Burners Can Effectively Protect Chil-
dren from Poisoning
Hahn A, Ul K.
Federal Institute for Risk Assessment (BfR), Berlin, Germany; "2BAM Federal Institute for Material Research and Testing, Berlin, Germany

Background: For more than 10 years the Feder-
al Institute for Risk Assessment (BfR) and its predecessor institutes have been striving to reduce the risk of poi-
sioning from lamp oil by raising awareness of the haz-
ards. In most of these accidents children drank directly from the unsafe oil lamps, which are mostly in the reach of the children. Therefore, a European standard was published in 2003 (DIN EN 14059: Decorative oil lamps – Safety requirements and test methods) on the initiative of BfR, which stipulates safety requirements and test methods for decorative oil lamps with different pur-
oposes. However, manufacturers and distributors have so far failed to develop childproof oil lamps for use in homes and gardens or place such lamps on the European market. To protect the children, proposals have been made for an easy construction of child-safe burners. Method: Out of concern for children’s health the BAM Federal Institute for Materials Research and Testing (BAM), with the support of BfR, has come up with a design study for a childproof burner for lamp oils. This is a very simple and low-cost design that can be con-
structed without any major technical outlay. Existing lamps can be retrofitted. The burners are designed in such a way that children can no longer open and drink from the oil lamps. It is also much more difficult for them to access thewick. The BAM, the responsible public agency, makes this design available to manufac-
turers and distributors free of charge on the Internet. Manufacturers can then incorporate it into their own marketable products thereby considerably increasing the safety of their products in line with the Product Safety Act. Results: The BAM and BfR activities should be seen more particularly against the backdrop that significant amounts of lamp oil are consumed in al-
lamps containing biodiesel, mineral oil or coconut oil is quite small, but will increase in the future with a new legislation. Conclusion: The still existing gap between the local housing areas and their safety can be narrowed in the future by using eco-friendly lamp oil and lye ingestions, including two fatalities from such a community meeting. The elders suggested a method to reduce the risk of lamp oil and lye ingestions, including two fatalities from such a community meeting. The elders suggested a method for children who live in these communities on the dangers to children from hydrocar-
bons and lyes. Results: A series of face-to-face community based meetings were ruled out by the elders as unwise for reasons of lack of time and reluctance to use telephones, the primary method of contacting a poison center. The majority, if not all, standard poison preven-
tion materials, including prevention/information pamphlets, phone stickers or magnets with the toll free telephone number or Radio and TV PSAs have no con-
nexion or impact in the Amish community. Our poison center noted a number of significant pediatric kerosene, lamp oil and lye ingestions, including two fatalities involving Amish patients. Method: Direct consulta-
tion with elders in the Amish and Mennonite communi-
ties over a year’s time on possible ways to educate the elders suggested a pamphlet to be distributed at the country stores where the kerosene and lye are sold. A pamphlet was designed to conform to the Amish community standards. Collabora-
tive efforts of local county health departments and the Amish and Mennonite communities helped identify a distribution method including midwifes, clinics, schools, and stores. Discussion: Previous educational materials did not address the specific needs of a specific
275. High Fidelity Patient Simulations Enhance Clinical Toxicology Educational Experiences

Marrath, S.1, Stook, J.2, Grant, WD.2, Rodrigues, E.2, Holland, MC.1, and Greer, J.L.1
1Upstate Medical University, Upstate New York Poison Center, Syracuse, NY, USA; 2Upstate Medical University, Syracuse, NY, USA

Background: Toxicology specific curriculum in Emergency Medicine (EM) Residency Programs is often didactic without actual hands-on experience. The integration of computer enhanced simulation mannequins into the curriculum allows for repetitive and consistent experiences, especially with rare exposures and experiences of severe complications of common exposures. This may be the only way physicians can practice the bedside management of such cases. These sessions required logistics to be similar to those for emergency medicine simulation.

Methods: Sim-GY 2-EM residents held toxicology simulations which employ Laerdal SimMan® high fidelity mannequins. Seventeen different simulations are currently in use representing common critical poisoning cases as well as rare toxicological scenarios: a triyclic antidepressant poisoning; calcium channel blocker overdose in an adult and pediatric patient; dermal hydrofluoric acid exposure; a smoke inhalation patient; pediatric hydrocarbon aspiration; an unknown and unresponsive overdose patient. For each scenario, demonstration of both cognitive and psychomotor competencies is required. Because of the computer support for each mannequin, the level of difficulty for each simulation can be varied. Following each scenario, a debriefing session is held. Results: The residents note that even though there is a high likelihood of their encountering toxic exposures in the emergency department, the simulations enhance their abilities to treat these patients successfully because of their “real-life” experience.

Conclusions: Preparing for unusual toxic exposures poses extra demands on rapid detection, diagnosis, and communication. As there is much uncertainty with unusual out-breaks, communication at all levels (first responders, public, media) demands special skills. Unusual outbreaks may be patients presenting with symptoms not fitting clinical pictures, or an unusual number of cases, high uncertainty in diagnosis. At times, it may be necessary to count the number of small handfuls of ASA, and at other times to disseminate “small handfuls” of ASA. In conclusion, there is no standard number that constitutes a “handful of pills,” but it is instead a subjective amount to each person depending on pill size and diagnostic accuracy, although they can never be a replacement for sound clinical judgment. A third key factor is rapid sharing of information between various (governmental) organizations. In the Netherlands, a national multidisciplinary assessment team for chemical incidents has been established. Information collected by one institute, is rapidly distributed to all others. This team then provides first responders with tips, facts and news about poisoning for the public with tips, facts and news about poisoning. In the United States, awareness of poisoning is growing, and practice guidelines are being developed, which when designing low cost and sustainable community interventions, help bridge gaps to reach underserved ethnic communities.

277. How to Prepare for Unusual Toxic Outbreaks

De Vries I, Meuvelbelt J.
Dutch National Poisons Information Centre, Bilthoven, The Netherlands

Background: Good preparedness is essential to successful management in case of toxic outbreaks. Preparing for unusual toxic outbreaks poses extra demands on rapid detection, diagnosis, and communication. As there is much uncertainty with unusual outbreaks, communication at all levels (first responders, public, media) demands special skills. Unusual outbreaks may be patients presenting with symptoms not fitting clinical pictures, or an unusual number of cases, high uncertainty in diagnosis. At times, it may be necessary to count the number of small handfuls of ASA, and at other times to disseminate “small handfuls” of ASA. In conclusion, there is no standard number that constitutes a “handful of pills,” but it is instead a subjective amount to each person depending on pill size and diagnostic accuracy, although they can never be a replacement for sound clinical judgment. A third key factor is rapid sharing of information between various (governmental) organizations. In the Netherlands, a national multidisciplinary assessment team for chemical incidents has been established. Information collected by one institute, is rapidly distributed to all others. This team then provides first responders and authorities with coherent advice on the adverse effects for public health and the environment. Possible actions to reduce the number of human casualties and the size of environmental pollution are proposed. This expertise is available 24 h a day. Likewise, a Laboratory Network of specialized reference laboratories has been established, so no time is lost in finding laboratory expertise. Risk communication: Thorough knowledge of the information needs of all groups involved (first responders, local and national authorities, public, media), and their behavior in circumstances with high uncertainty is crucial. Public awareness campaigns should be tailored to the specific local situation. Media is vital to keep an open mind. For instance: is it truly or totally a toxic outbreak or does mass psychogenic illness creep in? In this latter case, suppressing turmoil by spreading the facts is less important than providing all resources for adequate first response. Using a multidisciplinary approach will improve communication.

279. Develop and Launch the First Free, Bilingual Text Messaging Service for Poisoning Prevention in Developing Nations and News

Simeonov I, Hamm K, Heard SE.
University of California San Francisco, San Francisco, CA, USA

Background: In the US 88% of people own a mobile phone, nearly 60% carry a cell phone “at all times.” Including inside the home. Ninety-eight percent of cell phones can send and receive text messages, 2.5 billion text messages are sent daily. In 2009, more text messages were sent per phone in the 35–44 age group than in the U.S. Of wireless users 13%, 57% are considered regular text message users. Goal was to develop free, opt-in service for the public with tips, facts and news about poisoning as part of sleeping awareness. Bilingual Text Messaging Service for Poisoning Prevention in Developing Nations and News was created to reduce childhood morbidity and mortality associated with accidental poisoning in resource-poor settings.

References:
information texted back or emailed. Well-placed, targeted advertising is essential in driving consumer opt-ins.

280. Serial Anti-Factor XA Levels After Large Intentional Enoxaparin Overdose
Truitt CA, O’Connor AD, French R.
Banner Good Samaritan Medical Center, Phoenix, AZ, USA
Background: We present a case of intentional enoxaparin overdose (OD), complicated by concomitant warfarin therapy, followed by serial anti-factor Xa (anti-Xa) levels. Based on our review, this appears to be the largest and only intentional overdose reported. Case report: A 58-year-old man with prior CVA and chronic anticoagulation for aortic valve replacement presented to the ED after suicidal ingestion of 960–1,600 mg (12.8–21 mg/kg) of enoxaparin. He reported injecting his abdomen with 12–20 preloaded enoxaparin 80 mg syringes 5 h prior to arrival. In addition to chronic warfarin therapy, he was on enoxaparin for 1 month after a recent CVA. He denied warfarin OD, and complained of headache and left flank pain on presentation. Vital signs were normal. Physical exam was remarkable for mild, diffuse tenderness of the abdominal wall. There were numerous puncture wounds with minimal bleeding noted. CT head, abdomen & pelvis showed no acute hemorrhage, but demonstrated small subcutaneous (SC) air at injection sites. Initial labs: Hb 13.6 g/dL, Pt 365 K/m^3, PT 28.5 s, INR 2.5, PTT 173 s, anti-Xa >2.0 IU/mL (therapeutic 0.6–1.0), Cr 0.7 mg/dL, UA no RBCs. Warfarin & enoxaparin were held, no antides were administered, and serial neurologic exams and labs were obtained. Hb remained stable. On the next 2 days anti-Xa decreased from >2.0 IU/mL at 5 h to 1.0 at 20 h, 0.4 at 29 h, and finally 0.2 at 39 h after injection. Warfarin was restarted on day 2, and he was transferred to inpatient psychiatry without evidence of bleeding.

Discussion: Management of enoxaparin OD is complicated by patients’ underlying need for anticoagulation and lack of an effective reversal agent if bleeding complications arise. Protamine has limited efficacy, and appropriate dosing is unknown in cases of LMWH toxicity. Despite massive OD and concomitant warfarin therapy our patient did not develop significant bleeding. Serial anti-Xa levels were compatible with maintenance of first order elimination kinetics for enoxaparin with a reported mean T1/2 of 4.5–7 h. Conclusion: Serial anti-Xa levels help monitor clinical effects of the following SC enoxaparin OD. In this massive, intentional OD anti-Xa levels approximated anticipated therapeutic enoxaparin pharmacokinetics.

281. Evaluation of a Method for Analysis of Hydrocodone and Metabolites in Urine by Tandem Mass Spectrometry
Valtier S,† Bebarta VS,† Vargas T,†
†Clinical Research Division, Wiford Hall Medical Center, San Antonio, TX, USA; †Department of Emergency Medicine, Wiford Hall Medical Center, San Antonio, TX, USA
Background: For pain management and primary care clinics, monitoring patient compliance of hydrocodeine (HC) is a significant problem. Quantitative analysis of HC and its primary metabolites, hydromorphone (HM) and norhydrocodone (NHC), can aid in monitoring pain management, distinguishing prescribed from unauthorized drug use, and reduce drug diversion. Following the metabolism and excretion profile of an individual with a sensitive and specific drug test can help in determining time since last dose and expected peak concentrations. Objective: We sought to develop and evaluate a simple, rapid and sensitive method to detect and quantitate HC and metabolites in urine by liquid chromatography tandem mass spectrometry (LC/MS/ MS). Methods: Standards spiked with concentrations of HC, HM and NHC ranging from 1 to 5,000 ng/mL were prepared in mobile phase and in opioid negative urine. On line extraction was performed using two multiple reaction monitoring (MRM) transitions per analyte. The linear range was determined for this procedure on concentrations ranging from 1 to 5,000 ng/mL of each analyte. Values were considered within acceptable range if the measured amount was within ±20% of target concentration and ±20% of ion ratio calculation. Results: The linear range was shown to be 5–5,000 ng/mL with r value >0.99 for all compounds. The limit of detection (LOD) for samples prepared in mobile phase was 1 ng/mL (signal to noise ≥3) for all analytes with the exception of HM transition 2 which did not meet acceptance criteria at 2.5 ng/mL. For urine standards, the LOD was 2.5 ng/mL and LOQ of 5 ng/mL for all analytes. The method yielded good precision for both urine and mobile phase preparations at QC levels of 50% Concentration. Conclusion: This study provides a simple and rapid validated LC/MS/MS method for quantitation of hydrocodone and its metabolites in urine spiked samples. Additional method and LC/MS/MS optimization of urine obtained from individuals administered hydrocodone.

282. Study of Paraoxonase-1 Function on Tissue Damage of Dichlorvos
Zhao M, Wang N.
Department of Emergency Medicine, Shengjing Hospital of China Medical University, Shenyang, China
Background: Paraoxonase-1 (PON1) is an A-esterase capable hydrolyzing various organophosphates to protect tissue damage in animals by detecting acetylcholinesterase inhibition level after organophosphates exposure, but no investigation was designed to study the ultrastructure changes after PON1 pretreatment which is a direct evidence for tissue protection of PON1. Methods: Purified rabbit PON1 were injected intravenously into rats 30 min before they were given dichlorvos or dichlorvos + dichlorvos pretreatment at control group. Blood was collected at 30 min, 1, 2, 4, 6, 24, 48 and 72 h after dichlorvos administration to examine the acetyl cholinesterase (AChE) inhibition level and poisoning signs were observed. Seventy-two hours later, animals were anesthetized with chloral hydrate and kidney were removed for observation of ultrastructure. Results: AChE activities in PON1 pretreatment group were statistically significant from dichlorvos administration group (p < 0.01). The clinical signs were alleviated by PON1 (p < 0.05). The most common change of organophosphorus poisoning damage to liver was small lipid-like structures could be seen through out the liver structure. In kidney, dense bodies were seen. The most significant changes in lung was lost of lamellar structure of lamellar bodies in type II alveolar epithelial cell. As for changes of hippocampus, demylation take place after acute organophosphorus, but neural edema was not improved significantly in our study. Conclusions: PON1 can decrease the AChE inhibition, relieve poisoning signs and alleviate tissue damage of dichlorvos.

283. Real-Time LC-MS/TOF Analysis Guiding Treatment in Diphenhydramine-Induced Seizures
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†San Francisco Division, California Poison Control System, University of California, San Francisco, San Francisco, CA, USA; ‡Department of Laboratory Medicine, University of California, San Francisco, San Francisco, CA, USA
Background: Our institution developed an LC-MS/MS seizure panel for common drugs involved in drug-induced seizures. We report a case of seizure and delirium due to diphenhydramine (DPH) ingestion with real-time serum and pill analysis to guide treatment. Case report: A 40-year-old female with history of alcohol abuse had a tonic seizure an unknown time after ingesting 60 pills of an herbal supplement called “Sound Sleep” and possibly other medications. Upon arrival she was awake but confused, afibrile, tachycardic, hypertensive and had a resting tremor. Five hours later, she became agitated with incomprehensible speech, delirium, mydriasis and was placed in 4-p restraint. Her ECG showed sinus tachycardia and diffuse atrial activity. Lorazepam 2 mg IV and haloperidol 5 mg IV were given with good effect. At this time, we requested serum and “Sound Sleep” pill specimens. Over the next 4 h her agitation and delirium worsened, requiring treatment lorazepam instead of phenytoin. Twelve hours later she was confused without agitation and was discharged on day 4. Methods: Serum and pill samples were analyzed using our current Liquid Quadrupole Time-of-Flight Mass Spectrometer (LC1200-MS/TOF 6230). The chomatograms obtained were analyzed using Agilent’s MassHunter Qualitative analysis software to determine the qualitative and quantitative drugs in the specimen. We have to both formula and retention time matches. Agilent’s MassHunter Qualitative Analysis software was used to determine its level. Discussion: Emergency patient management requires quick and efficient analysis. This software package utilizing LC-MS/TOF identified DPH in a patient with seizure and agitated delirium, within a time frame that allowed recommendation of a specific intervention (phenytoin). Conclusion: This study of potential utility of rapid turnaround directed toxicology analysis in the treatment of the acutely poisoned patient.

284. Caffeine in pre-Pre-Teens: Emergency Department Pediatric GC/MS Urine Toxicology Screens
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Introduction: In our pediatric Emergency Department, the consulted Medical Toxicology service typically recommends comprehensive GC/MS toxicology screening tests in cases of unknown or suspected ingestions or overdoses. We have anecdotal evidence that numbers of positive caffeine and nicotine results over the last 5 years. Caffeine and nicotine use and abuse continue to increase in people <18 years old. Therefore, we performed this study to find out the actual prevalence of caffeine and nicotine in the pediatric Emergency Department population described above. Methods: We performed a retrospective chart review of pediatric (less than 18 years old) Emergency Department records at an urban tertiary care hospital, with GC/MS urine toxicology testing (UTOX) between January 2009 and December 2009. We collected information on age, sex, and xenobiotics found on UTOX. Results: Of the 162 cases that met our inclusion criteria, 49% were male, and the median age was 16 (range 11–20) months. Drugs of abuse were as follows: caffeine (81%), nicotine/cotinine (25%), catalopram (12%), diphenhydramine (11%), acetaminophen (8%), ibuprofen (6%), dextromethorphan (6%), fluoxetine (5%), quetiapine (5%), bupropion (5%), and oxcarbazepine (5%). Other agents found in ≤5% of cases included: amitryptiline, amphetamine, benzotropine, carbamazepine, chlorpromazine, chlordiazepoxide, clonazepam, clonidine, dextroamphetamine, dextro- ephe-drine, hydrocodone, lamotrigine, levorphanol, lidocaine, MDA, MDMA, methyleneidene, metoclo- pramide, mirtazapine, morphine, naproxen, nortripty- line, oxazepam, phencyclidine, phenobarbital, paracetamol, phenylpropanolamine, sertraline, topira- mate, tramadol, trazadone, and zolpidem. Caffeine was

Clinical Toxicology vol. 48 no. 6 2010
Abstracts

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found in: 17/26 (65%) of children <10 years old; 4/15 (27%) of children <5 years old; and 47/57 (5%) of children <2 years old. Conclusion: Caffeine and nicotine are prevalent in the pediatric population presenting to the Emergency Department. Caffeine was present in over 80% of pediatric patients included in this study. Further screening in the pediatric Emergency Department is recommended in the presence of caffeine and nicotine use, but this study suggests a marked prevalence of caffeine and nicotine use or exposure.

285. Malignant Hyperthermia Followed by Acute Inferior Myocardial Infarction and Negative Cardiac Catheterization: Variant Takotsubo Cardiomyopathy

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Background: Malignant hyperthermia is a disease of calcium regulation in skeletal muscle. The resulting hypermetabolic state causes cardiovascular disturbances such as tachycardia and hypotension. Takotsubo cardiomyopathy, also known as “broken heart syndrome,” mimics acute myocardial infarction and occurs in patients following stressful events who have no angiographic coronary disease and is classically transient in the cardiac apex, although variants have been described. Takotsubo cardiomyopathy has been reported in association with malignant hyperthermia to our knowledge. Case report: A 29-year-old previously healthy female underwent elective breast reduction. Operative anesthesia was achieved with propofol, succinylcholine, and sufentanil. Two hours into the procedure, her end-tidal CO₂ and temperature began to rise. They peaked respectively at 156.4 mmHg and 42.0°C (107.6°F) over the next hour. Her heart rate rose from 130 to 150 bpm and her systolic blood pressure fell from 120 to 95 mmHg. Dantrolene was administered (2 mg/kg IV) resulting in resolution of symptoms over the next hour. Surgery was aborted and the patient admitted to the intensive care unit. Upon arrival, bradyarrhythmia was noted. An echocardiogram 3 mm of ST elevation in the inferior leads with reciprocal changes. Emergent cardiac catheterization was negative for coronary artery disease but revealed a hyperdynamic left ventricle and an akinetically inferior wall. Dantrolene was continued at 1 mg/kg every 6 h for 48 h. Her maximum creatine kinase was 8,590 U/L with borderlines at 1.7. Troponin was 0.6 ng/mL (normal < 0.2). Her EKG abnormalities resolved and she remained hemodynamically stable. An echocardiogram 10 days later revealed slight basal septal hypokinesia with normal wall thickness. Conclusion: We report a case of malignant hyperthermia associated with acute inferior myocardial infarction in a 29-year-old with no angiographic coronary disease and transient cardiac wall motion abnormalities. Her clinical picture may represent a variant of Takotsubo cardiomyopathy.

286. Hyperkalemia As a Complication of Chronic Digoxin Poisoning

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Abstracts

Clinical Toxicology vol. 48 no. 6 2010

Serum potassium levels, when available, were recorded. Hypokalemia was defined as a serum potassium of <3.5 mEq/L. Serum creatinine levels, when available, were used as an indicator of renal function. Hyperkalemia was defined as a serum potassium level >5.0 mEq/L. Hypokalemia was only present in 4% (112/27) of acute cases and 2% (2/94) of chronic cases. Of cases with hyperkalemia and available serum creatinine levels, 43% (3/7) of patients in the acute group and 61% (35/57) of patients in the chronic group had creatinine of 2.0 mg/dL or greater. Conclusion: Although hyperkalemia is often described as a complication of acute digoxin toxicity, our results found hyperkalemia was present in 66% of patients with chronic digoxin poisoning. This is likely due to a higher prevalence in patients presenting with chronic toxicity. Conversely, only 26% of acute cases had hyperkalemia. Very low rates of hyperkalemia in the retrospective analysis of all Illinois Poison Center chronic digoxin poisoning.

287. Extreme Metabolic Alkalosis Associated with Alternative Cancer Therapy

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Background: Bicarbonate therapy is used by some alternative practitioners for cancer patients despite lack of evidence supporting its use. We present a case of severe metabolic alkalosis following IV bicarbonate. Case report: A 64-year-old female with cancer was given IV sodium bicarbonate (NaHCO₃) at a national cancer center. She got 350 mg NaHCO₃/250 mL D₅W daily 4 x days. On day 5, her sister found her confused and fell out of bed. In the ED she was confused and a VBG showed pH = 8.09, pCO₂ = 26 mmHg. She was put on a VBH + bicarbonate = 80 mL/L, base excess >30 mmol/L. Vital signs: HR = 94, BP = 162/87, RR = 16. Labs were Na⁺ = 134 mmol/L, K⁺ = 1.7 mmol/L, Cl⁻ = 38 mmol/L, CO₂ = 54 mmol/L. CO₂ = 2.09 mg/dL, lactate 3.9 mmol/L. Urine pH = 6.5. Head CT and urine were normal. ECG was sinus rhythm with a QT = 519 ms IV NS + 20 mg KCl/L at 200 mL/h. Her K and Mg supplement. ABG 1 h later showed pH = 7.74, pCO₂ = 56, pO₂ = 74, bicarbonate = 74, base excess >30. Mental status and types normalized with supportive care. She left AMA 48 h after presentation with K = 3.8, Cl = 100, Na⁺ = 134 mmol/L, CO₂ = 34, CO₂ = 0.91, and VBH with pH = 7.45, pCO₂ = 47, bicarbonate = 33, base excess = 9. Discussion: Human studies of NaHCO₃ for cancer therapy have not been reported. Such use of NaHCO₃ may stem from evidence in somailian monkey where the pH of some tumors may decrease metastases. Despite internet testimoniials advocating oral baking soda to treat tumors and use of IV NaHCO₃ by some naturpath in the US, we did not find reports of adverse effects after NaHCO₃ cancer therapy in the medical literature. We also did not find reports of survival with pH of 8.09. Metabolic alkalosis is poorly tolerated in humans, with reported mortality of 45% with pH of 7.55 and 80% with pH > 7.65. Mortality may vary based on the manner and rate of development of alkalosis. In this case, factors including volume repletion from poor intake and vomiting and decreased renal excretion of bicarbonate likely worsened alkalosis caused by exogenous NaHCO₃. Conclusion: We describe a patient with a venous pH of 8.09 associated with alternative cancer therapy. References: 1. Robey IF, Baggett BK, Kirkpatrick ND, et al. Mortality may vary based on the manner and rate of development of alkalosis. In this case, factors including volume repletion from poor intake and vomiting and decreased renal excretion of bicarbonate likely worsened alkalosis caused by exogenous NaHCO₃. Conclusion: We describe a patient with a venous pH of 8.09 associated with alternative cancer therapy. References: 1. Robey IF, Baggett BK, Kirkpatrick ND, et al. Mortality may vary based on the manner and rate of development of alkalosis. In this case, factors including volume repletion from poor intake and vomiting and decreased renal excretion of bicarbonate likely worsened alkalosis caused by exogenous NaHCO₃. Conclusion: We describe a patient with a venous pH of 8.09 associated with alternative cancer therapy. References: 1. Robey IF, Baggett BK, Kirkpatrick ND, et al. Mortality may vary based on the manner and rate of development of alkalosis. In this case, factors including volume repletion from poor intake and vomiting and decreased renal excretion of bicarbonate likely worsened alkalosis caused by exogenous NaHCO₃. Conclusion: We describe a patient with a venous pH of 8.09 associated with alternative cancer therapy. References: 1. Robey IF, Baggett BK, Kirkpatrick ND, et al. Mortality may vary based on the manner and rate of development of alkalosis. In this case, factors including volume repletion from poor intake and vomiting and decreased renal excretion of bicarbonate likely worsened alkalosis caused by exogenous NaHCO₃. Conclusion: We describe a patient with a venous pH of 8.09 associated with alternative cancer therapy. References: 1. Robey IF, Baggett BK, Kirkpatrick ND, et al.

288. Adverse Drug Reactions in Pediatric Patients Receiving a Single Dose of Lisdexamfetamine

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Background: Lisdexamfetamine mesylate (LDX, Vyvanse), is a long-acting prodrug of dextroamphetamine. It was FDA-approved in 2007 for the treatment of attention-deficit/hyperactivity disorder in 6-12-year-old children and later for adolescents. A retrospective analysis of exposures reported in 2009 to one state’s regional poison centers identified a total of 16 cases involving pediatric patients’ first dose of LDX. Of the 16 patients this analysis represents, dosages administered ranged from 30 mg up to 100 mg and all presented to local emergency departments with moderate to severe adverse reactions after receiving their first dose. Reported signs and symptoms include the prodrome of other amphetamines, including agitation, confusion, logorhea, tremors, twitching movements, nystagmus, rocking, weakness, hallucinations, phonic tics, extreme excitement, extrapyramidal effects, tachycardia, and hypertension. Prolonged use of LDX can lead to dependency and symptoms similar to that of obsessive disorders, panic and phobic disorders, and obsessive-compulsive and specific phobias. All patients were treated with supportive care, benzodiazepines, IV fluids and, in two cases, diphenhydramine. In all cases symptoms resolved and recommendations were given to discontinue the drug and to consult with their personal physicians. Conclusions: In this limited study, our data suggests that adverse effects due to LDX are similar to other related analeptics. Use of LDX is not associated with the use of this new drug in the pediatric age group.
290. Akathisia in Two Patients Following Newly Compounded 4-Aminopyridine
Rao KB, 1 O’Neill M, 1 Sperling J, 1 White H, 1 Farmer BM, 1 Procaccio DM, 1 Bouchech NC, 1 Nielsen LS, 2 Hoffman RS, 1 Paeng C, 1 Jang D, 1 Abe O, 1 Flomenbaum NE. 1 New York Presbyterian Hospital, New York, NY, USA; 2 New York City Poison Center, New York, NY, USA

Background: 4-Aminopyridine (4AP) is used for treatment of multiple sclerosis (MS). Typically, 4AP is produced for individual patients in a compounding pharmacy. Each time it is compounded, the product may vary. 4AP causes seizures in overdose. We report 2 cases of a self-limited movement disorder following the first dose of newly compounded 4AP in MS patients on long-standing 4AP. Case report 1: A 47-year-old man was presented with normal VS, diabetes, and akathisia soon after taking the first dose of a newly compounded 4AP prescription. He noted that a similar problem occurred in the past and progressed to seize after beginning a new bottle of 4AP. Case report 2: A 57-year-old woman presented with flushing, akathisia, tachycardia, transient confusion, ocular dystonia, and clonus after taking the first tablet from a newly compounded bottle of slow-release 4AP. Serum glucose, sodium, neuroimaging, EEG and CSF cultures were unremarkable. Both patients were treated successfully with benzodiazepines and returned to baseline within 8 h. Both discontinued their newly compounded formulations. Table analysis in case 2 suggested normal drug concentration with a possible impaired release mechanism. Taken in consideration with past reports, it is possible that 4AP may have caused side effects. No other medications, either topical or oral, were being administered and the child’s skin was untreated. The child was discharged to home in satisfactory condition. Case discussion: A Naranjo Score of 6 was calculated for this patient, signifying a probable adverse drug reaction to pramoxine. There is little in the way of pharmacokinetic data regarding this medication, but the extended duration of hallucinations indicates a possible depot effect with prolonged dermal application. Conclusion: Though pramoxine has an excellent safety profile, significant adverse reactions may occur with excessive use.

292. Adverse Events of Desvenlafaxine Using FDA Adverse Events Reporting System
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Background: In March 2008, the US Food and Drug Administration (FDA) approved desvenlafaxine (Pristiq®), for the treatment of major depressive disorder. Desvenlafaxine is a metabolite of the selective serotonin reuptake inhibitor and norepinephrine reuptake inhibitor (SNRI). Due to the norepinephrine reuptake inhibition, SNRIs may be associated with hypertension and dizziness. Using data from the FDA Adverse Events Reporting System (AERS), we investigated these adverse events (AEs) that may be contributory with desvenlafaxine (Pristiq®). Methods: A retrospective review of the AERS database was performed from May 1, 2008 to March 31, 2009. Patients and their associated AEs were evaluated using the terms “desvenlafaxine” and “Pristiq.” AEs were further stratified using the terms “increased blood pressure” and “dizziness.” Patients entered into the AERS database that did not include an event date of the AE were excluded. Results: During May 1, 2008 to March 31, 2009, there were 297 patients with 1,532 AEs that met our inclusion criteria. There were 26 AEs associated with increased blood pressure and 31 AEs associated with dizziness. Discussion: In contrast to selective serotonin reuptake inhibitors (SSRIs), the SNRIs have been associated with AEs due to the elevation of norepinephrine levels. Using the FDA AERS we highlight two common AEs that may be contributory with desvenlafaxine (Pristiq®), a new SNRI approved for major depressive disorder.

293. Serotonin Syndrome Precipitated by Methylene Blue
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Introduction: Methylene blue is used to localize parathyroid glands during parathyroidectomies at doses of 5–7.5 mg/kg. Methylene blue possesses monoamine oxidase (MAO) inhibition, which can lead to serotonin syndrome in patients taking serotonergic medications. A patient who met criteria for serotonin syndrome was treated with methylene blue. This patient demonstrated muscle rigidity with Methylene Blue use in patients on a strong MAO inhibitor and patients should be screened for the use of serotonergic agents and Methylene Blue is not well appreciated. Methylene Blue should be considered a strong MAO inhibitor and patients should be screened for the use of serotonergic agents prior to undergoing administration of Methylene Blue.

294. Methylene Blue: A Strong, but Poorly-Appreciated, MAOI
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Background: A 45-year-old male underwent cardiac bypass for coronary artery disease. During surgery, he was given methylene blue as a cardiovascular drug. During recovery, he developed hyperthermia, agitation delirium, severe myoclonus, ocular clonus, wide swings in blood pressure, metabolic acidosis, respiratory failure, and hyponatremia. On May 1, 2008, the FDA Adverse Events Reporting System (AERS) database was queried for serotonin syndrome in patients taking serotonergic drugs before surgery. Whether this interaction can be expected to occur at methylene blue doses which are used to treat methemoglobinemia (1 mg/kg) remains to be seen but should be considered.

295. A Decade of National Poison Data System (NPDS) Call Data – Baseline Statistical Models
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Introduction: NPDS call volume data exhibits repeated annual patterns (Month), 20 US holidays (Holiday), as well as seasonal patterns (Year). We examined all Human Exposure Calls (HECs, N = 23,805,706) and all Information Calls (ICs, N = 12,601,737) by day for the last decade (2000–2009) for both linear and log-related patterns. The months of January and December (extreme pat- terns) and March (month of the year to account for seasonal patterns (Month), 20 US holidays (Holiday), as well as
Time to account for overall secular trends. Day, Month, and Holiday were each treated as nominal (not ordinal or continuous) variables to avoid assumptions about their relationship with the outcome via PSAT JMP v 6.0.0. 

Results: Linear were better than log models for both HES and IC so subsequent results refer to the linear models, though doubling times were based on log models. Day, Month, Holiday and Time exhibited highly statistically significant (HSS, p < 0.0001) relations to both HES and IC. Most of the individual Days, Months and Holidays (elements) were statistically significant (SS, p < 0.05), with the exception of the elements which were not SS in the HES model were SS for IC, and vice versa. Thus all elements were included in both models. The slope [95% confidence interval] and associated doubling time (DT) were:

- EC slope = 98.7 [95.5, 102] calls/day/year, DT = 44.2 [42.8, 45.7] years
- IC slope = 314 [312, 317] calls/day/year, DT = 7.11 [7.05, 7.18] years

Conclusions: Even after accounting for the variation from Day, Month and Holiday, the secular trend (Time) remained HSS for both HES and ICs, with a greater rate of increase for the ICs. We have not included singular event predictors (such as weather-related health issues) in our findings, which may have application to PC surveillance, staffing, and funding. These initial results underscore the importance of considering all “statistically important” contributors in any quantitative analyses of NPDS call data.

296. Predictors of Toxic Alcohol Ingestion in Cases Called to a Regional Poison Control Center

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Background: Poison Centers are consulted on cases where the differential diagnosis includes ethylene glycol (EG) ingestion. Blood levels of EG are typically not available to assist with initial treatment decisions, which makes rapid diagnosis of EG ingestion difficult. The primary objective of this study is to see if readily available data (in the history and physical examination) can be used to develop a predictive model that accurately and rapidly diagnose the ingestion. The secondary objective is to determine if readily available data, which are already recorded in the charts, can be used to develop a predictive model that accurately and rapidly diagnose EG ingestion.

Methods: A predictive logistic regression model was used to collect data. A standardized data collection sheet was used to collect data. A predictive logistic regression model was used to assess the combined ability of pH, serum calcium, osmol gap, and anion gap (independent variables) to predict a final diagnosis of EG poisoning (dependent variable). Results: There were 102 patients included in the analysis. A total of 45 (44%) of the 102 patients had a final diagnosis of EG poisoning. Results indicated that higher levels of calcium (continuous), osmol gap (continuous), and anion gap (dichotomous, yes/no) were each associated with statistically significant or marginally significant increases in the odds of having a final diagnosis of EG poisoning. pH levels were not independently related to the EG poisoning outcome, and were not included in the final model. The c-index was estimated at 0.81, indicating that the model showed reasonable ability to discriminate between EG poison cases and non EG cases. Based on a linear predictor cutoff that maximized the sum of sensitivity and specificity, the final model had a sensitivity and specificity of 78 and 89% and positive and negative predictive values of 81% and 83% respectively. Conclusion: The combination of elevated calcium, osmol and anion gap were associated with the higher likelihood of being diagnosed with EG poisoning.

297. DNR Orders and the Suicidal Patient: An Ethical Dilemma

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Background: Advance directives and DNR orders are increasingly used to facilitate patient autonomy. DNR orders are generally written for patients with terminal conditions. The suicidal patient with a prior advance directive or DNR presents an ethical dilemma. We present a case where a pre-hospital DNR was honored in a patient with a suicidal ingestion. Case report: A 48-year-old female presents to the ED after being found at home unresponsive with a suicide note and an empty bottle of antifreeze (ethylene glycol). On arrival, she was unresponsive. Vital signs included BP 140/90 mmHg; HR 114; RR 30; O2 sat 80–95%. Initial ABG: pH 6.92; pCO2 18; pO2 195. Her past medical history was significant for remote TBI and numerous suicide attempts. Shortly after arrival, the patient’s health care proxy arrived with a pre-hospital DNR order and an advance directive along with the suicide note. Toxicology was consulted. The patient’s family, legal counsel and legal consults as the patient was potentially incompetent with a potentially reversible condition. The attending MD honored the DNR, but 6 h later, family members questioned the advance directive and the family was asked to give informed consent. The family refused. The family was significant for remote TBI and numerous suicide attempts. The patient was discharged home on the seventh hospital day. Case report: A 48-year-old female presents to the ED after being found at home unresponsive with a suicide note and an empty bottle of antifreeze (ethylene glycol). On arrival, she was unresponsive. Vital signs included BP 140/90 mmHg; HR 114; RR 30; O2 sat 80–95%. Initial ABG: pH 6.92; pCO2 18; pO2 195. Her past medical history was significant for remote TBI and numerous suicide attempts. Shortly after arrival, the patient’s health care proxy arrived with a pre-hospital DNR order and an advance directive along with the suicide note. Toxicology was consulted. The patient’s family, legal counsel and legal consults as the patient was potentially incompetent with a potentially reversible condition. The attending MD honored the DNR, but 6 h later, family members questioned the advance directive and the family was asked to give informed consent. The family refused. The patient’s condition deteriorated. Palliative care only care was begun on day 3; she died on day 5. Conclusion: As this case highlights, the setting of an acutely poisoned patient raise controversy. Does the advance directive reflect a competent patient’s wish, given her subsequent suicide attempt? Does favoring medical treatment over the patient’s wishes mean the clinician become complicit with the patient’s suicide? In this case, the ethics and legal team deemed that the patient was mentally competent when she previously executed the advance directive and recommended they be followed despite a clearly suicidal patient. Poison Centers commonly confront cases similar to this. Our approach has been to uniformly recommend full treatment of the overdose until hospital ethics committee and legal counsel have consulted. A recent physician group’s code of ethics only minimally addresses this issue. Consensus guidelines are warranted to provide consistency in the approach.

298. Acute Chest Syndrome Following Gasoline Inhalation in a Pediatric Patient with Sickle Cell Disease

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Background: Acute chest syndrome (ACS) is an acute complication of sickle cell disease resulting in rapidly progressive pulmonary infiltrates. The most common known causes of ACS are infection and fat embolism. The underling cause is unknown in nearly half of cases. We report a case of ACS following inhalation of gasoline fumes in an 11 year old boy. Case report: An 11 year old male with sickle cell disease presented with acute chest pain a few hours after sniffling fumes from a gasoline can. Initial chest radiographs was normal, WBC count was 12,100/mm3, with differential of 58% neutrophils and 85% monocytes; hemoglobin was 8.3 g/dL. C-reactive protein was 0.3 mg/dL. The child was admitted to hospital, started on vancomycin, ceftriaxone and dexamethasone. A chest X-ray showed bilateral pleural effusions progressing despite transfusion, and bilevel positive airway pressure (BPAP) was initiated. Exchange transfusion was then performed, with rapid improvement in his respiratory function and oxygen requirement. Pulmonary infiltrates gradually resolved. He was discharged home on the seventh hospital day.

Conclusion: Acute chest syndrome temporally develops in circumstances of low oxygen tension, such as pneumonia, fat embolism with vascular obstruction, and acute pain with hyperventilation and atelectasis. Inhalation of volatile hydrocarbons such as gasoline may produce similar alveolar hypoxia by displacing oxygen in inspired alveolar gases, thus initiating the sickling and microvascular obstruction necessary for development of acute chest syndrome. This case report presents a case of ACS following inhalation of gasoline, and not associated with signs of infection or other known risk factors for acute chest syndrome.

299. Impact of Toxicologists upon Patient Care – An Evaluation of Toxicology Service Quality & Selected Core Competencies for Training via a Survey of Internal Customers

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Unlike external customers (patients), internal customers (who belong to the same organization as the service provider) for a toxology service include emergency medicine (EM) & internal medicine (IM) residents & preceptors. The Council for Graduate Medical Education’s Outcome Project uses six general competencies for fellow development; of which are difficult to evaluate. Purpose: Determine the impact of the tox service upon patient care & evaluate other aspects of our service delivery & the achievement of core competencies by the fellows. Method: A survey was created on survey monkey. Through the use of email lists; 411 residents & faculty in EM, IM, & Pediatrics were asked to do the survey. They had a 12-day period to do the survey & were given a reminder email 6-days into the period. The 14 survey questions addressed: why providers did & did not ask for toxicology consults on their toxic patients; service parameters including ease of access to toxicologists, timeliness, impact upon patient care, & education for the consultees; & two of the core competencies. Results: A total of 104 surveys were completed (24%). Responses came from 44% of the EM docs, 24% of the IM docs, and 15% of the Peds docs. 11% of the respondents had used the tox service 1–5 times while 30% had used it >5 times. The #1 reason to NOT use the tox service was the respondent “generally knew what she was doing”. The #1 reason to use the tox service was “thought he knew what to do but wanted confirmation.” 98% said there was “never” or “rarely” a problem in reaching a toxicologist & 100% said the service was “often” or “always” timely. Thirty-three percent felt the education provided by the tox service to the consultees was “always better” than from other services. Members of the service acted “professionally” (95% always & 5% usually) & used good interpersonal skills (82% always & 18% usually). Importantly, respondents felt care was “always” (54%) or “usually” (42%) improved by the toxicologists. “Always” (54%) or “usually” (42%) improved by the toxicologists. Conclusion: While response rate to the on-line survey was low, the respondents strongly felt that toxicologists improved patient care.

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Background: Oral PE exposure increased following the Combat Methamphetamine Epidemic Act of 2005 when manufacturers reformulated many pseudophedrine cold/cough products with PE. PE is a sympathomimetic amine and directly stimulates α1 receptors which can lead to hypertension, dizziness and seizures in overdose. Many PE-containing products are combined with an antihistamine, dextromethorphan and/or an opioid,
increasing the risk for side effects. An increase in oral PE exposure calls to the Poison Center was noted and re-evaluation of current pediatric toxic referral doses ensued. Methods: A retrospective analysis of oral PE exposures in children (<13 years) in 2008 was performed. For five milligram (3-6 months), 8 mg (6-12 months), 15 mg (1-6 years), 60 mg (6-12 years), 120 mg (>12 years) were used as referral amounts. Patients with coingestants/multi-ingredient products were included. Results: Four hundred and ninety-four patients were identified. Four hundred and fifteen were observed at home; 79 were evaluated in a HCF. Of the 415 at home, 337 ingested a subtoxic PE dose; 78 ingested a potentially toxic dose. Subtoxic exposures: no effect (n = 203), 41 with symptoms (39 minor, 2 unrelated), lost to follow-up (n = 93). Potentially toxic exposures: no effect (n = 55), minor symptoms (n = 14), lost to follow-up (n = 9). Minor effects in subtoxic group: drowsiness (n = 30), irritability/behavior (n = 4), vomiting (n = 4), mydriasis (n = 3), ataxia (n = 2), insomnia (n = 2), cough (n = 1), diarrhea (n = 1), dry mouth (n = 1), nausea (n = 1). Minor effects in potentially toxic group: drowsiness (n = 9), vomiting (n = 6), diarrhea (n = 2), drowsiness (n = 1), mydriasis (n = 1). Of patients observed at home, none ingested a PE-only product. HCF evaluated patients: 28 experienced symptoms (20 minor, 1 moderate, 6 unrelated, 1 lost to follow-up), no effect (n = 49), lost to follow-up (n = 2). Minor symptoms in HCF group: drowsiness (n = 16), vomiting (n = 3), ataxia (n = 1), tachy-cardia (n = 1). There was no effect: hypertension (n = 1). Of the 20 patients with minor effects, 6 ingested a subtoxic dose of PE, and 5 received AC. Of the HCF patients, none ingested a PE-only product, and none were admitted. Discussion: Patients that experienced symptoms did not ingest a PE-only product. In addition, the majority of symptoms documented were more consistent with other active ingredients in the product formulation. The lack of significant symptoms from the ingestion of oral PE products may suggest the current PC’s referral amounts are too conservative.

301. Chronic Methanol Inhalation Without Retinal Toxicity or Metabolic Acidosis: A Case Report and Analysis of Inhaled Carburetor Cleaner
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Background: Methanol (MeOH) exposure produces toxicity by two-step conversion to formic acid, causing blindness, severe acidosis, and death. Ingestion is the most common route of methanol poisoning, but inhalation is becoming more common. There are conflicting reports with coingestants/multi-ingredient products may suggest the current PC’s referral amounts are too conservative.

302. Does Measured Serum Osmolality Alone Predict Ethylene Glycol Toxicity?
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Background: Calculating an osmol gap (OG) is problematic in identifying ethylene glycol (EG) poisoning. We hypothesized that a measured serum osmolality (mOsm) alone would predict toxic concentrations of EG. Methods: We searched 8 years of EG cases (January 1, 2002 through January 1, 2010) from our poison center (PC) database. Only cases with both an EG concentration and a mOsm were included for analysis. Cases were evaluated for measured EG concentrations (with toxic defined as >20 mg/dL) in relation to an arbitrary mOsm cutoff value of 350 mOsm/kg. Results: A total of 418 EG exposures were reported to the PC during the 8 year period. Mean EG and mOsm were 100 mg/dL and 339 mOsm/kg respectively and the EG concentrations ranged from 0 to 1,450 mg/dL. Fifty-eight cases had both values recorded in the chart and 34 were of interest (i.e. recorded an EG >20 mg/dL). Eighteen had a mOsm <350 mOsm/Kg with 7 yielding an EG >100 mg/dL. Even in the 16 of 19 patients with mOsm >349 (range 350–716), EG concentrations ranged from 0 to 1,450 mg/dL. The lowest mOsm associated with an EG >20 mg/dL was 285 mOsm/kg (associated EG was 58.1). A minority of the cases (44%) were those with EG > 20 mg/dL, and mOsm > 350 mOsm/kg. Conclusions: Historically, the OG has been challenging in the assessment of EG poisoning but using the absolute mOsm alone has not yet been studied. Our results from this retrospective PC database review indicate that the mOsm alone appears to be a poor indicator of EG toxicity. This analysis suffers from all the limitation of the poison center data review. Significantly, we did not address time of ingestion and the presence of other alcohols or acetone. Only 110/418 cases had both mOsm and EG determinations as it may have been impractical to expect clinicians to routinely use of mOsm in EG poisoning. A prospective study is warranted to re-evaluate the usefulness of mOsm alone as a screening tool for EG poisoning.

303. The Practice of Medical Toxicology in the US
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Background: The ACMT’s ToxIC Registry is a national database early in its existence, consisting of data on toxicology cases seen at the bedside by toxicologists. It began with four centers on January 15, 2010 & was at 11 centers by March 1, 2010. The registry will provide a source for research, education, healthcare, and public health. Objective: The purpose of this study was to analyze the initial cases entered into the ToxIC registry. Methods: Registry data is uploaded to a secure on-line database. The database was downloaded into an Excel spreadsheet and then was queried to establish a description of the initial patient data. We summarized data regarding the location and type of encounter, agents involved, clinical syndromes, and treatments provided. Results: As of March 27, 2010, there were 269 patients in the ToxIC registry, the tables reflect this population. Conclusion: The most common population seen at bedside by medical toxicologists are pts in hospitals.
who OD’d on alcohols or analgesics & who have diverse clinical syndromes.

304. Does Measured Serum Osmolality Predict Methanol Toxicity?
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Background: Screening for methanol poisoning using an osmol gap (OG) is controversial among clinicians and only assists if the number is very high. In light of this, we question the usefulness of a measured serum osmolality (msOsm) in methanol poisoning. The aim of this study is to test an arbitrary msOsm of 350 mOsm/kg or greater (alone) as a predictor of methanol toxicity (>20 mg/dL). Methods: Eight years of methanol cases (January 1, 2002 through January 1, 2010) were searched from our poison center (PC) database. Only those cases including both a recorded methanol concentration and a msOsm within the chart were analyzed. Further scrutiny of those cases yielding methanol concentrations >20 mg/dL were inspected in relation to their specific msOsm. Results: A total of 374 exposures to methanol were reported to the PC during the 8 year period. Methanol concentrations (mean 83 mg/dL) and msOsm (mean 328 mOsm/kg) ranged from 0 to 665 mg/dL and 273–571 mOsm/kg respectively. While 52 cases met inclusion criteria for study, 21 were noted to be of interest (methanol > 20 mg/dL). A majority of the cases (67%) yielded both a methanol > 20 mg/dL and msOsm > 350 mOsm/kg. Conversely 76% of patients with a msOsm < 350 had a methanol concentration <20 mg/dL, fully 22 had no detectable methanol. Strikingly, one patient with a msOsm of 280 mOsm/kg had an associated methanol concentration of 450 mg/dL (the timing of these values relatable to each other is indeterminate). Conclusions: Our results indicate that a msOsm > 350 mOsm/kg was present in two thirds of methanol toxic cases (>20 mg/dL). These data suffer from the standard limitations related to all retrospective poison center reviews. Significantly, we could not address time of ingestion, account for coding and documentation errors, or appreciate the presence of other disease states (e.g. pancreatitis), alcohols or acetone being present. While only 21 cases met our inclusion criteria, many more would have if every patient had “both” methanol and msOsm reported (impractical to assume all clinicians work up methanol poisoning identically). A prospective study is warranted to re-evaluate the usefulness of msOsm alone as a screening tool for methanol poisoning.