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American Academy
of Clinical Toxicology

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Date:

1/9/2017

Question:

Botulism is an uncommon disorder caused by toxins produced by *Clostridium botulinum*. Seven subtypes of botulinum toxin exist (subtypes A, B, C, D, E, F and G). Which subtypes have been noted to cause human disease and which ones have been reported to cause infant botulism specifically in the United States?

Answer:

According to the cited reference “Only subtypes A, B, E and F cause disease in humans, and almost all cases of infant botulism in the United States are caused by subtypes A and B. Botulinum-like toxins E and F are produced by *Clostridium baratii* and *Clostridium butyricum* and are only rarely implicated in infant botulism” (Rosow RK and Strober JB. Infant botulism: Review and clinical update. 2015 *Pediatr Neurol* 52: 487-492)

Date:

1/10/2017

Question:

A variety of clinical forms of botulism have been recognized. These include wound botulism, food borne botulism, and infant botulism. What is the most common form of botulism reported in the United States?

Answer:

According to the cited reference, “In the United States, infant botulism is by far the most common form [of botulism], constituting approximately 65% of reported botulism cases per year. Outside the United States, infant botulism is less common.” (Rosow RK and Strober JB. Infant botulism: Review and clinical update. 2015 *Pediatr Neurol* 52: 487-492)

Date:

1/11/2017

Question:

Which foodborne pathogen accounts for approximately 20 percent of bacterial meningitis in individuals older than 60 years of age and has been associated with unpasteurized milk and soft cheese ingestion?

Answer:

According to the cited reference, “*Listeria monocytogenes*, a gram-positive rod, is a foodborne pathogen with a tropism for the central nervous system. *L. monocytogenes* outbreaks have been associated with unpasteurized milk, soft cheeses, and deli-style meats. Illness, though rare in the general population, is an important cause of disease in newborns, pregnant women, the elderly, and people with impaired, cell-mediated immunity, such as transplant recipients and patients with AIDS. In 1995, the Centers for Disease Control and Prevention reported that *L. monocytogenes* accounted for 20% of bacterial meningitis cases among people >60 years of age. Presentation may be more subacute (>24 hours) than it is with other forms of bacterial meningitis. Cerebrospinal fluid Gram’s stain may be positive in only 30% to 40% of cases. Pregnant women are also at increased risk for listeria infection. In this population, it causes chorioamnionitis in the woman (not meningitis), which at the time of delivery can lead to neonatal meningitis. Because of this risk, pregnant women are advised to avoid foods that may be sources of listeria infection, such as soft cheeses and deli meats”. (New England Journal of Medicine “Question of the Week” December 27, 2016)

Date:

1/12/2017

Question:

What is rotenone?

Answer:

According to the cited reference, “Rotenone is a natural toxin present in plants from the genera *Derris* and *Lonchocarpus*. For centuries natives of the Amazon basin have used this compound to induce narcosis in fish and facilitate fishing for human consumption; this practice is still used by many Amazon riverine groups. Rotenone is also commercialized worldwide as a pesticide. In aquaculture, rotenone is used to eliminate fish and other unwanted organisms from production systems.” Trade names for products containing rotenone include Chem-Fish, Cuberol, Fish Tox, Noxfire, Rotacide, Sinid and Tox-R. It is also marketed as Curex Flea Duster, Derrin, Cenol Garden Dust, Chem-Mite, Cibe Extract and Green Cross Warble Powder. The compound may be used in formulations with other pesticides such as carbaryl, lindane, thiram, piperonyl butoxide, pyrethrins and quassia. (Melo KM et al. Short term exposure to low doses of rotenone induces developmental, biochemical, behavioral and histological changes in fish. 2015 *Env Sci Poll Res Int* 22(18): 13926-13938)

Date:

1/13/2017

Question:

What does the term “signal word”, as used by U.S. EPA, signify?

Answer:

Signal words” are the words used on a pesticide label- Danger, Warning, Caution- to indicate level of toxicity. Signal words “describe the acute (short-term) toxicity of the formulated pesticide product. The signal word can be either: DANGER, WARNING or CAUTION. Products with the DANGER signal word are the most toxic. Products with the signal word CAUTION are lower in toxicity. The U.S. Environmental Protection Agency (EPA) requires a signal word on most pesticide product labels. They also require it to be printed on the front panel, in all capital letters, to make it easy for users to find. The only pesticide products that are not required to display a signal word are those that fall into the lowest toxicity category by all routes of exposure (oral, dermal, inhalation, and other effects like eye and skin irritation).([https://ofmpub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do?details=&glossaryName=Terms%20of%20Env%20\(2009\)#formTop](https://ofmpub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do?details=&glossaryName=Terms%20of%20Env%20(2009)#formTop); accessed December 2016 and <http://www.npic.orst.edu/factsheets/signalwords.pdf>; accessed December 2016)

Date:

1/16/2017

Question:

Lithium is widely used as long-term therapy for bipolar disorder. What are the clinically important adverse risks for patients on long-term lithium therapy?

Answer:

According to one systematic review and meta-analysis of randomized controlled trials and observational studies (more than 385 studies included): “Lithium is associated with increased risk of reduced urinary concentrating ability, hypothyroidism, hyperparathyroidism, and weight gain. There is little evidence for a clinically significant reduction in renal function in most patients, and the risk of end-stage renal failure is low. The risk of congenital malformations is uncertain; the balance of risks should be considered before lithium is withdrawn during pregnancy. Because of the consistent finding of a high prevalence of hyperparathyroidism, calcium concentrations should be checked before and during treatment.” (McKnight RF et al. Lithium toxicity profile: a systematic review and meta-analysis. 2012 Lancet 379:721-728)

Date:

1/17/2017

Question:

How do electronic cigarettes produce the vapor inhaled by users of these products?

Answer:

According to the cited reference, “Electronic cigarettes (e-cigarettes), also known as electronic nicotine-delivery systems, are devices that produce an aerosol by heating a liquid that contains a solvent (vegetable glycerin, propylene glycol, or a mixture of these), one or more flavorings, and nicotine, although the nicotine may be omitted. The evaporation of the liquid at the heating element is followed by rapid cooling to form an aerosol. This process is fundamentally different

from the combustion of tobacco, and consequently the composition of the aerosol from e-cigarettes and the smoke from tobacco is quite different. E-cigarette aerosol is directly inhaled (or “vaped”) by the user through a mouthpiece. Each device includes a battery, a reservoir that contains the liquid, and a vaporization chamber with heating element. (Dinakar C and O’Connor GT. The health effects of electronic cigarettes. 2016 NEJM 375:1372-1381)

Date:

1/18/2017

Question:

What is the elimination half-life of smoked crystal methamphetamine?

Answer:

Per the cited references, “The elimination half-life of smoked crystal methamphetamine (and methamphetamine) administered by intranasal or IV routes is about 11 hours.” (Kish SJ. Pharmacologic mechanisms of crystal meth. 2008 CMAJ 178(13): 1679-1682 and Schifano F, et al. Smokable (“ice,” “crystal meth”) and non-smokable amphetamine-type stimulants: clinical pharmacological and epidemiological issues, with special reference to the UK. Ann Ist Super Sanita 2007;43:110-115)

Date:

1/19/2017

Question:

MEK inhibitors (inhibit the mitogen- activated protein kinase/extracellular signal-regulated kinase (MAPK/ERK) kinase) are a relatively new class of chemotherapeutic agents used in the treatment of a variety of metastatic cancers. These agents have been associated with the development of ocular toxicity. What is the nature of this toxicity?

Answer:

According to the cited reference “As the ocular toxicity associated with MEK inhibitors is a relatively new discovery, very little is known about the mechanism of these ocular events. The majority of ocular toxicities reported with MEK inhibitors have occurred at the level of the retina with the two most common and sight-threatening events being retinal vein occlusion and sub-retinal fluid accumulation.” (Duncan KE et al. MEK inhibitors: a new class of chemotherapeutic agents with ocular toxicity. 2015 Eye 29:1003-1012)

1

Date:

1/19/2017

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Date:

1/20/2017

Question:

Individuals requiring chronic transfusion therapy are often treated with the iron chelator deferoxamine in order to address transfusion-induced hemochromatosis and associated complications. Which toxicities have been associated with the use of deferoxamine?

Answer:

According to the cited reference, “In the 1980’s a number of investigators reported ototoxicity and ocular toxicity induced by deferoxamine, although others have suggested that doses less than 50 mg/kg/d are not associated with otic or ocular toxicity. The reported otologic disturbance is bilateral high frequency sensorineural hearing loss. The ocular disturbances include decreased acuity, peripheral field loss, abnormal color vision, defective dark adaptation, thinning of retinal vessels, retinal stippling, and abnormal visual evoked potentials.” (Chen SH et al. Auditory and visual toxicity during deferoxamine therapy in transfusion dependent patients. 2005 J Pediatr Hematol Oncol 27:651-653)

Date:

1/23/2017

Question:

What is “nanging” and what clinical symptoms may result from repeated nanging?

Answer:

Nanging” is the practice of repeated inhalation of nitrous oxide. According to the cited reference, “Nitrous oxide causes irreversible oxidation of the cobalt atom of vitamin B12 rendering the vitamin inactive. Vitamin B 12 is essential for the formation of methionine by methylation of homocysteine. In turn, methionine is converted to S-adenosyl-methionine (SAM) which is required for all methylation reactions including those of myelin phospholipids. Vitamin B12 deficiency can produce spinal cord disease particularly affecting the dorsal columns causing subacute combined degeneration. Clinical symptoms result from myopathy, peripheral axonal neuropathy or both, with combinations of paresthesias, gait ataxia, sphincter disturbances and

pyramidal weakness. Impaired cognition and altered mentation may occur. (Ng J and Frith R. Nanging. 2002 Lancet 360:384)

Date:

1/24/2017

Question:

What is the classic presentation of tick paralysis?

Answer:

According to the cited reference, "The classic presentation is that of an acute symmetric ascending flaccid paralysis that evolves over hours to days, sometimes preceded by prodromal symptoms, including paresthesias, restlessness, irritability, fatigue, and myalgias. These symptoms are followed hours later by flaccid weakness that generally begins in the lower extremities. Fever is absent. The deep tendon reflexes are diminished or absent. If the tick continues to feed, the weakness ascends to the upper extremities over the ensuing 12 to 24 hours. Finally the respiratory muscles fail. (Edlow JA and McGillicuddy DC. Tick paralysis. 2008 Infect Dis Clin No Amer. 22:397-413)

Date:

1/25/2017

Question:

Who were the "radium girls"?

Answer:

According to the cited reference, the so-called "radium girls" were "Teenage girls and young women, whose job it was to apply luminous paint containing radium to watches [and instrument dials] during World War I, were among the first industrial radiation poisoning victims in the United States." They attained dangerous exposures to radium "through licking their brushes to attain a fine point, through inhaling fine particles of radium laden dust and radon (a radioactive gas)..."(Clark C. Physicians, reformers and occupational disease: The discovery of radium poisoning. 1987 Women & Health 12(2):147-167)

Date:

1/26/2017

Question:

What is NEPA?

Answer:

NEPA is the National Environmental Policy Act. This act was signed into law on January 1, 1970. NEPA requires federal agencies to assess the environmental effects of their proposed

actions prior to making decisions. The range of actions covered by NEPA is broad and includes: making decisions on permit applications, adopting federal land management actions, and constructing highways and other publicly-owned facilities. Using the NEPA process, agencies evaluate the environmental and related social and economic effects of their proposed actions. Agencies also provide opportunities for public review and comment on those evaluations. (<https://www.epa.gov/nepa/what-national-environmental-policy-act>; accessed January 2017)

Date:

1/27/2017

Question:

What are the primary environmental sources for the chemical sulfur dioxide?

Answer:

Sulfur dioxide in the air comes mainly from activities such as the burning of coal and oil at power plants or from copper smelting. In nature, sulfur dioxide can be released to the air from volcanic eruptions. (<https://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=46>; accessed December 2016)

Date:

1/30/2017

Question:

The recognition of chemicals as potential carcinogens had its inception with observations made by Sir Percival Pott in the 1770's. What was this individual's contribution to the science of chemical carcinogenesis?

Answer:

According to the cited reference, "...Sir Percival Pott in 1775 described the frequent occurrence of cancer of the scrotum in chimney sweeps in England. He hypothesized that this was because of their significant exposure to soot. More importantly, he also proposed a mechanism to reduce the incidence of these cancers simply by requiring these individuals to bathe on a regular basis. This was instituted and the incidence of scrotal cancer was essentially eliminated." (Cohen SM and Arnold LL. Chemical carcinogenesis. 2011 Tox Sci 120(S1): S76-S92)

Date:

1/31/2017

Question:

The aromatic amine 4-aminobiphenyl (4-ABP) is present in tobacco smoke. The development of which human cancer has been linked to exposure to this chemical?

Answer:

The cited reference points out that “The aromatic amine 4-aminobiphenyl is present in cigarette smoke and is excreted in the urine in forms that lead to DNA adduct formation.....this combination of increased mutagenic DNA adduct formation by 4-ABP and increased [bladder] cell proliferation leads to a significant incidence of bladder tumors, with cigarette smoking being the major cause of bladder cancer in the United States. (Cohen SM and Arnold LL. Chemical carcinogenesis. 2011 Tox Sci 120(S1): S76-S92)

Date:

2/1/2017

Question:

What are the landmark principles regarding expert testimony as established by the well-known case of Daubert v Merrell Dow Pharmaceuticals, Inc.?

Answer:

According to the cited reference, “First, it recognized the trial judge as the “gatekeeper” who must screen proffered expert testimony. Second, the objective of the screening is to ensure that expert testimony, in order to be admissible, must be “not only relevant, but reliable..... To determine whether proffered scientific testimony or evidence satisfies the standard of evidentiary reliability, a judge must ascertain whether it is “ground[ed] in the methods and procedures of science.....The Court also mentioned as indicators of good science whether the technique or theory has been subjected to peer review or publication, whether the existence of known or potential error rates has been determined, and whether standards exist for controlling the technique’s operation. In addition, although general acceptance of the methodology within the scientific community is no longer dispositive, it remains a factor to be considered.” (Reference Manual on Scientific Evidence, Third Edition, The National Academies Press, Washington, DC)

Date:

2/2/2017

Question:

What is the prevalence rate for intentional volatile solvent use/abuse among American adolescents?

Answer:

According to the cited reference, “Abused inhalants are voluntarily inhaled for their euphorogenic effects by a surprisingly high proportion of American adolescents. According to the 2013 Monitoring the Future study, the 30-day prevalence rate for intentional volatile solvent use among American 8th graders, or mostly 12- to 14-year-olds, was 2.7%. This prevalence is higher than all usage rates for all other illicit drugs except marijuana, and this trend has held steady for the past two decades. Moreover, the true prevalence of solvent use may be higher due to incorrect self-reporting of inhalant use. To wit, in a longitudinal study, 49% of 7th graders who admitted to volatile solvent misuse recanted the following year, and the researchers predicted that the vast majority of recanters were actual solvent users. Volatile solvents are most

commonly misused by young adolescents, with an age at peak use of 14 years.” (Beckley JT and Woodward JJ. Volatile solvents as drugs of abuse: Focus on the cortico-mesolimbic circuitry. 2013 Neuropsychopharm 38:2555-2567)

Date:

2/3/2017

Question:

Based on the presumed cardiovascular fluctuations affecting the uteroplacental unit in pregnant cocaine users what are the overall risks of labor-related adverse events in this population?

Answer:

According to the cited reference, based on the presumed cardiovascular fluctuations affecting the uteroplacental unit in pregnant cocaine users “the overall risks of labor-related adverse events in this population are increased as follows: preterm labor 17.4%, precipitous labor 13.4%, placental abruption 17.3%, abnormal fetal monitoring 15.3%, and meconium-stained fluid 25%” (Chasnoff IJ, et al. Cocaine use in pregnancy: perinatal morbidity and mortality. Neurotoxicol Teratol. 1987, 9:291–293 as cited in Cain MA et al. The Maternal, fetal, and neonatal effects of cocaine exposure in pregnancy. 2013 Clin Obstet Gyn, 56 (1): 124-132)

Date:

2/6/2017

Question:

What characterizes the orolingual angioedema associated with the administration of tissue plasminogen activator?

Answer:

According to the cited reference, “orolingual angioedema is a rare adverse effect of tissue plasminogen activator (tPA) treatment of acute ischemic stroke with a reported incidence of between 1% and 5%. The frontal, insular, and peri-insular regions are often involved and are believed to play a role in the pathophysiology of stroke-associated angioedema....Orolingual angioedema developing after tPA administration for acute ischemic stroke may manifest as unilateral swelling of the lips tongue and face. The resultant edema is commonly contralateral to the ischemic lesion that is believed to be due to the infarction’s triggering autonomic dysfunction and vasomotor changes in the hemiparetic side. Despite this distinct presentation, available literature has demonstrated equal representation of bilateral, contralateral and ipsilateral edema.” (Pahs L et al. A novel approach to the treatment of orolingual angioedema after tissue plasminogen activator administration. 2016 Ann Emerg Med 68(3):345-348)

Date:

2/7/2017

Question:

What is the epidemiology and what are the risk factors for infant botulism?

Answer:

The cited reference points out that “Botulism affects infants ranging from less than 1 week to 1 year of age with a median age of 10 weeks. Up to 95% of infant botulism cases occur in children younger than 6 months of age. Geographically the prevalence of infant botulism in the United States is highest in California, Utah, and the eastern Pennsylvania-New Jersey-Delaware area. Type A disease tends to be more prevalent in the Western U.S., whereas type B disease is more prevalent in the eastern United States. Infants living in rural/farm environments appear to be at higher risk for contracting botulism than those living in more urban environments, presumably because of higher exposure to dust particles. It has been suggested that exposure to soil from active construction sites may also increase the risk of contracting botulism, whether by living near a construction site or by having a parent who works in construction; however this link has not been conclusively established.” (Rosow LK and Strober JB. Infant botulism: Review and clinical update. 2015 *Pediatric Neurol* 52:487-492)

Date:

2/8/2017

Question:

What is a “cancer cluster”?

Answer:

The cited reference describes “The term cancer cluster usually implies that more cases of cancer (usually of the same type) are identified within a certain group of people, geographic area, and time period than are expected, based on the size and age of the population. Usually the term refers to a highly localized situation such as a school, neighborhood, or workplace, although it is sometimes used to refer to a broader geographic area or larger subgroup of the population.” (Thum MJ and Sinks T. Understanding Cancer Clusters. *CA Cancer J Clin* 2004; 54:273–280)

Date:

2/9/2017

Question:

Which substance has recently been described as causing a “zombie outbreak” in New York?

Answer:

The cited article reports “a synthetic cannabinoid caused mass intoxication of 33 persons in one New York City neighborhood, in an event described in the popular press as a “zombie” outbreak because of the appearance of the intoxicated persons.” This report goes on to state: “The potency of the synthetic cannabinoid identified in these analyses is consistent with strong depressant effects that account for the “zombielike” behavior reported in this mass intoxication. AMB-FUBINACA is an example of the emerging class of “ultrapotent” synthetic cannabinoids and poses a public health concern.” (Adams AJ et al. “Zombie” outbreak caused by the synthetic cannabinoid AMB-FUBINACA in New York. 2017 NEJM 376(3): 235-242)

Date:

2/10/2017

Question:

What percent of cases of acute liver failure in adults are due to drug-induced liver injury?

Answer:

According to the cited article, “In adults, 11% of cases of acute liver failure are caused by drug-induced liver injury”. (Olson KR et al. Case 2-2017: An 18-year-old woman with acute liver failure. 2017 NEJM 376(3): 268-278)

Date:

2/13/2017

Question:

Metronidazole is a commonly prescribed antibiotic that has been reported to rarely induce what has been termed “metronidazole-induced encephalopathy”. What are the clinical symptoms associated with this syndrome and what are the reported brain MRI findings associated with this entity?

Answer:

The cited reference notes: “Three types of symptoms have been reported: seizures, cerebellar dysfunction, and acute changes in mental status. These symptoms may develop alone or in combination. Brain MRI on T2 weighted FLAIR images reveals abnormalities, mostly within the cerebellar dentate nuclei and corpus callosum. The third cerebral ventricle [has been reported to be] sandwiched by bilateral cerebellar dentate nuclei taking the form of a “chestnut”. The abnormality within the cerebellar dentate nuclei has thus been termed the “chestnut sign” in Japan where several case with metronidazole induced encephalopathy have been reported.” (Kuriyama A. Chestnut sign: metronidazole-induced encephalopathy. 2017 J Emerg Med 52(1): 101-102)

Date:

2/14/2017

Question:

How rapidly does physical dependence on benzodiazepines develop?

Answer:

The cited article states “Physical dependence to benzodiazepines can be seen after just 3-6 weeks of use at therapeutic doses and 40% of patients using benzodiazepines for longer than 6 months will experience moderate to severe withdrawal [upon discontinuation of the drug].” (Puening SE et al. Psychiatric emergencies for clinicians: Emergency department management of benzodiazepine withdrawal. J Emerg Med 52(1): 66-69)

Date:

2/15/2017

Question:

Which compound, reportedly absorbed through intact skin covered by a latex glove, was responsible for the death of was Dartmouth researcher Dr. Karen Wetterhahn?

Answer:

Dr. Wetterhahn, a 48-year-old researcher, was reportedly working with dimethylmercury in her laboratory, under a chemical hood, when a small amount of this extraordinarily toxic chemical was spilled onto her gloved hand. This material was absorbed and she died 298 days following exposure having suffered severe neurotoxic effects of dimethylmercury. (Nierenberg DW et al. Delayed cerebellar disease and death after accidental exposure to dimethylmercury. 1998 NEJM 338(23): 1672-1676)

Date:

2/16/2017

Question:

What percent of adults and youth (people > 12 years of age) in the United States are current users of tobacco?

Answer:

The cited article notes: “More than a quarter (27.6%) of adults were current users of at least one type of tobacco product in 2013 and 2014, although the prevalence varied depending on use category. A total of 8.9% of youths had used a tobacco product in the previous 30 days; 1.6% of youths were daily users. Approximately 40% of tobacco users, adults and youths alike, used multiple tobacco products; cigarettes plus e-cigarettes was the most common combination. Young adults (18 to 24 years of age), male adults and youths, members of racial minorities, and

members of sexual minorities generally had higher use of tobacco than their counterparts.”
(Kasza KA et al. Tobacco-product use by adults and youths in the United States in 2013 and 2014. 2017 NEJM 376(4): 342-353)

Date:

2/17/2017

Question:

In which human body tissue are polychlorinated biphenyls (PCBs) preferentially stored?

Answer:

The cited reference notes “PCBs are pervasive environmental contaminants that are found in body tissues and fluids of the general population. Because they are lipophilic and generally have half-lives longer than 1 week, PCBs are preferentially stored in adipose tissue and are present in serum, blood plasma, and human milk.” (<https://www.atsdr.cdc.gov/toxprofiles/tp17.pdf>; accessed Jan 2017)

Date:

2/20/2017

Question:

What are neonicotinoids?

Answer:

The cited article notes; “Neonicotinoids (neonics) are a class of chemicals used as insecticides for their neurotoxic action on the nicotinic acetylcholine receptor (nAChRs). Developed to replace organophosphate and carbamate insecticides, neonics are systemic in design, transfusing into all parts of treated plants, including pollen, nectar, and guttation fluids, and the foods grown by those plants. They are used for pest management across hundreds of crops in agriculture, horticulture, and forestry; in timber conservation and aquaculture; in vector control treatments for pets and livestock; and in urban and household pest control products. They are highly effective against difficult-to-control sucking, boring, and root-feeding insects.” (Cimino AM et al. Effects of neonicotinoid pesticide exposure on human health: a systematic review. 2017 Env Health Persp 125(2): 155-162)

Date:

2/21/2017

Question:

What is chlorfenapyr?

Answer:

According to the cited reference, “Chlorfenapyr is the only pyrrole pesticide currently registered for use against bed bugs. The compound is a pro-insecticide, i.e. the biological activity depends on its activation to form another chemical. The new chemical disrupts certain functions in the bed bug’s cells, causing its death.” (<https://www.epa.gov/bedbugs/pesticides-control-bed-bugs>; accessed; January 2017)

Date:

2/22/2017

Question:

What is a PEHSU?

Answer:

According to the published website, “The Pediatric Environmental Health Specialty Units (PEHSUs) are a source of medical information and advice on environmental conditions that influence reproductive and children’s health. PEHSUs are academically based, typically at university medical centers, and are located across the United States and Canada. These PEHSU form a network that is capable of responding to requests for information throughout North America and offering advice on prevention, diagnosis, management, and treatment of environmentally-related health effects in children. Because environmental factors have a variety of impacts on the health of children and reproductive age adults, the PEHSU network has experts in pediatrics, allergy/immunology, neurodevelopment, toxicology, occupational and environmental medicine, nursing, reproductive health and other specialized areas. PEHSU’s work with health care professionals, parents, schools and community groups, and others to provide information on protecting children and reproductive-age adults from environmental hazards. They also work with Federal, State, and local agencies to address children’s environmental health issues in homes, schools, and communities.”(http://www.pehsu.net/About_PEHSU.html; accessed January 2017)

Date:

2/23/2017

Question:

Around the world, more than 600 million people reportedly use betel nut (*Areca catechu*), in part, for its purported euphoric effects. Is the use of betel nut currently legal in the United States?

Answer:

Yes, the use of betel nut is currently legal in the United States. (Milgrom P. et al. Symptoms with betel nut and betel nut with tobacco among Micronesian youth. 2016 *Addictive Behaviors*, 53:120-124)

Date:

2/24/2017

Question:

What is the relative potency of the drug carfentanyl in relation to morphine and fentanyl?

Answer:

A recent DEA “Officer Safety Alert” warns law enforcement personnel that “Carfentanil is a synthetic opioid approximately 10,000 times more potent than morphine and 100 times more potent than fentanyl. The presence of carfentanil in illicit U.S. drug markets is cause for concern, as the relative strength of this drug could lead to an increase in overdoses and overdose-related deaths, even among opioid-tolerant users. The presence of carfentanil poses a significant threat to first responders and law enforcement personnel who may come in contact with this substance. In any situation where any fentanyl-related substance, such as carfentanil, might be present, law enforcement should carefully follow safety protocols to avoid accidental exposure.

(https://www.dea.gov/divisions/hq/2016/hq092216_attach.pdf; accessed February 2017)

Date:

2/27/2017

Question:

What is a cancer “cluster” and how many purported “cancer clusters” are reported to state health departments each year?

Answer:

The cited article states “The term cancer cluster implies that more cases of cancer (usually of the same type) are identified within a certain group of people, geographic area and time period than are expected, based on the size and age of the population. Usually the term refers to a highly localized situation such as a school, neighborhood, or workplace, although it is sometimes used to refer to a broader geographic area or larger subgroup of the population.” “It is reported that more than 1,000 suspected cancer clusters are reported to state health departments each year.” (Thun MJ and Sinks T. Understanding cancer clusters. 2004 CA Cancer J Clin 54:273-280)

Date:

2/28/2017

Question:

Which two drugs are considered to be associated with the highest risk for the development of drug-induced lupus (DIL)?

Answer:

The cited reference notes “Procainamide, with a DIL incidence during 1 year of therapy of approximately 20% and hydralazine, with a 1- year incidence of 5-8% are by far the highest risk drugs for inducing lupus-like disease...” (Rubin RL. Drug-induced lupus. 2015 Expert Opin Drug Saf 14(3):361-378)

Date:

3/1/2017

Question:

A strong association between which anticonvulsant drug and the HLA-B*1502 allele has been found in Asian populations suffering from Stevens-Johnson syndrome (SJS) and the related disorder toxic epidermal necrolysis (TEN).

Answer:

The cited article notes “A strong association between HLA-B*1502 and carbamazepine-induced SJS-TEN has been found in Asian populations other than the Han Chinese, including Malay, Thai, and South Asian Indians. In Malaysia, Thailand, and India studies have shown that carbamazepine as the major cause of drug induced SJS-TEN.” (Chen P et al. Carbamazepine-induced toxic effects and HLA-B*1502 screening in Taiwan. 2011 NEJM 364:1126-1133)

Date:

3/2/2017

Question:

What are the clinical characteristics associated with acute clonidine overdose?

Answer:

The cited reference points out that “Clonidine overdose is characterized by CNS depression, bradycardia and miosis, and can mimic opioid poisoning. Other clinical effects include early hypertension, followed by hypotension, hypothermia and respiratory depression. Clonidine overdoses are uncommon, and the toxidromic triad of CNS depression, bradycardia and hypotension can often appear serious. In addition, the duration of some of the clinical effects may be prolonged, particularly the bradycardia. Case reports and reviews suggest clonidine may result in severe toxicity with ingestions of small amounts resulting in significant CNS depression and cardiovascular effects.” (Isbister GK et al. Adult clonidine overdose: prolonged bradycardia and central nervous system depression, but not severe toxicity. 2017 Clin Tox 55(3): 187-192)

Date:

3/3/2017

Question:

What is the “exposome”?

Answer:

The “exposome” can be defined as the measure of all the exposures of an individual in a lifetime and how those exposures relate to health. An individual’s exposure begins before birth and includes insults from environmental and occupational sources. Understanding how exposures from our environment, diet, lifestyle, etc. interact with our own unique characteristics such as genetics, physiology, and epigenetics impact our health is how the exposome will be articulated. (<https://www.cdc.gov/niosh/topics/exposome/>; accessed February 2017)

Date:

3/6/2017

Question:

A recent analysis of counterfeit OxyContin seized in Canada demonstrated fentanyl to be present in 89% of all tablets. Fentanyl is also often found in counterfeit alprazolam as well as other counterfeit medications. Why is fentanyl apparently used so often in the production of illicit street drugs?

Answer:

The cited editorial notes: “Rising fentanyl use reflects the drugs potency and low production costs. Even with declining prices, heroin costs about \$65,000 per kilogram wholesale, whereas illicit fentanyl is available at roughly \$3500 per kilogram. Drug dealers thus face strong incentives to mix fentanyl with heroin and other street drugs.” (Frank RG and Pollack HA. Addressing the fentanyl threat to public health. 2017 NEJM 376(7):605-607)

Date:

3/7/2017

Question:

One population-based cohort study of older adults, observed that new use of an atypical antipsychotic drug was associated with a higher 90-day risk for hospitalization with acute kidney injury (AKI). What are the potential causes for this observed effect?

Answer:

The cited reference notes “Drug use was also associated with an increased risk for other adverse outcomes, including hypotension, acute urinary retention, pneumonia, and acute cardiac events. These outcomes are known potential causes of AKI.” (Hwamng YJ et al. Atypical antipsychotic

drugs and the risk for acute kidney injury and other adverse outcomes in older adults: a population-based cohort study. 2014 Ann Intern Med. 161:242-248)

Date:

3/8/2017

Question:

The concentration of melanin in human hair is recognized as affecting the amount of some drugs that might be incorporated into hair. As a consequence, at co-equal doses, higher drug levels are typically found in the hair of individuals with darker colored hair. This influence is particularly pronounced for which class of drugs?

Answer:

The cited reference notes “This influence is particularly pronounced for basic drugs, such as cocaine or codeine.” (Kronstrand R., et al. Codeine concentration in hair after oral administration is dependent on melanin content. 1999 Clin Chem 45:1485–94)

Date:

3/9/2017

Question:

As part of their risk management strategy for certain drugs, the Food and Drug Administration (FDA) requires a so-called “Risk Evaluation and Mitigation Strategy (REMS)”. What does a REMS include?

Answer:

The noted reference states: “A REMS includes at least one of the following component: a Medication Guide, a communication plan for health care providers, and “elements to assure safe use” (ETASUs).” (Gassman AL et al. FDA regulation of prescription drugs. 2017 NEJM 376:674-682 and FDA basics webinar: a brief overview of Risk Evaluation and Mitigation Strategies (REMS). Silver Spring, MD: Food and Drug Administration, September 2, 2016 (<http://www.fda.gov/AboutFDA/>)

Date:

3/10/2017

Question:

What are the factors that affect health care worker exposures to potentially hazardous antineoplastic drugs?

Answer:

According to the cited reference “The likelihood that a worker will experience adverse effects from hazardous drugs increases with the amount and frequency of exposure and the lack of proper work practices.” Specifically, “the factors that affect worker exposures include the following: Drug handling circumstances (preparation, administration, or disposal); Amount of drug prepared; Frequency and duration of drug handling; Potential for absorption; Use of ventilated cabinets; PPE; and General and specific work factors”. Preventing Occupational Exposures to Antineoplastic and Other Hazardous Drugs in Health care Settings, available at (<https://www.cdc.gov/niosh/docs/2004-165/pdfs/2004-165.pdf>)

Date:

3/13/2017

Question:

Loperamide is an antidiarrheal agent available as an over the counter drug available to the public without a prescription. What is the mechanism by which this drug reduces diarrhea?

Answer:

The noted article states that loperamide “inhibits intestinal peristalsis through mu-opioid receptor agonism, calcium channel blockade, calmodulin inhibition and decreasing paracellular permeability”. (Eggleston W et al. Loperamide abuse associated with cardiac dysrhythmia and death. 2017 Ann Emerg Med 69(1):83-86 and Baker DE. Loperamide: a pharmacological review. 2007 Rev Gastroenterol Disord. 7(suppl 3): S11-S18)

Date:

3/14/2017

Question:

What is “iodide mumps”?

Answer:

The cited reference notes: “Iodide “mumps” was first described in a kidney-impaired patient after intravenous pyelography. It can develop after any imaging procedure that uses iodine-based contrast medium. Patients usually exhibit painless bilateral parotid or submandibular gland swellings that are rapid in onset (5 minutes to several days) and gradually disappear during the next 6-day period. At times, all salivary glands are enlarged, whereas sometimes only 1 gland is swollen, but either bilateral parotid or submandibular salivary gland swellings are the norm. No long-term consequences, other than 1 case of facial palsy, have been reported.” (Mandel L and Surattanont F. Bilateral parotid swelling: A review. 2002 Oral Surg, Oral Med, Oral Path, Oral Radiol and Endodont. 93(3): 221-237, see also “Image challenge”, NEJM 2017 at <http://www.nejm.org/image-challenge>)

Date:
3/15/2017

Question:

Hepatic veno-occlusive disease (HVOD) has been reported as a complication of herbals that contain pyrrolizidine alkaloids. What are the clinical characteristics of hepatic veno-occlusive disease?

Answer:

The cited article notes, "Hepatic veno-occlusive disease (HVOD) is a clinical syndrome characterized by hyperbilirubinemia, painful hepatomegaly and weight gain due to fluid retention, after hematopoietic stem cell transplantation (HSCT), HVOD is a well-recognized life threatening complication, with an incidence rate of 10% to 60%." Similar clinical findings are reported following the ingestion of herbals containing pyrrolizidine alkaloids. The cited article cautions, "Confirmation of HVOD is based on the histology examination of liver tissue." (Dai N et al. Gynura root induces hepatic veno-occlusive disease: A case report and review of the literature. 2007 World J Gastroenterol 13(9): 1628-1631)

Date:
3/16/2017

Question:

What is the scientific basis for using nails (fingernails and/or toe nails) as a testing matrix for detecting drugs?

Answer:

The cited article notes, "Nails are made of keratin. The average growth rate for fingernails is 3 mm per month (range between 1.9 and 4.4 mm/month). Toenails grow 30 – 50% slower than fingernails and are much more susceptible to drug contamination from sweat. As the nail grows, [some] chemicals (illicit substances, drugs, alcohol biomarkers, etc.) incorporate into the keratin fibers where they can stay for extended periods of time (3 – 5 months in fingernails, and 8 – 14 months in toenails). The mechanisms of drug deposition in nails have not been extensively studied." (Shu I., et al. Detection of drugs in nails: Three year experience. 2015 J Analytical Tox 39:624-628)

Date:
3/17/2017

Question:

Which potentially harmful drugs are most commonly identified in meconium?

Answer:

A recent study involving more than 76,000 assays of meconium revealed “The positivity rate was the highest for the cannabis metabolite 11-nor-9-carboxy-delta-9-tetrahydrocannabinol (25.2%, n = 18,643), followed by opiates/oxycodone (23.2%, n = 17,778), amphetamine/methamphetamine (6.7%, n = 5134), cocaine metabolites (5.5%, n = 4205), methadone (5.3%, n = 4093), benzodiazepines (3.4%, n = 2603), barbiturates (1.1%, n = 834), propoxyphene (1.0%, n = 749), and phencyclidine (0.1%, n = 44). Based on documented pharmacy history, drugs administered to either the mother or newborn during the birth hospitalization were detected in meconium, providing evidence that drugs can be incorporated into meconium rapidly. Drugs administered directly to the newborn after birth were recovered in meconium as both parent drug and metabolites, providing evidence of neonatal metabolism. Overall, patterns observed in meconium exhibited many similarities to those patterns commonly reported with urine drug testing.” These authors concluded: “Interpretation of meconium drug testing results requires comparison of results with clinical and analytical expectations, including maternal admissions to drug use, pharmacy history, recognized metabolic patterns for drugs of interest, cutoff concentrations, and other performance characteristics of the test. Concentrations of drug(s) and drug metabolites(s) may not reliably predict timing of drug use, extent of drug use, or frequency of drug exposures.” (McMillin GA et al. Patterns of drugs and drug metabolites observed in meconium: What do they mean? 2015 Ther Drug Monit 37:568-580)

Date:

3/20/2017

Question:

What are “biosimilars”?

Answer:

A biosimilar product is a biological product that is approved based on a showing that it is highly similar to an FDA-approved biological product, known as a reference product, and has no clinically meaningful differences in terms of safety and effectiveness from the reference product. Only minor differences in clinically inactive components are allowable in biosimilar products. The Patient Protection and Affordable Care Act (Affordable Care Act), signed into law by President Obama on March 23, 2010, amends the Public Health Service Act (PHS Act) to create an abbreviated licensure pathway for biological products that are demonstrated to be “biosimilar” to or “interchangeable” with an FDA-licensed biological product. This pathway is provided in the part of the law known as the Biologics Price Competition and Innovation Act (BPCI Act). Under the BPCI Act, a biological product may be demonstrated to be “biosimilar” if data show that, among other things, the product is “highly similar” to an already-approved biological product. (<https://www.fda.gov/Drugs/DevelopmentApprovalProcess/HowDrugsareDevelopedandApproved/ApprovalApplications/TherapeuticBiologicApplications/Biosimilars/default.htm>; accessed February 2017)

Date:

3/21/2017

Question:

What is the nerve agent known as “VR”?

Answer:

The cited article notes: “A product of the arms race during the Cold War, the Russian VX, or VR, is an organophosphorus compound that is a structural isomer of the western VX compound (or A4), with which it shares a very high toxicity. It is much less studied and known than VX because the knowledge of its existence is relatively recent. A very low volatility and high resistance in the environment make it a persistent agent. Poisoning occurs mainly following penetration through skin and mucosa but vapour inhalation is a credible risk in some circumstances. The clinical presentation may be differed by several hours and despite the absence of signs and symptoms, the casualty should not be considered as contamination or intoxication-free. This agent has a long residence time in blood, a characteristics that clearly differentiates it from other compounds such as sarin. The protocols for antidote administration may thus have to be changed accordingly. The fact that VR poisoned individuals will less respond to the current oxime therapy used in France, the 2-PAM and that VR represents a higher threat than VX, being probably possessed by some proliferating states, justify the interest for this toxic product. (Cuquel AC et al. The VR, the Russian version of the nerve agent VX. 2015 Anns Pharm Francaises 73(3): 180-189)

Date:

3/22/2017

Question:

What is the vascular toxicity commonly associated with platinum based chemotherapy?

Answer:

The cited reference reports on a large group of patients receiving platinum based chemotherapy for bladder cancer. These authors concluded “Patients receiving platinum based chemotherapy were at higher risk for thromboembolism but not other vascular events, particularly in the first year after diagnosis. This risk of thromboembolism is similar for cisplatin and carboplatin.”

Date:

3/23/2017

Question:

What is the usual time frame for the onset of alcohol withdrawal symptoms?

Answer:

The cited reference notes “Alcohol withdrawal symptoms can be seen within 8 hours of a patient’s last drink and as long as 7 days after.” (Schuckit MA Recognition and management of withdrawal delirium (delirium tremens). 2014 NEJM 371(22):2109-2113)

Date:

3/24/2017

Question:

What is the explanation for a “rebound” in INR that may be seen following the successful treatment of warfarin overdose with vitamin K1?

Answer:

The cited article notes “Treatment with early doses of vitamin K1 will result in initial INR improvement, which can be falsely reassuring. If the patient’s INR is not closely monitored, there is a risk of a rebound increase in the INR. The reason for this rebound is that warfarin has a much longer half-life (estimates of 44 hours in overdose) than vitamin K1 (elimination half life of 1.7 hours).” (Berling I. et al. Warfarin poisoning with delayed rebound toxicity. 2017 J Emerg Med 52(2): 194-196)

Date:

3/27/2017

Question:

Gases that trap heat in the atmosphere are called greenhouse gases. What are the main gases considered to be “greenhouse gases”?

Answer:

The main gases considered to be “greenhouse gases” are carbon dioxide (CO₂), methane, nitrous oxide and the fluorinated gases (hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride) (<https://www.epa.gov/ghgemissions/overview-greenhouse-gases>; accessed; January 2017)

Date:

3/28/2017

Question:

Which adverse health effects have been attributed by some to so-called “carbonless carbon paper”?

Answer:

The cited reference notes: “According to available data, exposure to certain types of carbonless copy paper or its components has resulted, under some conditions, in mild to moderate symptoms of skin irritation and irritation of the mucosal membranes of the eyes and upper respiratory tract. In most cases, good industrial hygiene and work practices should be adequate to reduce or eliminate symptoms. These include adequate ventilation, humidity, and temperature controls; proper housekeeping; minimal hand-to-mouth and hand-to-eye contact; and periodic cleansing of hands.” (<https://www.cdc.gov/niosh/docs/2001-107/>; accessed; January 2017)

Date:

3/29/2017

Question:

The reference cited below notes “Histamine fish poisoning, also known as scombroid poisoning, is the most common cause of ichthyotoxicosis worldwide and often results from the ingestion of histamine-contaminated fish in the Scombroidae and Scomberesocidae families, including mackerel, bonito, albacore, and skipjack.” Ingestion of which two fish make up more than 80% of histamine fish poisoning in the United States?

Answer:

Tuna and mahi mahi make up more than 80 % of reported cases of histamine fish poisoning. (Feng C et al. Histamine (Scombroid) fish poisoning: A comprehensive review. 2016 Clin Rev Allerg Immunol 50:64-69)

Date:

3/30/2017

Question:

The reference cited below notes “Workers in industries where beryllium is present may be exposed to beryllium by inhaling or contacting beryllium in the air or on surfaces. Inhaling or contacting beryllium can cause an immune response that results in an individual becoming sensitized to beryllium.” How is beryllium used in industry?

Answer:

The cited reference reports: “Beryllium is used industrially in three forms: as a pure metal, as beryllium oxide, and most commonly, as an alloy with copper, aluminum, magnesium, or nickel. Beryllium oxide (called beryllia) is known for its high heat capacity and is an important component of certain sensitive electronic equipment. Beryllium alloys are classified into two types: high beryllium content (up to 30% beryllium) and low beryllium content (2 – 3% beryllium). Copper-beryllium alloy is commonly used to make bushings, bearings, and springs. Beryllium is also found as a trace metal in slags and fly ash.” (<https://www.osha.gov/SLTC/beryllium/index.html>; accessed January 2017)

Date:

3/31/2017

Question:

What is the so-called “General Duty Clause” promulgated by OSHA?

Answer:

The “General Duty Clause” of the OSH Act of 1970 requires: (a) Each employer — (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees; (2) shall comply with occupational safety and health standards promulgated under this Act.(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and

conduct.(https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=OSHACT&p_id=3359; accessed March 2017)

Date:

4/3/2017

Question:

What are the differences in the development of neuro-cognitive effects between healthy children with a single anesthesia exposure before age 36 months, compared with healthy siblings with no anesthesia exposure?

Answer:

One recent study of 105 sibling pairs reported “no statistically significant differences in mean scores were found between sibling pairs in memory/learning, motor/processing speed, visuospatial function, attention, executive function, language, or behavior.” The authors concluded “Among healthy children with a single anesthesia exposure before age 36 months, compared with healthy siblings with no anesthesia exposure, there were no statistically significant differences in IQ scores in later childhood.” However these authors cautioned, “Further study of repeated exposure, prolonged exposure, and vulnerable subgroups is needed.” (Sun SL et al. Association between a single general anesthesia exposure before age 36 months and neurocognitive outcomes in later childhood. 2016 JAMA. 315(21): 2312-2320.

Date:

4/4/2017

Question:

What is the widely abused substance, first popularized in the Houston, Texas, hip-hop culture, known as “purple drank”?

Answer:

The cited reference notes, “Also known as “syrup,” “sizzurp,” “barre,” and “lean” (nicknamed for the posture that users assume when intoxicated), purple drank is a concoction that can take several forms. Most involve some form of codeine cough syrup containing the opiate painkiller codeine and promethazine hydrochloride, an antihistamine with sedative properties. The cough syrup is typically mixed with a soft drink and candy, with some variants including alcohol. Other forms of this mixture can include over-the-counter cough syrups, which are easier to obtain and much cheaper than prescription strength codeine cough syrup, but produce different effects. For example, misuse of dextromethorphan can result in hallucinogenic effects, rather than the sedative effects of the traditional form of purple drank containing codeine and promethazine. The high-profile arrest of former Oakland Raiders Quarterback JaMarcus Russell in 2010 for possession of codeine, and allegations of his habitual misuse, led to heightened awareness of a potential purple drank problem.” (Agnich LE et al. Purple drank prevalence and characteristics of misusers of codeine cough syrup mixtures. 2013 Addictive Behaviors 38:2445-2449)

Date:

4/5/2017

Question:

Candida endophthalmitis has been associated with the use of which illicit substance?

Answer:

Candida endophthalmitis has been associated with the use/abuse of brown heroin. (Melnychuk EM and Sole DP. A rare central nervous system fungal infection resulting from brown heroin use. 2017 J Emerg Med 52(3): 314-317)

Date:

4/6/2017

Question:

Which recombinant immunoglobulin has been suggested as a useful therapy in the reversal of dabigatran associated bleeding? What is the proposed mechanism for this reversal effect?

Answer:

The cited reference notes that “Idarucizumab is a recombinant immunoglobulin G1 iso-type molecule that binds specifically to the thrombin binding site of dabigatran and its metabolites with an affinity that is approximately 350 times greater than the affinity of dabigatran to thrombin, resulting in the inability of dabigatran to thrombin resulting in the inability of

dabigatran to bind thrombin.” (Miller L et al. Idarucizumab for reversal of dabigatran-associated bleeding: misnomer or miracle? 2017 J Emerg Med 52(3): 341-347 and Schiele F et al. A specific antidote for dabigatran: functional and structural characterization. 2013 Blood 121: 3554-3562)

Date:

4/7/2017

Question:

What are the adverse health effects of concern associated with occupational exposure to hexavalent (VI) chromium?

Answer:

The cited reference notes: “The primary occupational health effect associated with hexavalent chromium compounds is an increased risk of lung cancer from inhalation exposures. In addition, health effects associated with exposure to chromium (VI) can include airway sensitizations, or asthma, skin sensitizations, e.g., allergic and irritant contact dermatitis, nasal and skin ulcerations, and eye irritation”. (https://www.osha.gov/OshDoc/Directive_pdf/CPL_02-02-076.pdf; accessed March 2017)

Date:

4/10/2017

Question:

Listeriosis is caused by the Gram-positive organism, *Listeria monocytogenes*. This bacterium generally causes self limited and mild gastroenteritis. What is the disease profile often associated with *Listeria monocytogenes* infections in at risk populations (e.g. pregnant women, elderly people, immuno-compromised people, unborn babies, and neonates) with possible inadequate cell mediated immunity?

Answer:

The cited reference reports: “Mainly in patients with impaired cell-mediated immunity, listeriosis can lead to severe illnesses, including severe sepsis, meningitis, or encephalitis, and thereby cause lifelong consequences and even death. Infection during pregnancy can result in spontaneous abortions or stillbirths. Preterm birth is also a common consequence of listeriosis in pregnant women.” (de Noordhout CM et al. The global burden of listeriosis: a systematic review and meta-analysis. 2014 The Lancet Infectious Diseases 14:1073-1082)

Date:

4/11/2017

Question:

Which plant, known as the “heartbreak grass” has been posited as a homicidal agent used by the government of Vladimir Putin?

Answer:

Plants of the genus *Gelsemium* are also known as “heartbreak grass” and have been posited as a homicidal agent used by the government of Vladimir Putin. The cited reference notes “All three species of *Gelsemium* are highly poisonous. The leaves, stems and roots are equally toxic, and consuming the plant has been used as a method to commit suicide and homicide. Experimental work indicates that typical symptoms of intoxication include sweating, dizziness, nausea, vomiting, blurred vision, muscular weakness, limb paralysis, dilated pupils, breathing difficulty, coma and convulsion. In instances of severe poisoning, the nervous system is depressed and death is caused by respiratory depression. (Jin GL et al. Medicinal plants of the genus *Gelsemium* (Gelsemiaceae, Gentianales)—A review of their phytochemistry, pharmacology, toxicology and traditional use. 2014 *J Ethnopharm* 152:33-52)

Date:

4/12/2017

Question:

Valproic acid is often used in the management of chronic seizure disorders and for bipolar disease as well as in the preventive management of migraine headaches. In which clinical circumstances has levocarnitine been proposed to manage overdoses of valproic acid?

Answer:

Levocarnitine has been proposed as part of the treatment regimen for patients with hyperammonemia, comatose patients and those with increasing blood levels (>400 mg/dl) (Sun C. Valproic acid. 2017 *Critical Decisions in Emerg Med*. 31(1):24)

Date:

4/13/2017

Question:

What is mexedrone?

Answer:

The cited reference notes “Mexedrone, 3-methoxy-2-(methylamino)-1-(4-methylphenyl)propan-1-one, is the alpha-methoxy-derivative of mephedrone (4-methyl-N-methyl cathinone). These authors point out “Whilst there are no published pharmacological studies of mexedrone, based on in vitro and in vivo studies of mephedrone, it can be anticipated that mexedrone inhibits the re-uptake of serotonin and dopamine in a dose-dependent manner and has affinity for serotonin and

dopamine membrane transporters and receptors (5-HT₂ and D₂ receptors), producing sympathomimetic effects similar to amphetamines.” (Roberts L et al. 11 analytically confirmed cases of mexedrone use among polydrug users. 2017 Clin Tox 55(3):181-186)

Date:

4/14/2017

Question:

What characterizes the clinical findings associated with tick paralysis?

Answer:

The cited reference notes “Tick paralysis, a uniquely tick-borne neurotoxic envenoming, is characterized by an ascending flaccid neuromuscular paralysis with sensory sparing and frequent cranial nerve involvement. Tick paralysis is caused by the dermal injection of salivary neurotoxins secreted primarily by gravid hard ticks (Acari: Ixodidae) while blood feeding, and often before ovipositing.” These authors also point out that tick paralysis “mimics polio and primarily afflicts children.” (Diaz JH. A comparative meta-analysis of tick paralysis in the United States and Australia. 2015 Clin Tox 53(9):874-883)

Date:

4/17/2017

Question:

What is the common name for the chemical 2-chlorovinyl-dichloroarsine?

Answer:

2-chlorovinyl-dichloroarsine is better known as Lewisite, a combination of acetylene and arsenic trichloride. Lewisite was originally developed as a chemical warfare agent and is a concern as a potential weapon that might be used by terrorists. The cited reference notes “Lewisite’s systemic toxicity and, presumably, its cutaneous and ocular irritability result primarily from its arsenic content.” (Vilensky JA and Redman K. British Anti-Lewisite (Dimercaprol: An amazing history. 2003 Ann Emerg Med 41:378-383)

Date:

4/18/2017

Question:

What is so-called “NSAID colopathy”?

Answer:

The cited reference notes “The term NSAID colopathy has been used for non-specific colonic injury seen at colonoscopy, ranging from erosions to ulcers, with or without strictures, which have been seen with NSAID (including low-dose aspirin) use. It does not have the protean manifestations of small bowel injury. The resolution of the findings with cessation of NSAID exposure has supported their etiological role, but proof with repeat challenge has not been clearly demonstrated in most cases. Diaphragm disease of the colon may be considered diagnostic for NSAID-induced colon injury, although only a relatively small number of cases have been reported. Diclofenac-extended release formulations have been frequently implicated, supporting a role for high local drug concentrations due to its enterohepatic recirculation.” (Scheiman JM. NSAID-induced gastrointestinal injury: A focused update for clinicians. 2016 J Clin Gastroenterol 50:5–10)

Date:

4/19/2017

Question:

Hereditary angioedema may be clinically confused with severe drug related reactions in some circumstances. What is hereditary angioedema and what is the cause for hereditary angioedema?

Answer:

The cited reference notes: “Hereditary angioedema is a disabling and potentially fatal condition characterized by recurrent episodes of swelling without urticaria or pruritus. The condition is caused by deficiency (type I) or dysfunction (type II) of the C1 inhibitor protein, Patients have insufficient C1 inhibitor function to prevent bradykinin production by the contact system, leading to episodes of increased capillary hyper-permeability and swelling. These episodes manifest clinically as angioedema attacks.” (Longhurst H et al. Prevention of hereditary angioedema attacks with a subcutaneous C1 inhibitor. 2017 NEJM 376(12): 1131-1140)

Date:

4/20/2017

Question:

What are the MRI findings consistent with severe methanol toxicity?

Answer:

The cited reference notes “Methanol directly affects the putamen of the basal ganglia. With severe intoxication, both hemorrhagic and non-hemorrhagic damage of the putamen occur commonly. This was described initially in 1953, and clinically results in a parkinsonian-like disorder such as dystonia, cog-wheeling, stooped posture, shuffling gait, and hypokinesia. The predilection for and mechanism of toxicity to the putamen are not understood. Cases of axonal polyneuropathy and anterior horn cell loss in association with chronic exposure have been reported. At CT and MRI, methanol toxicity results in putamen hemorrhage or necrosis and

diffuse cerebral edema and petechial hemorrhages.” (Anderson JC. Et al. Basal ganglia: Anatomy, pathology and imaging characteristics. 2004 Curr Probl Diagn Radiol 33: 28-41)

Date:

4/21/2017

Question:

What is the LactMed database?

Answer:

The LactMed® database contains information on drugs and other chemicals to which breastfeeding mothers may be exposed. It includes information on the levels of such substances in breast milk and infant blood, and the possible adverse effects in the nursing infant. Suggested therapeutic alternatives to those drugs are provided, where appropriate. All data are derived from the scientific literature and fully referenced. A peer review panel reviews the data to assure scientific validity and currency. (<https://toxnet.nlm.nih.gov/newtoxnet/lactmed.htm>; accessed March 2017)

Date:

4/24/2017

Question:

What is the Federal act that governs the speed of the regulatory review process for new therapeutic agents?

Answer:

The cited article notes: “Although the 21st Century Cures Act which was signed into law in December 2016, includes several reforms that are intended to further streamline FDA evaluations, the speed of the regulatory review process is directed by the Prescription Drug User Fee Act (PDUFA).” (Downing NS et al. Regulatory review of new therapeutic agents- FA versus EMA, 2011-2015. 2017 NEJM, 376 (14): 1386-1387)

Date:

4/25/2017

Question:

A blue color tinge to the vision has been reported in conjunction with which drug sometimes prescribed for the treatment of erectile dysfunction?

Answer:

The cited reference reports: “A small percentage (3%) of patients treated with sildenafil in flexible-dose studies report transient visual adverse events described as a blue color tinge to vision.....” (Jagle H et al. Visual short-term effects of Viagra: double-blind study in healthy young subjects. 2004 Am J Ophthalmology 137(5): 842-849)

Date:

4/26/2017

Question:

What is the typical clinical progression of the phenytoin and fosphenytoin related “purple-glove syndrome”?

Answer:

Some authors have described “...three temporal stages of injury: initial painful blue-purple discoloration and edema around the IV catheter site, subsequent worsening of pain, edema, and discoloration with development of epidermal sloughing, ulceration, or bullae formation, and neuromuscular symptoms such as paresthesias or weakness and eventually resolution of edema and discoloration starting from the periphery of the injury and moving towards the site of catheter insertion. Timing of these stages appears quite variable, with initial discoloration occurring from minutes to days after phenytoin administration and tissue recovery spanning days to months.” (Garbovsky LA et al Purple glove syndrome after phenytoin or fosphenytoin administration: review of reported cases and recommendations for prevention. 2015 J Med Tox 11:445-459 and Bhattacharjee P et al. Early pathophysiologic changes in purple glove syndrome. 2004 J Cutan Pathol 31(7): 513-515)

Date:

4/27/2017

Question:

Most scorpions whose stings cause serious medical problems are members of the Buthidae family. This family includes scorpions from the genera leiurus, androctonus and buthus, tityus, centruroides, mesobuthus, and parabuthus. Each of these genera are indigenous to different geographic locations; North and Central America, Asia, North Africa, Near/Middle East and South America. Match the listed genera with the correct geographic location

Answer:

Leiurus: Near and Middle East, androctonus and buthus: North Africa, tityus: South America, centruroides: North and Central America, mesobuthus: Asia (especially India), and parabuthus in South Africa. (Isbister GK and Bawaskar HS. Scorpion envenomation 2014 NEJM 371:457-463)

Date:

4/28/2017

Question:

What are xenoestrogens?

Answer:

The cited reference notes, "Environmental, industrial, or naturally occurring chemicals that possess estrogenic and/or antiestrogenic activities are termed xenoestrogens and may interfere with endocrine systems. These xenoestrogens are therefore defined as endocrine-active or endocrine-disrupting compounds." (Mueller SO. Xenoestrogens: mechanisms of action and detection methods. 2004 Anal Bioanal Chem 378:582-587)

Date:

5/1/2017

Question:

Collapsing focal segmental glomerulosclerosis is one cause for primary nephrotic syndrome. Which drugs have been implicated in causing this form of kidney disease?

Answer:

The cited article lists pamidronate, interferon and anabolic steroids as the drugs have been implicated in causing focal segmental glomerulosclerosis. (Sise ME et al. Case 12-2017: A 34 year old man with nephropathy. 2017 NEJM 376(16): 1575-1585)

Date:

5/2/2017

Question:

The use of cannabis and/or alcohol is usually discussed as increasing the risk for motor vehicle crash. What is the role of cannabis and alcohol in cycling related crash risk?

Answer:

One recent study found: "Approximately 15% of cyclists reported using cannabis just prior to the crash, and 14.5% reported using alcohol. Cannabis use identified by blood testing or self-report in the case period and by self-report in the control period yielded a crash risk of 2.38 (1.04–5.43); however, when self-report was used for both the case and control periods the estimate was 0.40 (0.12–1.27). Alcohol use, as measure either in blood or self-report, was associated with an odds ratio of 4.00 (95% CI: 1.64–9.78); results were similar when alcohol was measured by self-report only." (Asbridge M. et al. Cycling-related crash risk and the role of cannabis and alcohol: a case-crossover study. 2014 Preventive Med 66:80-86)

Date:

12:00:00 AM

Question:

What is chaparral and what toxicities have been associated with this substance?

Answer:

The cited reference notes: "Chaparral is an herbal preparation derived by grinding the leaves of the creosote bush (*Larrea tridentata*), an evergreen desert shrub. The ground leaves may be used for tea, placed in capsules, or formed into tablets. Chaparral has been recommended in nonscientific publications for use as an "antioxidant" or "free radical scavenger" to retard aging and to treat a variety of skin conditions (e.g., acne) and hepatitis. In addition, chaparral tea is used as a traditional American Indian medicine. The active ingredient in chaparral is a potent antioxidant, nordihydroguaiaretic acid (NDGA), which can act as a cyclooxygenase and lipoxygenase pathway inhibitor. Long-term studies in rats indicate that consumption of NDGA causes kidney cysts and mesenteric lymphadenopathy; however, there is no information on hepatotoxicity from animal studies." There have been a limited number of cases of hepatic toxicity reported in individuals ingesting chaparral. (Chaparral-induced toxic hepatitis—California and Texas, 1992 MMWR 41(43):812-814)

Date:

5/4/2017

Question:

What are the common pathogens found in so-called "raw milk" (milk that has not undergone pasteurization to kill disease-causing pathogens)?

Answer:

Listeria, E. Coli, Salmonella and campylobacter are the most common pathogens found in raw milk. (<https://www.cdc.gov/foodsafety/rawmilk/raw-milk-index.html>; accessed, April 2017)

Date:

5/5/2017

Question:

Under the Controlled Substances Act, what are the factors used to determine into which schedule a drug or substance should be placed or whether a substance should be decontrolled or rescheduled?

Answer:

These factors are listed in Section 201 (c), [21 U.S.C. § 811 (c)] of the CSA as follows:(1) Its actual or relative potential for abuse. (2) Scientific evidence of its pharmacological effect, if known. (3) The state of current scientific knowledge regarding the drug or other substance. (4) Its history and current pattern of abuse. (5) The scope, duration, and significance of abuse. (6) What, if any, risk there is to the public health. (7) Its psychic or physiological dependence liability. (8) Whether the substance is an immediate precursor of a substance already controlled under this subchapter. (<https://www.dea.gov/druginfo/csa.shtml>; accessed- April 2017)

Date:

5/8/2017

Question:

Which serious cutaneous disease resulted from the use of contaminated shaving brushes during the First World War and into the 1920s?

Answer:

Cutaneous anthrax resulted from the use of contaminated shaving brushes during the 1920s. The cited reference notes, "...the source material origin of shaving brushes had changed during the war (WWI). Cheap brushes of imported horsehair were being made to look like the preferred badger-hair brushes. Unfortunately, some of these brushes were not effectively disinfected and brought with them a nasty stowaway, *Bacillus anthracis*." (Szablewski CM et al. Anthrax cases associate with animal-hair shaving brushes. 2017 *Emerg Inf Dis* 23(5): 806-808)

Date:

5/9/2017

Question:

Hydroxychloroquine is commonly used in the treatment of a variety of rheumatologic diseases including lupus, and rheumatoid arthritis as well as for the treatment of certain malignancies (e.g. non-small cell lung cancer). What is the time course for the development of retinal toxicity in relation to the use of this drug?

Answer:

The listed article notes: "The risk of hydroxychloroquine mediated retinal toxicity is relatively low within the first 5-10 years of therapy when used at daily doses that do not exceed 5mg/kg, typically 200-400mg daily". However when used at very high doses (e.g. 1000 mg per day), "hydroxychloroquine can initiate the development of retinal toxicity within 1-2 years". (Leung LB et al. Rapid onset of retinal toxicity from high dose hydroxychloroquine given for cancer therapy. 2015 *Am J Ophthalmol* 160(4):799-805)

Date:

5/10/2017

Question:

Pulmonary toxicity is the most important dose limiting side effect of the chemotherapeutic agent bleomycin. What is the most common clinical presentation for patients with bleomycin pulmonary toxicity (BPT)?

Answer:

The cited reference notes “Patients with BPT usually present with nonproductive cough, exertional dyspnea, and occasionally fever, and the radiologic findings show bilateral infiltrates.” Sleijfer S. Bleomycin-induced pneumonitis. 2001 Chest 120: 617-624 and Hauges HS et al. Pulmonary and cardiovascular toxicity in long-term testicular cancer survivors. 2015 Urol Onc 33(9): 339-406.

Date:

5/11/2017

Question:

What is endosulfan and what is the primary toxicity of this compound

Answer:

The cited reference notes: “Endosulfan is a restricted-use pesticide (EPA class I) (a chlorinated hydrocarbon) that is particularly effective against aphids, fruit worms, beetles, leafhoppers, moth larvae, and white flies on a wide variety of crops. It is not approved for residential use. It is sold as a mixture of two different forms of the same chemical (referred to as α - and β -endosulfan). It is a cream-to-brown-colored solid that may appear crystalline or in flakes. It has a distinct odor similar to turpentine. The use of endosulfan is being restricted to certain crops and is scheduled to be canceled for all uses by 2016.” The primary toxicity is neurological with seizures being a prominent effect. Poor coordination, imbalance, difficulty breathing, gagging, vomiting, diarrhea, agitation, and loss of consciousness have also been reported. (<https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=609&tid=113>; accessed April 2017)

Date:

5/12/2017

Question:

What is “bear spray”?

Answer:

“Bear spray is a non-lethal bear deterrent designed to stop aggressive behavior in bears. Its use can reduce human injuries caused by bears and the number of bears killed by people in self-

defense. Bear spray uses a fine cloud of Capsicum derivatives to temporarily reduce a bear's ability to breath, see, and smell, giving you time to leave the area.”
<https://www.nps.gov/yell/learn/nature/bearspray.htm>; accessed March 2017 and Gervais, J. A. ; Luukinen, B.; Buhl, K.; Stone, D. 2008. Capsaicin Technical Fact Sheet; National Pesticide Information Center, Oregon State University Extension Services.
<http://npic.orst.edu/factsheets/archive/Capsaicintech.html>; accessed April 2017)

Date:

5/15/2017

Question:

What is the historical significance of the drug aminorex?

Answer:

The cited reference notes: “In 1967, only 2 years after the introduction of the anorexigen drug aminorex on the market in Switzerland, West Germany and Austria, an epidemic of pulmonary arterial hypertension (PAH) was observed. During this period, nearly 60% of the diagnosed patients had a history of aminorex intake that allowed us to recognize the temporal and geographical relationships between the use of the drug and PAH development. Furthermore, this epidemic significantly decreased 2 years after the withdrawal of aminorex. These patients were found to have precapillary PH with typical plexiform arteriopathy upon histological examination and a severe prognosis: 10 years after the epidemic, half of the patients died, usually of right heart failure.” (Montani D. et al. Drug-induced pulmonary arterial hypertension: a recent outbreak. 2013 Eur Resp Rev 22:244-250)

Date:

12:00:00 AM

Question:

What is the current status for use of the drug Rohypnol® in the United States?

Answer:

Rohypnol® (flunitrazepam) produces sedative-hypnotic, anti anxiety and muscle relaxant effects. This drug has never been approved for medical use in the United States by the FDA. Outside the U.S., Rohypnol® is commonly prescribed to treat insomnia. Rohypnol is also referred to as a “date rape” drug. Rohypnol® is a Schedule IV substance under the Controlled Substances Act and is not approved for manufacture, sale, use or importation into the U.S. Rohypnol® is smuggled into the US from other countries including Mexico.
(https://www.dea.gov/pr/multimedia-library/publications/drug_of_abuse.pdf; accessed May 2017)

Date:

5/17/2017

Question:

What are the potential advantages of buprenorphine as compared with morphine treatment of neonatal abstinence syndrome?

Answer:

One recent study reported: "Among infants with the neonatal abstinence syndrome, treatment with sublingual buprenorphine resulted in a shorter duration of treatment and shorter length of hospital stay than treatment with oral morphine, with similar rates of adverse events." (Kraft WK. Buprenorphine for the treatment of the neonatal abstinence syndrome. 2017 NEJM published online May 4, 2017, (DOI: 10.1056/NEJMoa1614835)

Date:

5/18/2017

Question:

What is the current usage level of illicit drugs by American youth?

Answer:

The cited reference notes "Youth are especially vulnerable to drug abuse. According to NIDA, young Americans engaged in extraordinary levels of illicit drug use in the last third of the twentieth century. Today, about 47% of young people have used an illicit drug by the time they leave high school and about 16 percent of eighth, tenth, and twelfth graders are current (within the past month) users. (https://www.dea.gov/pr/multimedia-library/publications/drug_of_abuse.pdf; accessed May 2017)

Date:

5/19/2017

Question:

The following street names refer to which synthetic narcotic: Amidone, Chocolate Chip Cookies, Fizzies, Maria, Pastora, Salvia, Street and Wafer?

Answer:

Amidone, Chocolate Chip Cookies, Fizzies, Maria, Pastora, Salvia, Street and Wafer all refer to the drug methadone. (https://www.dea.gov/pr/multimedia-library/publications/drug_of_abuse.pdf; accessed May 2017)

Date:

5/22/2017

Question:

Which flowering evergreen shrub that is abused for its stimulant effects is known by the following street names: Abyssinian Tea, African Salad, and Oat?

Answer:

Abyssinian Tea, African Salad, and Oat all refer to khat. The cited reference notes: "Khat is a flowering evergreen shrub. Khat that is sold and abused is usually just the leaves, twigs, and shoots of the Khat shrub. Khat is typically chewed like tobacco, then retained in the cheek and chewed intermittently to release the active drug, which produces a stimulant-like effect. Dried Khat leaves can be made into tea or a chewable paste, and Khat can also be smoked and even sprinkled on food." (https://www.dea.gov/pr/multimedia-library/publications/drug_of_abuse.pdf; accessed may 2017)

Date:

5/23/2017

Question:

Tramadol has been marketed in the United States for more than 29 years to treat mild-to-moderate pain. What are the two mechanisms by which this drug produces analgesia?

Answer:

The cited reference notes that tramadol "...has minimal affinity for the mu-opioid receptor and inhibits the reuptake of serotonin and norepinephrine. The active hepatic metabolite, o-desmethyltramadol or M1, is an opioid agonist with high relative intrinsic efficacy and moderate affinity for the mu-opioid receptor." (Babalonis S et al. Abuse liability and reinforcing efficacy of oral tramadol in humans. 2013 Drug Alc Dep 129:116-124)

Date:

5/24/2017

Question:

Is the American Conference of Governmental Industrial Hygienists (ACGIH) a U.S. governmental agency?

Answer:

No. ACGIH® is a 501(c)(3) charitable scientific organization that advances occupational and environmental health. (<http://www.acgih.org/about-us/about-acgih>; accessed May 2017)

Date:

5/25/2017

Question:

What are the potential cabin air hazards on commercial airliners?

Answer:

The potential cabin air hazards on commercial airliners include “Ventilation hazards (including carbon monoxide, ozone, and carbon dioxide levels); Transmission of communicable diseases from sick passengers; Cabin altitude and pressurization changes; Air contamination events, when cabin air becomes contaminated with breakdown products from heated engine oil or hydraulic fluid; pesticide exposures on certain flights.”

(<https://www.cdc.gov/niosh/topics/aircrew/cabinairquality.html>; accessed April 2017)

Date:

5/26/2017

Question:

The diagnosis of cyanide toxicity is generally a clinical one as blood cyanide levels are rarely if ever available quickly. Which readily available laboratory test may be helpful in the diagnosis cyanide toxicity in victims of smoke inhalation specifically?

Answer:

The cited article notes: “Although blood cyanide concentration can be measured, it is not of use for diagnosis in the acute setting as few laboratories perform the assay and results cannot be obtained rapidly. Diagnosis is therefore clinical; however, plasma lactate has been found to correlate with the severity of cyanide toxicity due to lactic acidosis from the prevailing anaerobic metabolism. In victims of smoke inhalation with burns <15% total body surface area (TBSA), a plasma lactate level >10 mmol/L (90 mg/dL) has been found to be a sensitive indicator of cyanide toxicity suggesting blood cyanide levels >40 mmol/L (1.0 mg/L).” (MacLennan L and Moiemann N. Management of cyanide toxicity in patients with burns. 2015 Burns 41:18-24)

Date:

5/29/2017

Question:

On January 5, 2005, in Graniteville, South Carolina, a train crash caused the release of what chemical that killed 9 people and injured more than 250?

Answer:

On January 5, 2005, in Graniteville, South Carolina, a train crash cause the release of 90 tons of chlorine gas killing 9 people and injured more than 250. (MMWR, January 28, 2005 / 54(03); 64-67

Date:

5/30/2017

Question:

With regard to carcinogenicity how does IARC classify radiofrequency electromagnetic fields?

Answer:

The WHO/International Agency for Research on Cancer (IARC) has classified radiofrequency electromagnetic fields as possibly carcinogenic to humans (Group 2B), based on an increased risk for glioma, a malignant type of brain cancer, associated with wireless phone use. (http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf; accessed May 2017)

Date:

5/31/2017

Question:

What are the most common adverse effects of the topically applied (applied directly to the eye) aminoglycosides tobramycin and gentamicin?

Answer:

Superficial punctate lesions on the cornea are the most common findings in patients receiving topical aminoglycosides. Corneal ulceration and conjunctival pseudomembranes may occur but are rare. (Fraunfelder FW. Corneal toxicity from topical ocular and systemic medications. 2006 Cornea 25:1133-1138)

Date:

6/1/2017

Question:

What is 2,3 benzofuran?

Answer:

2,3-Benzofuran is a colorless, sweet-smelling, oily liquid made by processing coal into coal oil. It may also be formed during other uses of coal or oil. 2,3-Benzofuran is not used for any commercial purposes, but the part of the coal oil that contains 2,3-benzofuran is made into a plastic called coumarone-indene resin. This resin resists corrosion and is used to make paints and

varnishes. The resin also provides water resistance and is used in coatings on paper products and fabrics. It is used as an adhesive in food containers and some asphalt floor tiles. The resin has been approved for use in food packages and as a coating on citrus fruits. We do not know how often the resin is used or whether any 2,3-benzofuran in the coating or packaging gets into the food. Exposure to 2,3 benzofurans has been implicated in the development of hepatic and renal injury in some experimental animal models. (<https://www.atsdr.cdc.gov/toxprofiles/tp25-c2.pdf>; accessed May 2017)

Date:

6/2/2017

Question:

What are the anthracycline chemotherapeutic agents and what is the primary toxicity that is dose limiting for these agents?

Answer:

The four most common anthracyclines are doxorubicin, daunorubicin, epirubicin and idarubicin. Doxorubicin and daunorubicin were the first to be used in clinical practice. Cardiotoxicity is the primary dose limiting toxicity for these agents.

The cited reference notes “The exact mechanism of anthracycline-induced cardiotoxicity remains unclear, though it is likely to be multifactorial. Until recently, the most widely accepted hypothesis was that anthracyclines interfered with redox cycling, resulting in DNA damage due to reactive oxygen species (ROS) production. More recently, topoisomerase 2 has been suggested to be the main mediator of cardiotoxicity, though other mechanisms contribute.

(McGowan JV et al. Anthracycline chemotherapy and cardiotoxicity. 2017 *Cardiovasc Drugs* 31:63-75)

Date:

6/5/2017

Question:

A report documents a patient has been taking a rhubarb and cascara compound as a laxative for a period of 5 years. On colonoscopy the entire colon appears black and dark brown. What is the basis for this abnormal coloration of the colon?

Answer:

This abnormal coloration of the colon is known as melanosis coli. The cited reference notes “the active ingredient in these substances (rhubarb and cascara) is anthraquinone, which causes injury to the colonic epithelial cells, resulting in the production of lipofuscin, the dark pigment seen in melanosis coli. The condition is benign and reversible.” (Kew ST and Chakravarthi S. Melanosis coli. 2013 *NEJM* 368:24)

Date:

6/6/2017

Question:

While the use of activated charcoal in poisoning and overdose cases is usually safe, it is not without potential risks. What is the most widely cited concern associated with the use of single dose activated charcoal?

Answer:

According to the cited reference, pulmonary aspiration is “the most widely cited concern associated with the use of single dose activated charcoal”. (Jurlink DN, Activated charcoal for acute overdose: a reappraisal. 2015 Br J Clin Pharmacol 81(3): 482-487)

Date:

6/7/2017

Question:

What are the systemic effects that have been attributed to envenomation by the brown recluse spider?

Answer:

The cited reference notes “Envenomation effects vary depending on the amount of venom injected, anatomic location of the bite, the inclusion of gastric contents within the bite, host susceptibility, and concomitant illness.” These authors further point out that “Twenty-four to 72 hours after envenomation, a morbilliform rash, fever, chills, nausea, vomiting, malaise, arthralgia, and myalgia may occur. Hemolytic anemia, leukocytosis, and thrombocytopenia are characteristic hematologic abnormalities. Very rarely, disseminated intravascular coagulation occurs.” Finally the cited article reports: “Systemic effects are more common in children and may be severe.” (Sams HH et al. Nineteen documents cases of *Loxosceles reclusa* envenomation. 2001 J Am Acad Dermatol 44:603-8.)

Date:

6/8/2017

Question:

What is so called “bee venom therapy”?

Answer:

The cited reference notes: “Bee venom therapy (BVT), in which bee venom is used for medicinal purposes, is available worldwide, but is primarily utilized in Asia, Eastern Europe, and South America. The diverse therapeutic applications of BVT include various musculoskeletal conditions, such as arthritis and rheumatism, chronic recalcitrant neuralgia, arthralgia, and immune-related diseases. BVT is also used to de- sensitize patients to bee stings and thus inhibit allergic reactions. (Park JH et al. Risk associated with bee venom therapy: A systematic review and meta-analysis. 2015 PLoS One 10(5): e0126971. doi:10.1371/journal.pone.0126971

Date:

6/9/2017

Question:

The cited reference notes “Acrylonitrile (AN) is an important industrial chemical used in the manufacture of acrylic and modacrylic fibers, resins, plastics, elastomers, adiponitrile, and nitrile rubber for various consumer goods. The primary routes of potential human industrial exposures to AN are inhalation and dermal contact.” What are the potential sources for nonindustrial AN exposures?

Answer:

The cited article reports “Potential nonindustrial AN exposures arise from the burning of biomass (eg, wild fires and fuel wood) and as a component of tobacco smoke.” (Marsh GM and Zimmerman SD. Mortality among chemical plant workers exposed to acrylonitrile. 2015 JOEM 57(2): 134-145)

Date:

6/12/2017

Question:

Despite some warnings to the contrary, lithium is often used a treatment for bipolar disorder in females of child bearing age. During the first trimester of pregnancy, maternal use of lithium is associated with an increased risk in which category of fetal malformations?

Answer:

Maternal use of lithium is associated with an increased risk of cardiac malformations, including Ebstein’s anomaly. However, the cited study of more than 1,300,000 pregnancies reported approximately “1 additional case [of cardiac malformations] per 100 live births when there was exposure early in pregnancy and that this association is dose dependent. (Patorno E et al. Lithium use in pregnancy and the risk of cardiac malformations. 2017 NEJM 376(23):2245-2254)

Date:

6/13/2017

Question:

What is favism?

Answer:

The cited reference notes “Reduced concentrations of G6PD render erythrocytes susceptible to hemolysis under oxidative conditions induced by oxidant drugs, infection, or ingestion of fava beans. The latter is known as favism.” These authors also note “Favism is characterized by acute hemolysis, hemoglobinuria, anemia, and jaundice. Headache, nausea, back pain, chills, and fever may be present. Although elevated methemoglobin (metHb) levels have been observed during the hemolytic crisis of favic patients textbooks and recent review articles do not mention symptomatic methemoglobinemia as a clinical feature. (Schuurman M et al. Severe hemolysis and methemoglobinemia following fava beans ingestion in glucose-6-phosphatase dehydrogenase deficiency—case report and literature review. 2009 Eur J Pediatr 168:779-782)

Date:

6/14/2017

Question:

The reference cited below notes “Despite the unusually beneficial effects of clozapine, its use is limited due to potentially severe or even life-threatening adverse effects, including agranulocytosis, hepatitis, ileus, epileptic seizures, and cardiovascular effects.” What are the adverse cardiovascular effects associated with clozapine?

Answer:

The cited reference notes “Among adverse cardiovascular effects, clozapine has been associated with tachycardia (in at least 10 % of clozapine- treated patients), hypertension or hypotension, syncope, and electrocardiographic (ECG) abnormalities (at an incidence of at least 1 %). Other severe adverse cardiac effects include rare but potentially life-threatening early myocarditis and later cardiomyopathy. (Curto M et al. Systematic review of clozapine cardiotoxicity. 2016 Curr Psychiatry Reports 18(7): 68-86)

Date:

6/15/2017

Question:

What is the AIHA?

Answer:

AIHA is the American Industrial Hygiene Association. According to the organization website, “AIHA is a nonprofit organization devoted to achieving and maintaining the highest professional standards for its members. More than half of the nearly 8,500 members are certified industrial hygienists (CIHs), and many hold other professional designations. AIHA administers comprehensive education programs that keep occupational and environmental health and safety (OEHS) professionals current in the field of industrial hygiene. AIHA is one of the largest international associations serving OEHS professionals practicing industrial hygiene and is a resource for those in large corporations, small businesses and who work independently as consultants.” (<https://www.aiha.org/about-aiha/Pages/default.aspx>; accessed May 2017)

Date:

6/16/2017

Question:

What are the unique aspects of norbormide rat poison?

Answer:

According to the cited reference, “Norbormide was introduced in 1964 by McNeil Laboratories Inc., as a toxicant selective for the rat species. Norbormide is a unique vasoactive substance endowed with species and tissue specific, endothelium independent, vasoconstrictor activity that is restricted to the peripheral arteries of rats.” (Bova S et al. Norbormide: a calcium entry blocker with selective vasoconstrictor activity in rat peripheral arteries. 2001 Cardiovascular Drug Reviews 19(3): 226-233)

Date:

6/19/2017

Question:

What are the usual clinical manifestations of hyper-magnesemia?

Answer:

The cited reference points out that the clinical manifestations of hyper-magnesemia are “concentration dependent” and that “They range from mild nausea and vomiting to absence of deep tendon reflexes. At higher levels, paralysis of voluntary muscles can occur. This could result in respiratory compromise by affecting diaphragmatic muscles... Higher levels cause conduction defects and hypotension” (Kala J and Abudayyeh A. Magnesium: An overlooked electrolyte. 2017 J Emerg Med 52(5): 741-743)

Date:

6/20/2017

Question:

Nephrolithiasis is a known complication associated with treatment of HIV using the protease inhibitor indinavir sulfate. What unique factor often makes the diagnosis of nephrolithiasis secondary to Indinavir difficult?

Answer:

The cited reference notes: “The detection of Indinavir [related stones] itself poses another challenge as no single imaging modality proves superior in definitively diagnosing indinavir stones. One study found that no abdominal imaging study is diagnostic, intravenous pyelogram detects less than 8% of indinavir stones, renal ultrasounds demonstrated obstruction in 82% of cases, and CT imaging revealed obstruction with no stones in over 50% of the cases.” (Huynh J et al. Indinavir-induced nephrolithiasis three and one half years after cessation of Indinavir therapy. 2011 Int Urol Nephrol 43:571-573 and Nadler RB, et al. The etiology of urolithiasis in HIV infected patients. 2003 Am Urolog Assoc 169:475–477).

Date:

6/21/2017

Question:

Can buprenorphine be used as an effective modality for the treatment of neonatal abstinence syndrome?

Answer:

A recently published article described a double blind, double dummy clinical trial of 63 infants who were exposed to opioids in utero. The authors of this study reported “The median duration of treatment was significantly shorter with buprenorphine than with morphine (15 days vs. 28 days), as was the median length of hospital stay (21 days vs. 33 days) ($P < 0.001$ for both comparisons). Adjunctive phenobarbital was administered in 5 of 33 infants (15%) in the buprenorphine group and in 7 of 30 infants (23%) in the morphine group ($P = 0.36$). Rates of adverse events were similar in the two groups.” (Kraft WK et al. Buprenorphine for the treatment of the neonatal abstinence syndrome. 2017 NEJM 376(24):2341-2348)

Date:

6/22/2017

Question:

Which anti-arrhythmic drug has been associated with a so-called “pancerebellar syndrome” associated with “nystagmus, dysmetria, titubation, and ataxia of gait and stance”?

Answer:

The cited reference notes: “Amiodarone appears to be associated with cerebellar toxicity. A pan-cerebellar syndrome with nystagmus, dysmetria, titubation, and ataxia of gait and stance occurred. Symptoms tended to resolve gradually over the course of weeks after drug withdrawal. There was a strong dose-dependent effect.” (Van Gaalen J et al. Drug-induced cerebellar ataxia: a systematic review. 2014 CNS Drugs 28:1139-1153)

Date:

6/23/2017

Question:

What is methyl ethyl ketone? By what other name is this chemical known?

Answer:

The cited reference notes: “2-Butanone, also known as methyl ethyl ketone (MEK), is a colorless liquid with a sweet, but sharp odor. 2-Butanone is manufactured in large amounts for use in paints, glues, and other finishes because it rapidly evaporates and will dissolve many substances. It will quickly evaporate into the air. 2- Butanone is often found dissolved in water or as a gas in the air. 2-Butanone is also a natural product made by some trees and is found in some fruits and vegetables. The exhausts of cars and trucks release 2-butanone into the air. 2-Butanone is usually found in the air, water, and soil of landfills and hazardous waste sites.” “Clinical reports and animal studies have clearly shown that exposure to 2-butanone alone causes minimal chronic neurological or hepatic deficits, if any. It does potentiate both the neurotoxicity of n-hexane and methyl-n-butyl ketone and the hepatotoxicity of carbon tetrachloride and chloroform”. (<https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=343&tid=60>; accessed May 2017)

Date:

6/26/2017

Question:

What percentage of drug-induced cases of torsade de pointes are associated with previously unrecognized long QT syndrome?

Answer:

The cited reference notes “.....previously unrecognized long QT syndrome, of any subtype, can be identified in 5 to 20% of patients with drug induced torsade de pointes.” (Roden DM. Long-QT Syndrome. 2008 NEJM 358:169-176)

Date:

6/27/2017

Question:

What are the mechanisms of action of triptan drugs used in the treatment of migraine headaches?

Answer:

The listed reference states “Triptans are serotonin agonists with high affinity for 5-HT_{1B} and 5-HT_{1D} receptors. Triptans were originally thought to provide relief from migraine by causing cranial vasoconstriction, most likely through action at postsynaptic 5-HT_{1B} receptors on smooth muscle cells of blood vessels. It is now theorized that triptan also block the release of vasoactive peptide from the perivascular trigeminal neurons through their action at presynaptic 5-HT_{1D} receptors on nerve terminals. In addition, triptans bind to presynaptic 5-HT_{1D} receptors in the dorsal horn, and this binding is thought to block the release of neurotransmitters that activate second order neurons ascending to the thalamus. Triptans may also facilitate descending pain inhibitory systems.” (Loder E. Triptan therapy in migraine. 2010 NEJM 363:63-70)

Date:

6/28/2017

Question:

What is lycoperdonosis?

Answer:

The cited reference notes, “Lycoperdon is the genus of fungi to which most puffballs belong”. These authors further note, “Lycoperdonosis is the respiratory disease caused by inhalation of large quantities of spores from the mature mushroom, commonly termed puffball.” (Strand RD et al. Lycoperdonosis, 1967 NEJM 277(2):89-91)

Date:

6/29/2017

Question:

What is the chemical denoted by the formula N₃Na?

Answer:

N₃Na is the chemical formula for sodium azide.

(https://pubchem.ncbi.nlm.nih.gov/compound/sodium_azide#section=RTECS-Number; accessed June 2017)

Date:

6/30/2017

Question:

The co-ingestion of drugs in which class may potentiate the adverse effects of the drug loperamide?

Answer:

According to the cited reference. “Loperamide is actively removed from the central nervous system by p-glycoprotein, a membrane transporter at the blood brain barrier, and therefore ingestion of P-glycoprotein inhibitors (e.g. amiodarone, macrolide antibiotics, ketoconazole, quinidine and verapamil) potentiates euphoria or anti-withdrawal effects.” These authors also note “Further potentiation can be achieved with drugs that inhibit hepatic metabolism of the drug.” (Bellew S and Barrett TW. Loperamide will stop you up but it can also bring you down. 2017 Ann Emerg Med 69(6):786-791)

Date:

7/3/2017

Question:

The reference cited below notes “Over the past decade, artemisinin-based combination therapies (ACTs) have been deployed as first- and second- line treatments for uncomplicated malaria across malaria-endemic regions. Since 2001, this deployment has included the delivery of over 500 million treatments of artemether-lumefantrine (AL), making it one of the most widely prescribed drugs worldwide”. What neurologic toxicity is of most concern in patients receiving ACTs?

Answer:

Neuroauditory toxicity is the neurologic toxicity of most concern in patients receiving ACTs. (Ramos-martin V et al. Review Article: Neuroauditory toxicity of artemisinin combination therapies—Have safety concerns been addressed? 2014 Am J Trop Hyg 91(1):62-73)

Date:

7/4/2017

Question:

Saw palmetto extracts are widely used as self-treatment for a variety of symptoms due to benign prostatic hyperplasia in men. What are the adverse effects associated with the use of saw palmetto?

Answer:

The cited reference reports a randomized trial of 369 men taking various doses of saw palmetto extract over 18 months. The authors report “There were no statistically significant differences between the groups in the rates of serious or non-serious adverse events, changes in vital signs, digital prostate examination findings or study withdrawal rates. Overall, there were no significant intergroup differences in laboratory test abnormalities, while differences in individual laboratory

tests were rare and small in magnitude. No evidence of significant dose-response phenomena was identified. (Avins AL et al. Safety and toxicity of saw palmetto in the CAMUS trial. 2013 J Urol 189:1415-1420)

Date:

7/5/2017

Question:

What are the so-called PAMORA agents?

Answer:

The cited reference notes “Peripherally acting μ -opioid receptor antagonist” agents (PAMORA’s) are newer agents that specifically block the peripheral effects of opioids on μ -opioid receptors in the enteric nervous system to treat OIC (opioid induced constipation). It has been suggested that up to 50% of patients with OIC may benefit from treatment with a PAMORA, however, PAMORA resistant constipation may be found in patients with other etiologies which may include medications, advanced age, immobility or advanced illness. Currently two agents are FDA-approved for the treatment of opioid-induced constipation. Naloxegol (Movantik®) was approved in 2014 for the treatment of opioid-induced constipation in adult patients with chronic non-malignant pain. Methylnaltrexone (Relistor®) was initially approved in 2008 for the treatment of opioid-induced constipation in adult patients with advanced illness who are receiving palliative care, when response to laxative therapy was not sufficient, and expanded in 2014 to include the treatment of opioid-induced constipation in adult patients with chronic, non-malignant pain. The use of PAMORAs are being incorporated within guidelines for management of constipation in patients receiving opioids.” (Frydrych V. <https://medicaid.utah.gov/pharmacy/ptcommittee/files/Criteria%20Review%20Documents/2015/2015.12%20PAMORA%20Drug%20Class%20Review.pdf>; accessed June 2017)

Date:

7/6/2017

Question:

Polonium-210 was used as a homicidal agent in the well-publicized case of Alexander Litvinenko. Which decay related particle is emitted by Polonium-210 and is responsible for the adverse effects of this isotope?

Answer:

The cited reference notes “Polonium-210 is a naturally occurring radioactive element that was discovered in 1898 by Marie Curie. It decays to stable lead-206 by emitting one alpha particle, with occasional excitation in the nucleus and emission of 803 keV gamma rays.” (Nathwani AC et al. Polonium-210 poisoning: a first-hand account. 2016 The Lancet 388:1075-1080)

Date:

7/7/2017

Question:

What is the risk of future opioid misuse, after high school, in those high school students with legitimate opioid use before high school graduation?

Answer:

The cited reference analyzed data from the Monitoring the Future Study and reports “Legitimate opioid use before high school graduation is independently associated with a 33% increase in the risk of future opioid misuse after high school. This association is concentrated among individuals who have little to no history of drug use and, as well, strong disapproval of illegal drug use at baseline.” These authors concluded “Use of prescribed opioids before the 12th grade is independently associated with future opioid misuse among patients with little drug experience and who disapprove of illegal drug use. Clinic-based education and prevention efforts have substantial potential to reduce future opioid misuse among these individuals, who begin opioid use with strong attitudes against illegal drug use. (Miech R et al. Prescription opioids in adolescence and future opioid misuse. 2015 *Pediatrics* 136 (5):e1169-e1177)

Date:

7/10/2017

Question:

The combination of 5-hydroxytryptamine (5-HT₃) receptor antagonist and dexamethasone is often recommended for the treatment of vomiting related to cancer chemotherapy. What other common complication occurs in this setting and is most often due to dexamethasone?

Answer:

The cited reference notes “The use of dexamethasone may reduce the delayed symptoms, but this benefit may be balanced by adverse effects, one of which is hiccup. The incidence of hiccups varies from 3% to 61% in cancer patients using dexamethasone based antiemetics for the prophylaxis of cisplatin-induced [as well as other chemotherapy induced] nausea/vomiting.” These authors further comment: “Although the mechanism is not known, it has been proposed that corticosteroids reduce the synaptic transmission threshold in the midbrain and directly stimulate the hiccup reflex arc.” (Liaw CC et al. Cisplatin-Related Hiccups: Male predominance, induction by dexamethasone, and protection against nausea and vomiting. 2005 *J Pain Symptom Management*. 30(4):359-366)

Date:

7/11/2017

Question:

What are the details of the classification system often used for endoscopic grading of esophageal injury secondary to caustic ingestion?

Answer:

Grade 0: No detectable mucosal change; Grade 1: erythema of mucosa; Grade 2: Erythema, sloughing, ulceration and non-circumferential exudates; Grade 3 Deep mucosal ulceration and circumferential mucosal sloughing; Grade 4 Eschar, full thickness changes and perforation. (Riffat F and Cheng A. Pediatric caustic ingestion: 50 consecutive cases and a review of the literature. 2009 Disease of the Esophagus 22:89-94)

Date:

7/12/2017

Question:

Many commercial mixtures containing which chemicals are known in the U.S. by the trade name Aroclor?

Answer:

Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor. Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils. (<https://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=26>; accessed June 2017)

Date:

7/13/2017

Question:

The neurotoxicity associated with the chemical n-hexane were first observed in workers in which industry?

Answer:

The cited reference notes: “The neurotoxicity of n-hexane was first observed in the shoe industries of Japan and Italy in the 1960s and early 1970s. A number of epidemiological studies were initiated in response to outbreaks of apparent peripheral neuropathy in shoe workers.” These authors go on to point out “One of the first large epidemiological investigations carried out was a case series of 93 cases of peripheral neuropathy in workers exposed to n-hexane from glues and solvents used in sandal manufacture. After several cases of advanced quadriplegia were noted in the Fukaya district, Mie prefecture, Japan, an epidemiological investigation was carried out.” (<https://www.atsdr.cdc.gov/toxprofiles/tp113-c2.pdf>; accessed July 2017)

Date:

7/14/2017

Question:

How might intra-operative carbon monoxide exposure occur during general endotracheal anesthesia?

Answer:

The cited reference reports, “Exposure to carbon monoxide during general anesthesia may result from volatile anesthetic degradation by carbon dioxide absorbents and rebreathing of endogenously produced CO. Although adherence to the Anesthesia Patient Safety Foundation guidelines reduces the risk of CO poisoning, patients may still experience subtoxic CO exposure during low-flow anesthesia. The consequences of such exposures are relatively unknown.” (Levy RJ. Anesthesia-related carbon monoxide exposure: Toxicity and potential therapy. 2016 *Anesth Analg* 123:670-681)

Date:

12:00:00 AM

Question:

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induction by dexamethasone, and protection against nausea and vomiting. 2005 J Pain Symptom Management. 30(4):359-366)

Date:

7/18/2017

Question:

What is the so-called hepatic sinusoidal obstruction syndrome and which plant alkaloids cause this potentially lethal problem?

Answer:

The “hepatic sinusoidal obstruction syndrome” is also known as hepatic veno-occlusive disease (VOD). This syndrome is caused by the ingestion of pyrrolizidine alkaloids. These compounds may be found in a variety of plants including those in genus Senecio and Heliotropium among others. (Edgar JA et al. Pyrrolizidine Alkaloids: Potential Role in the Etiology of Cancers, Pulmonary Hypertension, Congenital Anomalies, and Liver Disease. 2015 Chem Res Toxicol 28:4-20)

Date:

7/19/2017

Question:

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(<https://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=26>; accessed June 2017)

Date:

7/20/2017

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Date:

7/21/2017

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Date:

7/24/2017

Question:

Occupational exposure to the chemical carbon disulfide has been associated with a wide variety of adverse health effects including accelerated atherosclerosis in some workers. What phenomena have been posited as surrogate markers for the absorption of a medically important dose of carbon disulfide

Answer:

The cited article mentions that urinary 2-thiol-1,3-thiazolidine-carboxylic acid (TTCA) levels and/or the presence of ocular microaneurysms may serve as indicators of significant carbon disulfide exposure. (Sulsky SI et al. Critical review of the epidemiological literature on the potential cardiovascular effects of occupational carbon disulfide exposure. 2002 Int Arch Occup Environ Health 75:365-380)

Date:

7/25/2017

Question:

Which drug has been shown to rapidly and safely reverse the anticoagulant effect of dabigatran (Pradaxa)?

Answer:

Idarucizumab (Praxbind) has been shown to rapidly and safely reverse the anticoagulant effect of dabigatran in patients with uncontrolled bleeding or those taking dabigatran and who need to undergo an urgent or emergent procedure. (Pollack CV et al. Idarucizumab for dabigatran reversal. 2015 NEJM 373(6): 511-520)

Date:

7/26/2017

Question:

What are so-called “marijuana concentrates”, common street names “710 (the word “OIL” flipped and spelled backwards), wax, ear wax, honey oil, budder, butane hash oil, butane honey oil (BHO), shatter, dabs (dabbing), black glass, and errl?

Answer:

The cited reference notes: “A marijuana concentrate is a highly potent THC concentrated mass that is most similar in appearance to either honey or butter, which is why it is referred to or known on the street as “honey oil” or “budder.” These authors also point out: “Marijuana concentrates contain extraordinarily high THC levels that could range from 40 to 80 percent. This form of marijuana can be up to four times stronger in THC content than high grade or top shelf marijuana, which normally measures around 20 percent THC levels.”

(https://www.dea.gov/pr/multimedia-library/publications/drug_of_abuse.pdf; accessed June 2017)

Date:

7/27/2017

Question:

Okadaic acid has been posited to be the putative toxin in which type of shellfish poisoning?

Answer:

Okadaic acid has been posited to be the putative toxin in diarrhetic shellfish poisoning. (McIntyre L et al. Formation of a volunteer harmful algal bloom network in British Columbia, Canada, following an outbreak of diarrhetic shellfish poisoning. 2013 Mar *Drugs* 11:4144-4157)

Date:

7/28/2017

Question:

What is the effect of maternal cannabis use on newborn birth weight?

Answer:

A recent meta-analysis reported: "Infants exposed to cannabis in utero had a decrease in birth weight (low birth weight pOR=1.77: 95% CI 1.04 to 3.01; pooled mean difference (pMD) for birth weight=109.42 g: 38.72 to 180.12) compared with infants whose mothers did not use cannabis during pregnancy." (Gunn JKL et al. Prenatal exposure to cannabis and maternal and child health outcomes: a systemic review and meta-analysis. 2016 *BMJ Open* 6:1-*)

Date:

7/31/2017

Question:

What is malignant hyperthermia?

Answer:

The cited reference reports "Malignant hyperthermia is the term used to describe a clinical crisis induced by halogenated inhalational anesthetics and/or succinylcholine. These trigger agents cause a dysregulation of intracellular calcium of the striated muscle cell leading to life threatening hypermetabolism and muscle rigidity....There are a few reports on lethal malignant hyperthermia like reactions unrelated to anesthesia. The susceptibility to malignant hyperthermia is a paradigm for a pharmacogenetic disorder requiring for its clinical manifestation the cooperative effects of a genetic predisposition plus an external triggering factor. (Broman M et. al. Malignant hyperthermia, a Scandinavian update. 2015 *Acta Anesth Scan* 59:951-961)

Date:

8/1/2017

Question:

What is the immediate treatment for malignant hyperthermia

Answer:

The cited reference summarizes the immediate treatment of MH as follows: 1- Stop all triggering agents, 2- hyperventilate with 100% oxygen, 3- administer dantrolene bolus at 2.0 mg/kg up to 10 mg/kg. In addition, consider external cooling, treat hyperkalemia, monitor for acid base disturbances, monitor for arrhythmias and treat as appropriate (avoid calcium channel blockers or digoxin) (Broman M et. al. Malignant hyperthermia, a Scandinavian update. 2015 Acta Anesth Scan 59:951-961)

Date:

8/2/2017

Question:

What is the so-called “fentanyl footprint”?

Answer:

The so-called “fentanyl footprint” is “clusters of overdoses and overdose deaths occurring within a small geographic area within 48-72 hours”. The “fentanyl footprint” may provide a clue for first responders that a given drug over dose could be related to fentanyl or fentanyl related substances. (US DEA. Fentanyl Briefing Guide for First Responders. <https://www.dea.gov/index.shtml>)

Date:

8/3/2017

Question:

A 54-year-old male worker presents with scleroderma-like changes in the fingers with underlying erosive appearing lesions of the distal most phalanges on x-ray. In addition, the patient describes circulatory changes consistent with Raynaud’s phenomena. This clinical picture is consistent with occupational exposure to which industrial chemical.

Answer:

Vinyl chloride (Kielhorn J et. al. Vinyl chloride: Still a cause for concern. 2000 Env Health Perspect 108:579-588)

Date:

8/4/2017

Question:

Ciguatera is caused by eating reef fish that contain toxins known as ciguatoxins. Which specific parts of these fish contain the highest concentrations of ciguatoxins?

Answer:

The cited reference notes that the parts of reef fish containing the highest concentration of ciguatoxins are the head and viscera. (Chan TYK. 2016 A, J Trop Med Hyg. 94(4):704-709)

Date:

8/7/2017

Question:

Fentanyl administered by intravenous bolus can be associated with cough that may, at times, be severe. What are the risk factors for the development of fentanyl-induced cough?

Answer:

One study reports “.....significant independent risk factors for the development of fentanyl-induced cough include, a young age and absence of cigarette smoking, the absence of epidurally administered lidocaine and the absence of a priming dose of vecuronium.” (Oshima T et. al. Identification of independent risk factors for fentanyl-induced cough. 2006 Can J Anesth 53(8):753-758)

Date:

8/8/2017

Question:

Latrodectus mactans (black widow spider) envenomation has been reported to cause priapism in some patients. What is the most effective treatment for this form of priapism?

Answer:

The cited article notes that “Timely administration of [black widow spider] antivenin has been reported to be effective in relieving priapism in patients with observed black widow spider bites confirmed by capture of the spider or direct observation of the spider bite.” (Goel SC et al. Recognition and successful treatment of priapism and suspected black widow spider bite with antivenin. (2014 *Pediatr Emer Care* 30:723–724)

Date:

8/9/2017

Question:

Which opioid, developed for veterinary use, is 10,000 times more potent than morphine, yet induces less apnea when given in therapeutically doses.

Answer:

The cited reference notes “Carfentanil, an opioid developed for veterinary use, is 10,000 times more potent than morphine in animals, although it produces less apnea when dosed therapeutically.” (ACMT and AACT Position Statement: Preventing Occupational Fentanyl and Fentanyl Analog Exposure to Emergency Responders. July 2017 (http://www.clintox.org/wp-content/uploads/2016/04/Fentanyl_PPE_Emergency_Responders_.pdf; accessed August 2017)

Date:

8/10/2017

Question:

What is ethion?

Answer:

Ethion is an organophosphate pesticide. Pure ethion is a clear to yellowish liquid with an unpleasant sulfur-like smell. It does not occur naturally in the environment. Ethion is used in agriculture, mainly to control insects on citrus trees, but also on cotton, fruit and nut trees, and some vegetables. It may also be used on lawns and turf grasses, but it is not used in the home for pest control. (<https://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=206>; accessed July 2017)

Date:

8/11/2017

Question:

What is the LactMed database?

Answer:

The LactMed® database contains information on drugs and other chemicals to which breastfeeding mothers may be exposed. It includes information on the levels of such substances in breast milk and infant blood, and the possible adverse effects in the nursing infant. Suggested therapeutic alternatives to those drugs are provided, where appropriate. All data are derived from the scientific literature and fully referenced. A peer review panel reviews the data to assure scientific validity and currency. LactMed may be searched at <http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?LACT>(https://www.nlm.nih.gov/news/lactmed_announce_06.html; accessed August 2017)

Date:
8/14/2017

Question:
In patients taking injectable insulin, what is the suspected cause for insulin-mediated lipohypertrophy?

Answer:
The cited reference notes "Insulin-induced lipohypertrophy occurs at the injection site and is thought to be the result of repeated trauma and possibly the anabolic side effects of insulin. The condition can lead to labile control of blood glucose levels owing to variable insulin absorption at these sites. Lipohypertrophy typically causes such palpable, rubbery growths...." (Verma R. Insulin-mediated lipohypertrophy. 2017 NEJM 377(6):573

Date:
8/15/2017

Question:
What is the OSHA "Lock Out/Tag Out" (LOTO) standard?

Answer:
OSHA states "The lock out/tag out standard establishes the employer's responsibility to protect employees from hazardous energy sources on machines and equipment during service and maintenance. The standard gives each employer the flexibility to develop an energy control program suited to the needs of the particular workplace and the types of machines and equipment being maintained or serviced. This is generally done by affixing the appropriate lockout or tag out devices to energy-isolating devices and by de-energizing machines and equipment. The standard outlines the steps required to do this." (https://www.osha.gov/OshDoc/data_General_Facts/factsheet-lockout-tagout.pdf; accessed August 2017)

Date:
8/16/2017

Question:
Which drugs have been associated with the development of drug-induced gingival hyperplasia?

Answer:
The cited study analyzed reports from the US Food and Drug Administration (FDA) Adverse Event Reporting System (FAERS) and the Japanese Adverse Drug Event Report (JADER) database. More than 6 million reports were looked at and with regard to gingival hyperplasia, the authors reported "The RORs (95% confidence interval: CI) for cyclosporine, everolimus,

sirolimus, mycophenolate mofetil, amlodipine, nifedipine, carbamazepine, clobazam, levetiracetam, phenobarbital, phenytoin, primidone, topiramate, and valproic acid, were 39.4 (95% CI: 30.3–51.2), 4.2 (1.7–10.0), 6.6 (2.5–17.7), 13.1 (7.2–23.2), 94.8 (80.0–112.9), 57.9 (35.7–94.0), 15.1 (10.3–22.3), 65.4 (33.8–126.7), 6.5 (3.6–11.8), 19.7 (8.8–44.0), 65.4 (52.4–82.9), 56.5 (21.1–151.7), 2.9 (1.1–7.7), and 17.5 (12.6–24.4), respectively.....The median time-to-onset of gingival hyperplasia values for immunosuppressants, calcium channel blockers, and anticonvulsants use were 71, 262, and 37 days, respectively. (Hatahira H, et al. Drug-induced gingival hyperplasia: a retrospective study using spontaneous reporting system database. 2017 J Pharm Health Care Sci 3(19):1-11)

Date:

8/17/2017

Question:

What is the HSDB database?

Answer:

HSDB is a toxicology database that focuses on the toxicology of potentially hazardous chemicals. It provides information on human exposure, industrial hygiene, emergency handling procedures, environmental fate, regulatory requirements, nanomaterials, and related areas. The information in HSDB has been assessed by a Scientific Review Panel. The HSDB Scientific Review Panel meets several times yearly to review selected substances, add new records, and update records, as needed. (<https://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB>; accessed July 2017)

Date:

8/18/2017

Question:

Controlling exposures to occupational hazards is the fundamental method of protecting workers. Traditionally, a “hierarchy of controls” has been used as a means of determining how to implement feasible and effective control solutions. What is the so-called “hierarchy of controls”?

Answer:

The cited reference describes the “hierarchy of controls” as follows (from highest/safest control to lowest): Elimination and substitution followed by engineering controls, followed by administrative controls, followed by personal protective equipment. The idea behind this hierarchy is that the control methods at the left (elimination/substitution) are potentially more effective and protective than those at the right (PPE). Following this hierarchy normally leads to the implementation of inherently safer systems, where the risk of illness or injury has been substantially reduced. (<https://www.cdc.gov/niosh/topics/hierarchy/>; accessed August 2017)

Date:

8/21/2017

Question:

Which drug, recommended based on its anti-inflammatory effects in treating the serositis associated with familial Mediterranean fever, has been recommended for the treatment of recurrent pericarditis?

Answer:

Colchicine has been recommended for the treatment of recurrent pericarditis. (Lilly LS. Treatment of acute and recurrent idiopathic pericarditis. 2013 Circulation 127:1723-1726)

Date:

8/22/2017

Question:

Which drug is the first radioprotectant approved by the U.S. FDA?

Answer:

Amifostine is the first radioprotectant approved by the U.S. FDA; approved in 1999. The cited reference points out that amifostine is “a freely soluble organic thiophosphate cytoprotective agent used to reduce toxicities associated with certain cancer chemotherapy and radiotherapy. It is indicated to reduce the incidence of moderate to severe xerostomia in patients undergoing post-operative radiation treatment for head and neck cancer in which the radiation port includes a substantial portion of the parotid glands. Amifostine just be administered IV and is typically given 15 to 30 minutes before radiotherapy. It is not effective when administered post-exposure. (Koenig KL et al. Medical treatment of radiological causalities: Current concepts. 2005 Anns Emerg Med 45(6):643-654)

Date:

8/23/2017

Question:

Tick paralysis is a rare condition that can lead to significant morbidity and death is undiagnosed. Most cases of tick paralysis have been reported from Australia or North America including in the United States—the Pacific Northwest, the Rocky Mountain states, and the Southeast— and southwestern Canada. In North American which species of tick has been implicated as the most common vector causing tick paralysis?

Answer:

The cited reference reports “In North America the *Dermacentor andersoni* tick has been implicated most often. Other causative species in North America include *Dermacentor variabilis*, *Amblyomma americanum*, *Amblyomma maculatum*, and *Ixodes scapularis*. In Australia the majority of cases are caused by *Ixodes holocyclus*. (Pecina CA. Tick Paralysis. 2012 Seminars in Neurology 32(5):531-532)

Date:

8/24/2017

Question:

Stevens-Johnson’s syndrome and toxic epidermal necrolysis are potentially fatal mucocutaneous diseases that in some cases may be due to a variety of drugs. Which drugs are most commonly implicated as etiologic agents in pediatric patients suffering from these diseases?

Answer:

The cited article notes “Antibiotics, anticonvulsants, and nonsteroidal anti-inflammatory drugs are the most commonly implicated etiologies in children.” (Catt CJ et al. Ocular manifestations of Stevens Johnsons syndrome and toxic epidermal necrolysis in children. 2016 Am J Ophthalmol. 166:68-75)

Date:

8/25/2017

Question:

The triad of acute kidney injury, microangiopathic hemolytic anemia, and thrombocytopenia characterize the hemolytic uremic syndrome (HUS). This typically occurs following a GI infection with which toxin producing pathogen?

Answer:

The cited article notes “Typically, it occurs after a gastrointestinal infection with a Shiga toxin (Stx) producing pathogen. This diarrhea- or Stx-associated HUS (D1HUS or Stx-HUS) accounts for 90% of cases. Currently, there are no direct treatments and limited prevention strategies. Most patients recover from the acute illness, but there is a 1% to 4% mortality and one-third of patients are left with long-term medical problems.” (Keir LS. Shiga toxin associated hemolytic uremic syndrome. 2015 Hematol Oncol Clin N Am 29:525-539)

Date:

8/28/2017

Question:

What is the so-called “Pseudo-Bartter Syndrome”?

Answer:

The so-called “Pseudo-Bartter Syndrome” is furosemide-induced hypokalemia. The cited reference points out that “Pseudo- Bartter-Syndrome”, is found mainly in young females who work in health-care institutions.....who may have an easy opportunity to watch the impressive effect of diuretics and have an easier access to the drugs than people who work outside health-care institutions. Motivation for surreptitious furosemide intake is the intention to slim, to avoid edema or.....to change the shape of the body. Furosemide may be taken also unknowingly as an undeclared component of “health teas” and lead to hypokalemia.” (Ruisz W et al. Furosemide induced severe hypokalemia with rhabdomyolysis without cardiac arrest. 2013 BMC Woman’s Health 13:30-34)

Date:

8/29/2017

Question:

Are serial determinations of coagulation ability necessary following a bite of the copperhead snake (*Agkistrodon contortrix*)?

Answer:

Despite the fact that many written guidelines recommend routine and serial determinations of clotting parameters following copperhead snake bite, one recent study reported “Results for INR, PTT, platelet count and fibrinogen concentration remained within normal limits for 79%, 93%, 95%, and 91% of patients respectively.” These authors reported no patients developing bleeding complications following copperhead and presumed copperhead bites. These authors concluded that “In identified copperhead snakebites, it may be safe to forgo serial coagulation testing in both adult and pediatric patients in the absence of clinical evidence of bleeding. (Ali A,et. al. Lack of coagulopathy after copperhead snakebites. 2015 Ann Emerg Med 65:404-409)

Date:

8/30/2017

Question:

C. diphtheriae is an aerobic gram-positive bacillus. Toxin production (toxigenicity) occurs only when the bacillus is itself infected (lysogenized) by a specific virus (bacteriophage) carrying the genetic information for the toxin (*tox* gene). Only toxigenic strains can cause severe disease. What is the pathogenesis of toxigenic diphtheria?

Answer:

“Susceptible persons may acquire toxigenic diphtheria bacilli in the nasopharynx. The organism produces a toxin that inhibits cellular protein synthesis and is responsible for local tissue destruction and pseudomembrane formation. The toxin produced at the site of the membrane is absorbed into the bloodstream and then distributed to the tissues of the body. The toxin is responsible for the major complications of myocarditis and neuritis and can also cause low platelet counts (thrombocytopenia) and protein in the urine (proteinuria). Non-toxin producing strains may cause mild to moderate pharyngitis but are not associated with formation of a pseudomembrane. While rare severe cases have been reported, these may actually have been caused by toxigenic strains that were not detected because of inadequate culture sampling.” (<https://www.cdc.gov/vaccines/pubs/pinkbook/dip.html>; accessed August 2017)

Date:

8/31/2017

Question:

Which GABA[']ergic drugs are not reversed by the drug flumazenil?

Answer:

The cited reference notes “Flumazenil has a very rapid onset of action after parenteral administration, and competitively antagonizes the sedating effects of a wide range of benzodiazepines such as midazolam, diazepam and lorazepam at the GABAA receptor.It does not reverse the effects of other GABA[']ergic sedative/hypnotics such as barbiturates, inhalational anesthetics, propofol or ethanol nor does it reverse the effects of opioids.” (Silvotti M. Flumazenil, naloxone and the “coma cocktail”. 2015 Br J Clin Pharm 81(3):428-236)

Date:

9/1/2017

Question:

Does the drug MDMA have any legitimate therapeutic usage?

Answer:

The cited reference notes: “MDMA was first used in the 1970s as an aid in psychotherapy (mental disorder treatment using “talk therapy”). The drug didn't have the support of clinical trials (studies using humans) or approval from the U.S. Food and Drug Administration. In 1985, The U.S. Drug Enforcement Administration labeled MDMA as an illegal drug with no recognized medicinal use. Some researchers remain interested in its value in psychotherapy when given to patients under carefully controlled conditions. MDMA is currently in clinical trials as a possible treatment aid for post-traumatic stress disorder and anxiety in terminally ill patients, and for social anxiety in autistic adults.” (https://www.drugabuse.gov/publications/drugfacts/mdma-ecstasy#added_risk; accessed July 2017)

Date:
9/4/2017

Question:

Loperamide is classified as an opioid agonist, binds to opiate receptors in the gut wall and slows peristalsis thus decreasing the excessive GI motility of diarrhea. What is the explanation for the lack of CNS effects for this opioid agonist?

Answer:

The article cited notes “The lack of CNS effects is due to the low oral bioavailability and low penetration through the blood brain barrier, consequently at normal doses for diarrheal illness, it has no clinically significant analgesic activity and is not a scheduled substance because loperamide is extruded from the CNS by the P-glycoprotein efflux pump which plays a significant role in blood brain barrier function.” (Borron SW et al. Intentional misuse and abuse of loperamide: A new look at a drug with “low abuse potential”. 2017 J Emerg Med 53(1): 73-84)

Date:
9/5/2017

Question:

Burns, some serious, have been reported following the explosion and fire from lithium-ion batteries often included in popular e-cigarette products. What is the proposed mechanism for these battery failures?

Answer:

The proposed mechanism for lithium-ion battery failures is discussed by the cited reference as “...the thermal runaway mechanism. Thermal runaway occurs when the reaction rate and subsequent temperature increase causes the charged flammable organic components (ethyl acetate, ethyl carbonate and dimethyl carbonate) to short circuit.” (Treitl D. et. al. Full and partial thickness burns from spontaneous combustion of e-cigarette lithium-ion batteries with review of the literature. 2017 J Emerg Med 53(1): 121-125)

Date:
9/6/2017

Question:

What are the potential contraindications to intranasal medication administration?

Answer:

The cited reference lists the following potential contraindications to intranasal medication administration: 1- Abnormal neurologic examination or developmental delay; 2- Allergy or sensitivity to the medication being administered; 3- epistaxis; 4-Facial trauma; 5-Medical conditions that affect ciliary function (e.g. cystic fibrosis)l 6-Nasal obstruction (eg nasal polyps, significant facial trauma); 7-Rhinitis. (Bailey AM et al. Review of intranasally administered medications for use in the emergency department. 2017 J Emerg Med 53(1):38-48)

Date:

9/7/2017

Question:

Are prescriptions written by “cyber doctors” relying on online questionnaires legitimate under United States law?

Answer:

The Drug Enforcement Administration (DEA) warns: “Federal law prohibits buying controlled substances such as narcotic pain relievers (e.g., OxyContin®, Vicodin®), sedatives (e.g., Valium®, Xanax®, Ambien®), stimulants (e.g., phentermine, phendimetrazine, Adderall®, Ritalin®) and anabolic steroids (e.g., Winstrol®, Equipoise®) without a valid prescription from the individuals doctor. This means there must be a real doctor-patient relationship, which by most state laws requires a physical examination. Prescriptions written by "cyber doctors" relying on online questionnaires are not legitimate under the law.”

(https://www.deadiversion.usdoj.gov/consumer_alert.htm; accessed July 2017)

Date:

9/8/2017

Question:

What is atrazine?

Answer:

Atrazine is the common name for an herbicide that is widely used to kill weeds. It is used mostly on farms. Pure atrazine-an odorless, white powder-is not very volatile, reactive, or flammable. It will dissolve in water. Atrazine is made in the laboratory and does not occur naturally. Atrazine is used on crops such as sugarcane, corn, pineapples, sorghum, and macadamia nuts, and on evergreen tree farms and for evergreen forest regrowth. It has also been used to keep weeds from growing on both highway and railroad rights-of-way. Atrazine can be sprayed on croplands before crops start growing and after they have emerged from the soil. Some of the trade names of atrazine are Aatrex®, Aatram®, Atratol®, and Gesaprim®. The scientific name for atrazine is 6-chloro-N-ethyl-N'-(1-methylethyl)-triazine-2,4-diamine. Atrazine is a Restricted Use Pesticide (RUP), which means that only certified herbicide users may purchase or use atrazine.

Certification for the use of atrazine is obtained through the appropriate state office where the

herbicide user is licensed. (<https://www.atsdr.cdc.gov/phs/phs.asp?id=336&tid=59>; accessed August 2017)

Date:

9/11/2017

Question:

Gastrointestinal pathology, including bowel ischemia and GI perforation, has been described in association with cocaine and/or crack cocaine use. What is the anatomic site of most cocaine related GI perforations?

Answer:

The cited references note “Most of the intestinal perforations seem to occur juxtapyloric or within the first part of the duodenum.” (Lee HS et al. Acute gastroduodenal perforations associated with use of crack. 1990 Ann Surg 211:15-17 and Muniz AE and Evans T. Acute manifestations associated with use of crack. 2001 Am J Emerg Med 19(1):61-63)

Date:

9/12/2017

Question:

What is the relationship between the use of cannabis and the risk for testicular cancer?

Answer:

A systematic review and meta-analysis reports “Using meta-analysis techniques, we observed that a) current, b) chronic, and c) frequent cannabis use is associated with the development of testicular germ cell tumors (TGCT), when compared to never-use of the drug. The strongest association was found for non-seminoma development – for example, those using cannabis on at least a weekly basis had two and a half times greater odds of developing a non-seminoma TGCT compared those who never used cannabis (OR: 2.59, 95 % CI 1.60–4.19). We found inconclusive evidence regarding the relationship between cannabis use and the development of seminoma tumours. It must be noted that these observations were derived from three studies all conducted in the United States; and the majority of data collection occurred during the 1990’s.” (Gurney J et. al. Cannabis exposure and risk of testicular cancer: a systematic review and meta-analysis. 2015 BMC Cancer 15:897-907)

Date:

9/13/2017

Question:

What is the classic presentation of toxin-related tick paralysis?

Answer:

The cited article notes: “The classic presentation is that of an acute symmetric ascending flaccid paralysis that evolves over hours to days, sometimes preceded by prodromal symptoms, including paresthesias, restlessness, irritability, fatigue, and myalgias. These symptoms are followed hours later by flaccid weakness that generally begins in the lower extremities. Fever is absent. The deep tendon reflexes are diminished or absent. If the tick continues to feed, the weakness ascends to the upper extremities over the ensuing 12 to 24 hours. At this stage, the muscles supplied by the lower cranial nerves and then the upper cranial nerves become weak. Finally, the respiratory muscles fail. Without intervention, patients will probably die of respiratory failure. This phase occurs when the tick may have fed to repletion and dropped off, accounting for the patients who may recover without endotracheal intubation and mechanical ventilation. Patients have a normal mental status until hypoxia and hypercarbia supervene.” (Edlow JA and McGillicuddy DC. Tick paralysis. 2008 Infect Dis Clin N Am 22:397-413)

Date:

9/14/2017

Question:

The following are street names for which drug of abuse? Ah-pen-yen, Aunti, Aunti Emma, Big O, Black Pill, Chandoo, Chandu, Chinese Molasses, Chinese Tobacco, Dopium, Dover’s Powder, Dream Gun, Dream Stick, Dreams, Easing Powder, Fi-do-nie, Gee, God’s Medicine, Gondola, Goric, Great Tobacco, Guma, Hop/hops, Joy Plant, Midnight Oil, Mira, O, O.P., Ope, Pen Yan, Pin Gon, Pox, Skee, Toxy, Toys, When-shee, Ze, and Zero.

Answer:

The above-listed street names are common street names for opium.

(https://www.dea.gov/pr/multimedia-library/publications/drug_of_abuse.pdf#page=46; accessed: August 2017)

Date:

9/15/2017

Question:

What are the chemical analogues that are often substituted on the street for the substance of abuse, GHB?

Answer:

The cited reference notes “Analogues that are often substituted for GHB include GBL (gamma butyrolactone) and 1,4 BD (also called just “BD”), which is 1,4-butanediol. These analogues are

available legally as industrial solvents used to produce polyurethane, pesticides, elastic fibers, pharmaceuticals, coatings on metal or plastic, and other products. They are also sold illicitly as supplements for bodybuilding, fat loss, reversal of baldness, improved eyesight, and to combat aging, depression, drug addiction, and insomnia. (https://www.dea.gov/pr/multimedia-library/publications/drug_of_abuse.pdf#page=46; accessed August 2017)

Date:

9/18/2017

Question:

Which electrolyte abnormalities have been posited to be associated with the use of multiple dose activated charcoal?

Answer:

One study of 878 patients who received multiple dose activated charcoal reported “Hyponatremia (peak serum sodium >145 mEq/L [145 mmol/L]) was documented in 53 (6.0%; 95% CI 4.4% to 7.6%) patients, of whom 5 (0.6%; 95% CI 0.1% to 1.1%) had a serum sodium concentration of greater than 155 mEq/L (155 mmol/L). Hypermagnesemia (peak serum magnesium >2.5 mg/dL [1.0 mmol/L]) was documented in 27 (3.1%; 95% CI 2.0% to 4.2%) patients, of whom 3 (0.3%; 95% CI 0.1% to 1.0%) had peak values that were greater than 3.75 mg/dL (1.5 mmol/L).” (Dorrington CL et al. The frequency of complications associated with the use of multiple-dose activated charcoal. 2003 Ann Emerg Med. 41:370-377)

Date:

9/19/2017

Question:

What is the National Response Framework?

Answer:

The National Response Framework (NRF) is a guide to how the Nation responds to all types of disasters and emergencies. It is built on scalable, flexible, and adaptable concepts identified in the National Incident Management System to align key roles and responsibilities across the Nation. This Framework describes specific authorities and best practices for managing incidents that range from the serious but purely local to large-scale terrorist attacks or catastrophic natural disasters. The National Response Framework describes the principles, roles and responsibilities, and coordinating structures for delivering the core capabilities required to respond to an incident and further describes how response efforts integrate with those of the other mission areas. (<https://www.fema.gov/media-library/assets/documents/32230>; accessed September 2017)

Date:

9/20/2017

Question:

What is the published incidence of gingival hyperplasia due to the drug phenytoin?

Answer:

The cited reference notes “The incidence rate of phenytoin-induced gingival over-growth ranges from 3% to 93%, but 50% of patients on long-term therapy are prone to develop gingival overgrowth.” (Chacko LN and Abraham S. Phenytoin induced gingival enlargement. 2014 BMJ case reports. 2014(1): 1136/bcr-2014-204670)

Date:

9/21/2017

Question:

Which drug, often used in the treatment of pneumocystis jiroveci pneumonia, has been reported to induce hypoglycemia?

Answer:

Pentamidine has been reported to induce hypoglycemia. (Stahl-Bayliss CM et al. Pentamidine-induced hypoglycemia in patients with the acquired immune deficiency syndrome. 1986 Clin Pharmacol Ther 39(3):271-275)

Date:

9/22/2017

Question:

The clinical triad of microangiopathic hemolytic anemia, thrombocytopenia, and acute renal injury characterizes the hemolytic uremic syndrome (HUS). HUS is the leading cause for acute kidney injury in the pediatric population. The majority of HUS cases develop following a gastrointestinal infection with Escherichia coli O157. Which toxin, produced by this bacterium, is the putative toxin in the development of HUS?

Answer:

Shiga toxin is the putative toxin in the development of HUS. (Keir LS. Shiga toxin associated hemolytic uremic syndrome. 2015 Hematol Oncol Clin N Am 29:525-539)

Date:

9/25/2017

Question:

B. anthracis, the causative organism for anthrax, has three major virulence factors; an antiphagocytic capsule and two exotoxins. What are the two exotoxins?

Answer:

Edema toxin (ET) and lethal toxin (LT) are responsible for much of the morbidity and mortality observed with anthrax via the enzymatic effects of these exotoxins. (MMWR, Clinical Framework and Medical Countermeasure Use During an Anthrax Mass-Casualty Incident CDC Recommendations. December 4, 2015., 64(4).

<https://www.cdc.gov/mmwr/pdf/rr/rr6404.pdf>;accessed September 2017)

Date:

9/26/2017

Question:

Which form of anthrax has the highest case fatality rate?

Answer:

The highest case fatality rate associated with anthrax is seen in cases of anthrax meningitis. The cited reference notes “Anthrax meningitis, a result of hematogenous bacterial dissemination and meningeal seeding, can occur as a complication of all types of anthrax and has been noted in up to half of persons with inhalation anthrax cases. Anthrax meningitis is an expected complication during an anthrax mass-casualty incident.” (MMWR, Clinical Framework and Medical Countermeasure Use During an Anthrax Mass-Casualty Incident CDC Recommendations.

December 4, 2015., 64(4). <https://www.cdc.gov/mmwr/pdf/rr/rr6404.pdf>;accessed September 2017)

Date:

9/27/2017

Question:

Q fever is a CDC Category B terrorism threat agent because it is are moderately easy to disseminate; may result in moderate morbidity rates and low mortality rates; and requires specific enhancements of CDC’s diagnostic capacity and enhanced disease surveillance. What is the source for this infection in most cases?

Answer:

According to the CDC, Q fever is a disease caused by the bacteria *Coxiella burnetii* which is found worldwide. The bacteria naturally infects some animals, such as goats, sheep and cattle. *C. burnetii* bacteria are found in the birth products (i.e. placenta, amniotic fluid), urine, feces, and milk of infected animals. People can get infected by breathing in dust that has been contaminated by infected animal feces, urine, milk, and birth products. Some people never get sick; however

those that do usually develop flu-like symptoms including fever, chills, fatigue, and muscle pain. (<https://www.cdc.gov/qfever/>; accessed September 2017)

Date:

9/28/2017

Question:

What are the pharmacological risks for the development of Clostridium difficile infection (CDI)?

Answer:

The cited reference notes “Antibiotic use is the most common risk factor for initial and recurrent CDI. Although all antibiotics are associated with increased CDI risk, clindamycin, fluoroquinolone and second generation and higher cephalosporins are associated with the highest CDI risk. Proton pump inhibitors were identified as risk factors in some studies but not confirmed in others. Other risk factors include increased age, nasogastric tube and kidney disease. (Napolitano LM and Edmiston CE. Clostridium difficile disease: Diagnosis, pathogenesis, and treatment update. 2017 Surgery 162:325-348)

Date:

9/29/2017

Question:

What are the contraindications and relative contraindications to intranasal naloxone administration?

Answer:

The cited reference notes “Contraindications to intranasal administration can include nasal septal abnormalities, nasal trauma, epistaxis, excessive nasal mucus, and intranasal damage caused by the use of substances such as cocaine.” These authors also note “Relative contraindications to intranasal naloxone use include severe hypotension and the recent use of vasoconstrictors, which may prevent adequate absorption.” (Robinson A and Wermeling DP. Intranasal naloxone administration for the treatment of opioid overdose. 2014 Am J Health-Sys Pharm 71:2129-2135)

Date:

10/2/2017

Question:

What is the immunological basis for the development of food allergy-associated anaphylaxis?

Answer:

The cited reference states: “Food allergy–associated anaphylaxis is an IgE-mediated reaction. In a previously sensitized person with food-specific IgE on mast cells and basophils, the food allergen is ingested and absorbed into the local tissue and then cross-links IgE, resulting in immediate release of preformed mediators. This immune response is rapid; the onset of symptoms typically occurs within 5 to 60 after exposure to the food. (Jones SM and Burke AW. Food allergy. 2017 NEJM 377:1168-1176)

Date:

10/3/2017

Question:

What characterized the so-called “phossy jaw” epidemic of the late 1800’s/early 1900’s?

Answer:

The cited article notes “The infamous “phossy jaw” that created an epidemic of exposed bone osteonecrosis exclusively in the jaws began around 1858 and continued until 1906, with only a few cases appearing since that time. This epidemic of osteonecrosis produced pain, swelling, debilitation, and a reported mortality of 20% and was linked to “yellow phosphorous,” the key ingredient in “strike-anywhere” matches. In match-making factories, workers called “mixers,” “dippers,” and “boxers” were exposed to heated fumes containing this compound. Related to the duration of exposure, many of these workers developed painful exposed bone in the mouth, whereas their office-based counterparts did not. The exposed bone and clinical course were eerily similar to what modern day oral and maxillofacial surgeons see due to bisphosphonates used to treat metastatic cancer deposits in bone or osteoporosis.” (Marx RE. Uncovering the cause of “Phossy Jaw” circa 1858 to 1906: Oral and maxillofacial surgery closed case files—Case Closed. 2008 J Oral Maxillofac Surg 66:2356-236)

Date:

10/4/2017

Question:

What is BPA?

Answer:

The cited reference notes “BPA is an estrogenic compound. It has a similar structure as the highly potent estrogen receptor (ER) agonist, diethylstilbestrol (DES), and binds classical nuclear ER alpha and beta, as well as membrane-associated GPR30, albeit with lower affinity. Thus, BPA is expected to have effects on ER function in addition to other nuclear hormone receptors and most of the studies on BPA action have focused on hormone sensitive tissues. The ubiquitous presence of BPA in the environment, concomitant with the increased prevalence of

endocrine-related cancers, has led to numerous studies evaluating the role of BPA in carcinogenesis. (Seachrist DD et al. A review of the carcinogenic potential of bisphenol A. 2016 Reproductive Tox 59:167-182)

Date:

10/5/2017

Question:

What is the active chemical component in nutmeg and what are the toxicological effects associated with this compound?

Answer:

Answer: The cited article notes "Nutmeg is used as a native medication and is believed to have antidiarrhoeal and carminative properties. The active component in nutmeg is myristicin (5-allyl-1-methoxy-2,3-methylenedioxybenzene). Myristicin is a weak monoamine oxidase inhibitor, which has both cardiovascular and CNS effects. It also has hallucinogenic properties making it a potential drug of abuse. Poisoning due to myristicin is known to cause convulsions and delirium." (Sivathanu S et al Myristicin and phenytoin toxicity in an infant. BMJ Case Rep Published online: doi:10.1136/bcr-2013-203000)

Date:

10/6/2017

Question:

Which chemicals are most commonly classified under the title of "riot control agents"?

Answer:

Chloroacetophenone (CN), chlorobenzylidenemalononitrile (CS), chloropicrin (PS), bromobenzylcyanide (CA), dibenzoxazepine (CR), and combinations of these chemicals are irritant agents that belong to a class of agents collectively known as riot control agents or "tear gas". Of the many tear gas agents used worldwide, CN and CS are the most common. Most exposures are inhalational, ocular, or dermal and typically lead to complaints of eye, nose, and throat irritation; hacking cough; suffocation or choking sensation; and dyspnea. High-dose exposures in an enclosed space which likely occurs only rarely, may lead to the development of airway edema, non-cardiogenic pulmonary edema, and possibly respiratory arrest. The amount and route of the exposure to tear gas and the premorbid condition of the person exposed will contribute to the time of onset and the severity of illness. For example, given a similar route of exposure, clinical effects may vary from mild to severe, depending on the concentration of tear gas to which a person has been exposed.

(<https://emergency.cdc.gov/agent/riotcontrol/agentpoisoning.asp>; accessed September 2017)

Date:

10/9/2017

Question:

Describe the envenoming devices and envenoming process for the stonefish (*Synanceja horrida*).

Answer:

The cited reference notes: “.....the stonefish possesses 13 sharp venom spines along its dorsal fin. The additional anal and pelvic spines however are practically nonfunctional due to their location; they are not as sharp either and display a thicker sheath. The dorsal spines erect involuntarily when the surrounding water or sea bed is disturbed. They are covered by a warty sheath and the aperture is blocked by fibrous material. Two glands in the middle third of the shaft contain 5– 10 mg of venom per spine. Vertical pressure on the sharp spine pushes back the sheath, removes the blockage and squeezes out the venom from the glands. This destroys the glands and it takes several weeks to re-establish them. Unfortunately this vertical pressure is usually provided by humans stepping on them or handling fished or stranded animals, thus making the stonefish a source of danger and fear especially among divers, tourists, fishermen and others involved in the fishing trade, as the stonefish has recently become fashionable as a delicatessen. Since the spines are extremely sharp they can easily penetrate wellingtons or flippers. Protection against injuries is hence more difficult. Furthermore, the fish is able to survive for at least 24 h out of water if in moist surroundings, and even dead fish can cause serious injuries.” (Brenneke F et al. Stonefish envenomation-A lucky outcome. 2006 *Travel Med and Inf Dis* 4:281-285)

Date:

10/10/2017

Question:

What is the reported induction period for the development of lung cancer due to radon?

Answer:

The reported induction period for the development of lung cancer due to radon is between 5 and 25 years. (Torres-Duran M Et al. Residential radon and lung cancer in never smokers – A systematic review. 2014 *Cancer Letters* 345:21-26)

Date:

10/11/2017

Question:

What is the *Paxillus involutus* Immuno-hemolytic Syndrome?

Answer:

The cited reference notes: “The Paxillus syndrome is a rare, and potentially fatal, immunoallergic reaction that may follow the consumption of many common, but inedible, mushroom species, including Paxillus involutus (Poison Pax) and possibly Boletus luridus (Stem Net Bolete) and Clitocybe claviceps (Alcohol Funnel Cap). The Paxillus syndrome occurs most commonly after the repeated ingestion of Paxillus involutus and is characterized by an acute onset of nausea, vomiting, epigastric pain, and diarrhea within 30 mins to 3 hours of ingestion. An acute immune complex-mediated hemolytic anemia with hemoglobinuria, oliguria, anuria, and acute renal failure from immune-complex nephritis may follow, possibly initiated by an allergic response to a common Paxillus and Boletus antigenic protein constituent, involutin.” (Diaz J, Syndromic diagnosis and management of confirmed mushroom poisonings. 2005 Crit Care Med 33:427-436)

Date:

10/12/2017

Question:

The reference cited below notes that “Hypersensitivity pneumonitis (HP) is an interstitial lung disease caused by an immune response to a variety of antigens to which patients have previously been sensitized.” So-called “Farmer’s lung” is one of the most common types of HP. What is the prevalence of farmer’s lung in agricultural workers?

Answer:

The prevalence of farmers lung is estimated to be between 0.2 and 1.5% in farmers. (Soumagne T. et al. Emphysema in active farmers lung disease. PLOS ONE | <https://doi.org/10.1371/journal.pone.0178263> June 14, 2017)

Date:

10/13/2017

Question:

N,N-Dimethylacetamide (DMAc) is a widely used organic solvent in the chemical industry. The toxicity of this chemical target what organ in exposed workers?

Answer:

The cited reference notes “N,N-Dimethylacetamide (DMAc) is a widely used organic solvent in modern chemical industry with low to moderate hepatotoxicity to occupational health of employees.” (Liu X, et al. Dimethylacetamide-induced Hepatic Injury in Vitro: Mechanism and Potential Preventive Strategy. 2016 Biomed Env Sci 29(2):153-157)

Date:

10/16/2017

Question:

What percentage of patients hospitalized for problems related to chronic alcohol overuse develop hypophosphatemia?

Answer:

The cited reference notes that “Acute hypophosphatemia develops in up to 50% of patients over the first 2 to 3 days after hospitalization for problems related to chronic alcohol overuse develop hypophosphatemia.” (Palmer BF and Clegg DJ. Electrolyte disturbances in patients with chronic alcohol-use disorder. 2017 NEJM 377(14):1368-1377)

Date:

10/17/2017

Question:

What is “diamond polisher’s lung”?

Answer:

Diamond polisher’s lung is an occupational interstitial lung disease due to the inhalation of cobalt particles generated from high speed grinding tools used to grind and polish diamonds. (Demedts M et al. Cobalt lung in diamond polishers. 1984 Am Rev Resp Disease 130(1):130-135)

Date:

10/18/2017

Question:

Describe the clinical appearance of dermal injury secondary to nitric acid.

Answer:

The reference listed below states “Skin contact with liquid nitric acid leads to specific, intensive yellow- to brown-stained wounds with the building of an eschar. This appearance makes the evaluation of the wounds, including determination of burn depth and necessity of surgical treatment, difficult as compared with classical burn wounds. Even in a retrospective view, no typical marks could be identified, which facilitate the evaluation of the nitric acid wounds.” (Kolios L et al. The nitric acid burn trauma of the skin. 2010 J Plastic Recon Aesth Surg 63: e358-e363)

Date:

10/19/2017

Question:

What is diarrhetic shellfish poisoning

Answer:

The cited reference notes “Diarrhetic shellfish poisoning (DSP) is an acute gastrointestinal illness caused by consumption of bivalve mollusks that have accumulated okadaic acid (OA) or related dinophysistoxins through filter feeding. DSP toxins are produced by several species of marine dinoflagellates from the genera *Dinophysis* and *Prorocentrum*. Symptoms of DSP include nausea, abdominal pain, vomiting, diarrhea, headache, chills, and fever. Onset occurs 0.5–4 hours after consumption of contaminated food, and symptoms last up to 72 hours; treatment is supportive. To date, no sequelae have been reported, but speculation has suggested that chronic exposure may increase risk for gastrointestinal cancers.” (Lloyd JK et al. Diarrhetic Shellfish Poisoning, Washington, USA, 201. 2013 MMWR 19(8):1314-1316)

Date:

10/20/2017

Question:

What is the so-called “analgesic ladder” recommended by the World Health Organization?

Answer:

According to the cited reference, the “so-called “analgesic ladder” is recommended by WHO to “meet the therapeutic challenges presented by opioid tolerance” and involves analgesic therapy “initiated with a non-opioid analgesic co-administered, if necessary, with an adjuvant. As the underlying condition progresses and pain becomes more intractable, a weak opioid is substituted for the non-opioid. Eventually a strong opioid is introduced as a final step.” (Dumas EO and Pollack GM. Opioid tolerance development: A pharmacokinetic/pharmacodynamics perspective. 2008 The AAPS Journal 10(4):537-551)

Date:

10/23/2017

Question:

Describe the morphologic features of the calcium oxalate urine crystals that may be found in the urine of individuals who ingested ethylene glycol.

Answer:

The cited reference notes “Examination of the urine sediment by means of light microscopy reveals calcium oxalate monohydrate crystals.” These may have a variety of morphologies including “narrow rectangles with pointed ends” and “dumbbell shaped crystals”. The authors

point out that “Under polarized light, crystals [are] positively birefringent;...blue when parallel to the light and yellow when perpendicular to the light”. (Hanouneh M and Chen TK. Calcium oxalate crystals in ethylene glycol toxicity. 2017 NEJM 377(15):1467)

Date:

10/24/2017

Question:

What is chuna and what toxicity has resulted from the use of this substance?

Answer:

The cited reference reports: “Chuna is an edible calcium hydroxide paste that is added to chewing tobacco in India and other regions of Southeast Asia. Recently, chuna has been sold in packets, which have been known to burst, causing severe alkali ocular burns in children playing with them. In many cases, the severity of the injury resulted because of a delay in treatment, giving enough time for the chuna particles to embed deeply into the fornices of the eye. Most cases required surgery and resulted in severe, permanent vision loss.” (Ratnapalan S. et al. Causes of eye burns in children. 2011 *Pediatr Emerg Care* 27:151-156)

Date:

10/25/2017

Question:

The manchineel (*Hippomane mancinella*) tree produces an extremely potent toxic sap containing diterpene esters of the tiglane phorbol and daphnane types. What is the usual manner in which humans become exposed to this sap and what are the clinical manifestations associated with this exposure?

Answer:

The cited reference notes that "Exposure most commonly takes place when individuals take refuge from the rain under a Manchineel tree. Ingestion of the Manchineel fruit (Beach Apple or "Manzanilla de la muerte") can cause severe swelling, ulceration, and hemorrhage of the oral and gastrointestinal mucosa which has been reported to be fatal in extreme cases. Systemic manifestations can be significant and persistent bradycardia requiring permanent pacemaker insertion has been ascribed to Manchineel toxicity. The toxin has been used in belliciosities by aboriginals from Florida to the southern Caribbean by treating arrow tips or poisoning water. Ponce De Leone is said to have died subsequent to a poisoned arrow wound containing Manchineel toxin in West Florida following an encounter with the hostile Calusa indians. The Manchineel is found in Florida, the West Indies, and Central and South America." (Blue L et al. Manchineel dermatitis in North American students in the Caribbean. 2011 *J Travel Med* 18(6):422-424)

Date:

10/26/2017

Question:

The name “Tango and Cash” was applied to which street drug?

Answer:

The cited reference notes “In 1991 a brand of street heroin known as “Tango and Cash” was found to contain approximately 12 percent fentanyl and was believed to be responsible for an estimated 126 overdose deaths. Investigators were ultimately able to trace this clandestinely produced fentanyl to Wichita, Kansas where they seized two laboratories and approximately 40 pounds of additional fentanyl. (Fentanyl. A briefing Guide for First Responders. https://www.dea.gov/druginfo/Fentanyl_BriefingGuideforFirstResponders_June2017.pdf; accessed July 2017)

Date:

10/27/2017

Question:

What is hexachloroethane and what are the common uses for this chemical?

Answer:

Hexachloroethane (HCE; CASRN 67-72-1) is a halogenated hydrocarbon consisting of six chlorines attached to an ethane backbone. In the past, HCE was used as an antihelminthic for the treatment of sheep flukes, but is no longer used for this purpose since the U.S. Food and Drug Administration (FDA) withdrew approval for this use in 1971. HCE is primarily used by the military for smoke pots, smoke grenades, and pyrotechnic devices. HCE has also been used as a polymer additive, a moth repellent, a plasticizer for cellulose esters, and an insecticide solvent, and in metallurgy for refining aluminum alloys. HCE was also identified in the headspace of chlorine-bleach-containing household products. (https://cfpub.epa.gov/ncea/iris/iris_documents/documents/toxreviews/0167tr.pdf; accessed August 2017)

Date:

10/30/2017

Question:

Maradol papayas are a large, oval fruit that weighs 3 or more pounds, with green skins that turn yellow when the fruit is ripe. The flesh inside the fruit is salmon-colored. The importation of

Maradol papayas from Mexico has been associated with at least four (4) separate outbreaks of disease related to which organism?

Answer:

To date there have been four (4) separate outbreaks of salmonella illness linked to imported Maradol papayas from Mexico. (<https://www.cdc.gov/salmonella/urbana-09-17/index.html>; accessed October 2017)

Date:

10/31/2017

Question:

Methadone is well known to cause prolongation of the QTc interval. How does the use of buprenorphine compare to morphine with regard to QTc interval prolongation?

Answer:

The cited study compared the effects of methadone and buprenorphine (as well as levomethadyl acetate) with regard to the ability of each to cause prolongation of the QTc. These authors concluded that buprenorphine is associated with less QTc prolongation than levomethadyl or methadone. (Wedam EF et al. QT interval effects of methadone, levomethadyl and buprenorphine in a randomized trial. 2007 Arch Int Med 167(22):2469-2475)

Date:

11/1/2017

Question:

When a patient has inserted button sized magnets into both nares, what are the potential adverse effects?

Answer:

The cited reference notes "Attracting nasal magnets necessitate emergency removal because they can compress the mucosa of the nasal septum, leading to necrosis and septal perforation." (Kazikdas KC and Dirik MA. Button magnets in the nasal cavity. 2017 NEJM 377(17):1666)

Date:

11/2/2017

Question:

What is patiromer?

Answer:

The cited reference points out patiromer is “a novel non-absorbed, cation-exchange polymer that binds and exchanges potassium for calcium, predominantly in the gastrointestinal tract. It has demonstrated potassium-lowering effects in normo- or hyperkalemic patients on concomitant RAAS inhibitors with heart failure, diabetic nephropathy, and CKD, in the PEARL-HF, AMETHYST-DN, and OPAL-HK studies, respectively. Across all studies, it appears to be generally effective and well tolerated, with adverse events predominantly gastrointestinal in nature.” Vu BN et al. Patiromer: The first potassium binder approved in over 50 years. 2016 *Cardiology in Review* 24:316-323.

Date:

11/3/2017

Question:

Congress created the Occupational Safety and Health Administration (OSHA) to assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance. In what year was OSHA established?

Answer:

OSHA was established in 1970 with the Occupational Safety and Health Act of 1970. (<https://www.osha.gov/about.html>)

Date:

11/6/2017

Question:

What is “snus”?

Answer:

Snus is “a moist smokeless tobacco product popular in Sweden [that] gained the attention of global tobacco control workers a few years before e-cigarettes did.” The cited reference notes “While using snus may be less risky than smoking cigarettes to the health of the individual, it is not clear that promoting the use of snus would reduce the total harm associated with tobacco use at the population level.” (Zhu S, et al. The use and perception of electronic cigarettes and snus among the U.S. population. 2013 *PLOS One*. <https://doi.org/10.1371/journal.pone.0079332>)

Date:

11/7/2017

Question:

What are the chemical constituents of “stage smoke or stage fog” and what adverse effects do some performers attribute to exposure to “stage smoke or stage fog”?

Answer:

The cited article notes “Currently, mineral oil mists, glycols, and glycerin are among the most commonly used fog and haze materials.....Many performers have complained about respiratory health effects such as asthma and respiratory irritation from chemical stage fogs. Study results have been mixed about the occurrence of asthma but many of these materials are respiratory irritants that could exacerbate underlying asthma.” (Hinkamp D Et al. Occupational health and the performing arts: An introduction. 2017 J Occ Env Med 59(9):843-858)

Date:

11/8/2017

Question:

Cuprimine and Syprine are therapeutics approved by the USFDA to treat which disease?

Answer:

The cited reference notes “Cuprimine and Syprine are therapeutics approved by the USFDA to treat copper overload in Wilson Disease (a genetic defect in copper transport) by chelation and accelerated excretion of internally-deposited copper. These oral therapeutics are based on the respective active ingredients D-penicillamine (DPA) and N,N -bis (2-aminoethyl) -1,2-ethanediamine dihydrochloride (Trien). Cuprimine is considered the primary treatment, although physicians are increasingly turning to Syprine as a first-line therapy.” (Levitskaia TG et al. Evaluation of cupramine and syprine form decorporation of radioisotopes of cesium, cobalt, iridium and strontium. 2011 Health Phys 101(2):118-127)

Date:

11/9/2017

Question:

In 2009, the U.S. Environmental Protection Agency issued a cancellation order to phase-out and eliminate the use of organic arsenical pesticides by 2013, with one exception. What chemical was not included in this cancellation order?

Answer:

Not included in the EPA's cancellation order was monosodium methanearsonate (MSMA), a broadleaf weed herbicide for use on cotton. (Bencko V and Li Foong F. The history of arsenical pesticides and health risks related to the use of Agent Blue. 2017 Anns Ag Env Med 24(2):312-316)

Date:

11/10/2017

Question:

The disease known as “glanders” is considered a biological threat by the CDC. What is “glanders” and what animal species is primarily affected by the causative organism?

Answer:

Glanders is an infectious disease that is caused by the bacterium *Burkholderia mallei*. While people can get the disease, glanders is primarily a disease affecting horses. It also affects donkeys and mules and can be naturally contracted by other mammals such as goats, dogs, and cats. (<https://www.cdc.gov/glanders/index.html>; accessed October 2017)

Date:

11/13/2017

Question:

What is ochratoxin A?

Answer:

The cited article notes “Ochratoxin A (OTA) is a mycotoxin produced by several species of *Aspergillus* and *Penicillium* fungi that structurally consists of a para-chlorophenolic group containing a dihydroisocoumarin moiety that is amide-linked to L-phenylalanine. OTA is detected worldwide in various food and feed sources. Studies show that this molecule can have several toxicological effects such as nephrotoxic, hepatotoxic, neurotoxic, teratogenic and immunotoxic. A role in the etiology of Balkan endemic nephropathy and its association to urinary tract tumors has been also proved.” (el Khoury A and Atoui A. Ochratoxin A: General overview and actual molecular status. 2010 *Toxins* 2:461-493)

Date:

11/14/2017

Question:

What is sulfuryl fluoride and what are the clinical manifestations associated with poisoning due to this chemical?

Answer:

Sulfuryl fluoride is a highly toxic (toxicity category I) gas fumigant used for termite control of homes and buildings. Signs and symptoms of sulfuryl fluoride poisoning include irritation of the nose, eyes, and respiratory tract, dyspnea, numbness, weakness, nausea, vomiting, abdominal

pain, slowed speech or motor movements, cough, restlessness, muscle twitching, seizures, and pulmonary edema. (Mulay PR, et al. Notes from the Field. Acute Sulfuryl Fluoride Poisoning in a Family — Florida, August 2015. MMWR Morb Mortal Wkly Rep 2016;65:698–699. DOI: <http://dx.doi.org/10.15585/mmwr.mm6527a4>)

Date:

11/15/2017

Question:

A typical cigarette contains from 9 mg to 30 mg of nicotine, inhalation through smoking is only about 0.5-2 mg per cigarette. The estimated toxic dose of nicotine in non-addicted adults is 4-8 mg. What is the lethal dose of nicotine after one-time ingestion in children?

Answer:

The cited reference notes the lethal dose of nicotine after one-time ingestion among children is reported as 40-60 mg. (Malazia M, et al. Acute intoxication with nicotine alkaloids and cannabinoids in children from ingestion of cigarettes. Hum Toxicol 1983; 2:315e16 and Novotny TE et al. Tobacco and cigarettes butt consumption in humans and animals. 2011 Tobacco Control 20 (Suppl 1): i17-i20)

Date:

11/16/2017

Question:

What is the primary exposure of concern for workers in the shipyard industry which includes workers who dis-assemble ships?

Answer:

Exposure to asbestos and asbestos containing materials is the primary exposure of concern for workers in the shipyard industry which includes workers who dis-assemble ships.

(https://www.osha.gov/Publications/OSHA_shipyard_industry.pdf; accessed October 2017)

Date:

11/17/2017

Question:

Ethambutol-induced optic neuropathy (EON) is a well-known complication that results from the use of ethambutol. What are the clinical manifestations of EON?

Answer:

In patients taking ethambutol, the ocular manifestations of EON include painless loss of central vision and cecentral scotomas in the visual field. (Song W and Si S. 2017 Medicine 96(2):e5889-e5893)

Date:

11/20/2017

Question:

Necrotizing fasciitis due to clostridial infection is a potential consequence of intramuscular or subcutaneous injection of which street drug?

Answer:

Intramuscular or subcutaneous injection of black tar heroin may result in necrotizing fasciitis due to clostridial infection. (Dunbar NM and Harruff RC, Necrotizing fasciitis: Manifestations, microbiology and connection with black tar heroin. 2007 J Forensic Sci 52(4):920-923)

Date:

11/21/2017

Question:

Kratom is a drug of abuse that has a long history of use in Southeast Asia, where it is commonly known as thang, kakuam, thom, ketum, and biak. In the U.S., the abuse of kratom has increased markedly in recent years. What is Kratom, where does it come from and how is it used?

Answer:

Kratom is a tropical tree native to Southeast Asia. Consumption of its leaves produces both stimulant effects (in low doses) and sedative effects (in high doses), and can lead to psychotic symptoms, and psychological and physiological dependence. The psychoactive ingredient is found in the leaves from the kratom tree. These leaves are subsequently crushed and then smoked, brewed with tea, or placed into gel capsules. (https://www.dea.gov/pr/multimedia-library/publications/drug_of_abuse.pdf#page=84; accessed November 2017)

Date:

11/22/2017

Question:

What is the legal status of *Salvia divinorum* in the United States?

Answer:

Neither *Salvia divinorum* nor its active constituent Salvinorin A has an approved medical use in the United States. *Salvia* is not controlled under the Controlled Substances Act. *Salvia divinorum* is, however, controlled by a number of states. Since *Salvia* is not controlled by the CSA, some online botanical companies and drug promotional sites have advertised *Salvia* as a legal alternative to other plant hallucinogens like mescaline. (https://www.dea.gov/pr/multimedia-library/publications/drug_of_abuse.pdf#page=84; accessed October 2017)

Date:

11/23/2017

Question:

What is NIDA and what does this organization do?

Answer:

NIDA is a federal scientific research institute under the National Institutes of Health, U.S. Department of Health and Human Services. NIDA is the largest supporter of the world's research on drug use and addiction. NIDA-funded scientific research addresses the most fundamental and essential questions about drug use, including tracking emerging drug use trends, understanding how drugs work in the brain and body, developing and testing new drug treatment and prevention approaches, and disseminating findings to the general public, researchers, policymakers, and others.

Date:

11/24/2017

Question:

What is the "Monitoring the Future (MTF)" study?

Answer:

Since 1975 the MTF survey has measured drug, alcohol, and cigarette use and related attitudes among adolescent students nationwide. Survey participants report their drug use behaviors across three time periods: lifetime, past year, and past month. Overall, 45,473 students from 372 public and private schools participated in this year's Monitoring the Future survey. The survey is funded by the NIDA, a component of the National Institutes of Health (NIH), and conducted by the University of Michigan. Results from the Survey are released each fall. (<https://www.drugabuse.gov/related-topics/trends-statistics/monitoring-future>; accessed September 2017)

Date:

11/25/2017

Question:

B. anthracis, the causative organism for anthrax, has three major virulence factors; an antiphagocytic capsule and two exotoxins. What are the two exotoxins?

Answer:

Edema toxin (ET) and lethal toxin (LT) are responsible for much of the morbidity and mortality observed with anthrax via the enzymatic effects of these exotoxins. (MMWR, Clinical Framework and Medical Countermeasure Use During an Anthrax Mass-Casualty Incident CDC Recommendations. December 4, 2015., 64(4).

<https://www.cdc.gov/mmwr/pdf/rr/rr6404.pdf>;accessed September 2017)

Date:

11/26/2017

Question:

Which form of anthrax has the highest case fatality rate?

Answer:

The highest case fatality rate associated with anthrax is seen in cases of anthrax meningitis. The cited reference notes “Anthrax meningitis, a result of hematogenous bacterial dissemination and meningeal seeding, can occur as a complication of all types of anthrax and has been noted in up to half of persons with inhalation anthrax cases. Anthrax meningitis is an expected complication during an anthrax mass-casualty incident.” (MMWR, Clinical Framework and Medical Countermeasure Use During an Anthrax Mass-Casualty Incident CDC Recommendations. December 4, 2015., 64(4).

<https://www.cdc.gov/mmwr/pdf/rr/rr6404.pdf>;accessed September 2017)

Date:

11/27/2017

Question:

Q fever is a CDC Category B terrorism threat agent because it is are moderately easy to disseminate; may result in moderate morbidity rates and low mortality rates; and requires specific enhancements of CDC’s diagnostic capacity and enhanced disease surveillance. What is the source for this infection in most cases?

Answer:

According to the CDC, Q fever is a disease caused by the bacteria *Coxiella burnetii* which is found worldwide. The bacteria naturally infects some animals, such as goats, sheep and cattle. *C. burnetii* bacteria are found in the birth products (i.e. placenta, amniotic fluid), urine, feces, and milk of infected animals. People can get infected by breathing in dust that has been contaminated by infected animal feces, urine, milk, and birth products. Some people never get sick; however

those that do usually develop flu-like symptoms including fever, chills, fatigue, and muscle pain. (<https://www.cdc.gov/qfever/>; accessed September 2017)

Date:

11/28/2017

Question:

What are the pharmacological risks for the development of Clostridium difficile infection (CDI)?

Answer:

The cited reference notes “Antibiotic use is the most common risk factor for initial and recurrent CDI. Although all antibiotics are associated with increased CDI risk, clindamycin, fluoroquinolone and second generation and higher cephalosporins are associated with the highest CDI risk. Proton pump inhibitors were identified as risk factors in some studies but not confirmed in others. Other risk factors include increased age, nasogastric tube and kidney disease. (Napolitano LM and Edmiston CE. Clostridium difficile disease: Diagnosis, pathogenesis, and treatment update. 2017 Surgery 162:325-348)

Date:

11/29/2017

Question:

What are the contraindications and relative contraindications to intranasal naloxone administration?

Answer:

The cited reference notes “Contraindications to intranasal administration can include nasal septal abnormalities, nasal trauma, epistaxis, excessive nasal mucus, and intranasal damage caused by the use of substances such as cocaine.” These authors also note “Relative contraindications to intranasal naloxone use include severe hypotension and the recent use of vasoconstrictors, which may prevent adequate absorption.” (Robinson A and Wermeling DP. Intranasal naloxone administration for the treatment of opioid overdose. 2014 Am J Health-Sys Pharm 71:2129-2135)

Date:

12/4/2017

Question:

Methadone use has been associated with sexual dysfunction secondary to which endocrine abnormality?

Answer:

Opioids, as a class of drug, have been associated with a variety of endocrinopathies. The cited reference notes it is hypothesized “that methadone exerts neuroendocrinological effects on the tubero-infundibular and hypothalamic-pituitary- gonadal axes. The chronic stimulation of the mu receptors by methadone alters the function of the tubero-infundibular axis and the dopaminergic control of prolactin, with a consequential impact on sexual functioning. (Yee A et al. Sexual dysfunction in heroin dependents: A comparison between methadone and buprenorphine maintenance treatment. 2016 PLS ONE 11(1): e0147852.doi: 10.1371/journal.pone.0147852)

Date:

12/5/2017

Question:

Safrole and sassafras are sometimes used in the illicit manufacture of which drug of abuse?

Answer:

Safrole and sassafras are used in the illicit manufacture of MDMA (ecstasy).(https://www.deadiversion.usdoj.gov/chem_prog/advisories/safrole.htm; accessed November 2017)

Date:

12/6/2017

Question:

What are so-called “marijuana concentrates”?

Answer:

A marijuana concentrate is a highly potent THC (Tetrahydrocannabinol) concentrated mass that is most similar in appearance to either honey or butter, which is why it is referred to or known on the street as "honey oil" or "budder." Marijuana concentrates contain extraordinarily high THC levels that could range from 40 to 80%. This form of marijuana can be up to four times stronger in THC content than high grade or top shelf marijuana, which normally measures around 20% THC levels. (<https://www.dea.gov/pr/multimedia-library/publications/marijuana-concentrates.pdf>; accessed November 2017)

Date:

12/7/2017

Question:

How are marijuana concentrates typically abused?

Answer:

One form of abuse occurs orally by infusing marijuana concentrates in various food or drink products; however, smoking remains the most popular form of ingestion by use of water or oil pipes. A disturbing aspect of this emerging threat is the ingestion of concentrates via electronic cigarettes (also known as e-cigarettes) or vaporizers. Many abusers of marijuana concentrates prefer the e-cigarette/vaporizer because it's smokeless, odorless and easy to hide or conceal. The user takes a small amount of marijuana concentrate, referred to as a "dab," then heats the substance using the e-cigarette/vaporizer producing vapors that ensures an instant "high" effect upon the user. Using an e-cigarette/vaporizer to ingest marijuana concentrates is commonly referred to as "dabbing" or "vaping." (<https://www.dea.gov/pr/multimedia-library/publications/marijuana-concentrates.pdf>; accessed November 2017)

Date:

12/8/2017

Question:

What should be considered when faced with a neonate suffering withdrawal symptoms purportedly associated with prenatal exposure to either cocaine or methamphetamine?

Answer:

The cited reference emphasizes: "Because there is no neonatal abstinence syndrome requiring pharmacologic intervention observed with either prenatal cocaine or methamphetamine exposure, clinicians should investigate for opioid co-exposures when working with a stimulate exposed neonate demonstrating significant withdrawal symptoms. (Smith LM and Santos LS. Prenatal exposure: The effects of prenatal cocaine and methamphetamine exposure on the developing child. 2016 Birth Defects Res. (Part C) 108(2): 142-146)

Date:

12/11/2017

Question:

Which heroin metabolite is unique to heroin and manifests a longer half-life than heroin itself?

Answer:

The cited reference notes that 6-monoacetylmorphine (6-MAM) is unique to heroin with a substantially longer half-life than heroin itself. (Raja AS et al. Case 37-2017: A 36-year-old man with unintentional opioid overdose. 2017 NEJM 377(22): 2181-2188)

Date:

12/12/2017

Question:

Heroin related noncardiogenic pulmonary edema occurs more frequently in which group of patients: males or females; patients using heroin for weeks to months or those using for months to years?

Answer:

The cited reference notes heroin related noncardiogenic pulmonary edema “is more frequent in males and in people who have been using heroin for weeks to months, rather than months to years.” (Raja AS et al. Case 37-2017: A 36-year-old man with unintentional opioid overdose. 2017 NEJM 377(22): 2181-2188)

Date:

12/13/2017

Question:

How often is fentanyl involved in opioid overdose deaths?

Answer:

The cited reference reported “Fentanyl was detected in 56.3% of 5,152 opioid overdose deaths in the 10 states during July–December 2016. Among these 2,903 fentanyl-positive deaths, fentanyl was determined to be a cause of death by the medical examiner or coroner in nearly all (97.1%) of the deaths. Northeastern states (Maine, Massachusetts, New Hampshire, and Rhode Island) and Missouri** reported the highest percentages of opioid overdose deaths involving fentanyl (approximately 60%–90%), followed by Midwestern and Southern states (Ohio, West Virginia, and Wisconsin), where approximately 30%–55% of decedents tested positive for fentanyl. New Mexico and Oklahoma reported the lowest percentage of fentanyl-involved deaths (approximately 15%–25%). In contrast, states detecting any fentanyl analogs in >10% of opioid overdose deaths were spread across the Northeast (Maine, 28.6%, New Hampshire, 12.2%), Midwest (Ohio, 26.0%), and South (West Virginia, 20.1%).” (O’Donnell JK, et al. Deaths Involving Fentanyl, Fentanyl Analogs, and U-47700 — 10 States, July–December 2016. MMWR Morb Mortal Wkly Rep 2017;66:1197–1202. DOI: <http://dx.doi.org/10.15585/mmwr.mm6643e1>.

Date:

12:00:00 AM

Question:

What is the “B reader” program?

Answer:

The B Reader examination was originally developed to identify physicians qualified to serve in national pneumoconiosis programs directed at coal miners and others who suffer from dust-related illness. This originally included epidemiologic research on coal workers' pneumoconiosis and the compensation of coal miners with pneumoconiosis under programs processed by government agencies. The original intent of the B Reader Program still exists, but B Readers are also now involved with epidemiologic evaluation, surveillance, and worker monitoring programs involving many types of pneumoconioses. The B Reader Program aims to ensure competency in radiographic reading by evaluating the ability of readers to classify a test set of radiographs, thereby creating and maintaining a pool of qualified readers having the skills and ability to provide accurate and precise ILO classifications.

(<https://www.cdc.gov/niosh/topics/chestradiography/breader.html>; accessed December 2017)

Date:

12/15/2017

Question:

Which pesticides are currently recommended by the World Health Organization for aircraft cabin disinsection?

Answer:

The cited reference notes: "Aircraft disinsection is allowed under international law, but not all countries require it. The U.S. Environmental Protection Agency (EPA) has not currently approved any pesticides for use in passenger cabins on commercial aircraft. The U.S. Department of Transportation provides information on which countries require disinsection on inbound flights. The only pesticides recommended by the World Health Organization (WHO) for aircraft disinsection are synthetic pyrethroids (permethrin, d-phenothrin, and 1R-trans-phenothrin). Other pesticides, including DDT (dichlorodiphenyltrichloroethane), were used to disinsect aircraft several years ago but are no longer used."

(<https://www.cdc.gov/niosh/topics/aircrew/pesticides.html>; accessed December 2017)

Date:

12/19/2017

Question:

Which drug, also known as compound RU 36486 has been used as an abortifacient?

Answer:

The cited reference notes: "In the early 1980s, the identification of mifepristone was both an important milestone in steroid research and a laboratory mistake. Researchers could claim that they now had agonists and antagonists for the five major classes of steroid hormones: estrogens, androgens, mineralocorticoids and, now, progestins, and glucocorticoids. While the French

researchers from Roussel-Uclaff were hoping for a pure anti- glucocorticoid, their compound RU 36486, shortened to RU 486, also had anti-progesterone properties, making it a likely abortifacient with all the accompanying moral, political and economic problems." (Schaff EA. Mifepristone: ten years later. 2010 Contraception 81:1-7)

Date:

12:00:00 AM

Question:

What is the classic triad associated with chronic exposure to elemental mercury?

Answer:

The article noted below states "...chronic exposure can produce a classic triad of symptoms: tremors, gingivitis and erethism ((which includes emotional instability, depression, vasomotor disturbances, insomnia, memory loss, anorexia, etc.) as well as a variety of cutaneous, neurological, psychological and renal symptoms, but sometimes only vague and non-specific symptoms such as asthenia, anorexia, weight loss, general and muscular weakness are experienced. (Broussard LA et al. The toxicology of mercury. 2002 Lab Med 33:614-625 as cited in Broi U et al. Medico-legal aspects of self-injection of metallic mercury in cases of suicide or self-harming. 2017 J For Legal Med 50:12-19)

Date:

12/21/2017

Question:

What clinical triad is classic for thallium poisoning?

Answer:

The cited reference notes "The triad of gastroenteritis, polyneuropathy and alopecia has been regarded as the classic syndrome of thallium poisoning." (Saha A et al. Erosion of nails following thallium poisoning: a case report.2004 Occup Environ Med 61:640-642)

Date:

12/22/2017

Question:

What is the ITER (International Toxicity Estimates for Risk) database?

Answer:

ITER contains data in support of human health risk assessments. It is compiled by Toxicology Excellence for Risk Assessment (TERA) and contains data from CDC/ATSDR, Health Canada, RIVM, U.S. EPA, IARC, NSF International and independent parties offering peer-reviewed risk values. ITER provides comparison charts of international risk assessment information and explains differences in risk values derived by different organizations. (<https://toxnet.nlm.nih.gov/newtoxnet/iter.htm>; accessed December 2017)

Date:

12/23/2017

Question:

Chronic exposure to benzene may result in a range of hematopoietic derangements. What are these hematopoietic derangements?

Answer:

The cited reference notes “Chronic exposure to benzene leads to a range of hemopoietic malfunctions involving anemia, leucopenia, thrombocytopenia, pancytopenia. Acute myelogenous leukemia is the major cancerous disorder associated with chronic benzene exposure, although other forms of leukemia have also been reported.” (Zolghadr F et al. How benzene and its metabolites affect human marrow derived mesenchymal stem cells. 2012 Tox Letters 214:145-153)

Date:

12/25/2017

Question:

What is erythromelalgia and with which mushroom species has this condition been associated?

Answer:

The cited reference notes “Erythromelalgia is a painful peripheral, inflammatory condition characterized by intense burning pain, redness, and edema of the hands and feet, often intensified by heat and relieved by cold.” These authors further note that “In 1918, Ichimura first described mushroom-induced erythromelalgia in Japan within 3 days of consuming *Clitocybe acromelalga* mushrooms, which resembled the prized edible mushroom, *Lepista inversa* (Edible Blewit). In 2001, Saviuc and co-authors reported the first European observations of mushroom-induced erythromelalgia in seven French patients within one to several days of consuming *Clitocybe amoenolens* (Poison Dwarf Bamboo Mushroom) mushrooms, which resemble the edible mushrooms *Lepista inversa* (Edible Blewit) and *Clitocybe gibba* (Common Funnel Cap), in the high alpine meadows of France. (Diaz JH. Syndromic diagnosis and management of confirmed mushroom poisonings. 2005 Crit care Med 33:427-436)

Date:

12/26/2017

Question:

Cisplatin is commonly associated with hearing loss in adults receiving this drug. What is the prevalence of hearing loss due to cisplatin therapy?

Answer:

Them cited reference notes “Among adults who have received cisplatin, clinically significant hearing loss develops in approximately 60% of patients with testicular cancer and 65% of patients with head and neck cancer. (Cunningham LL and Tucci DL. Hearing loss in adults. 2017 NEJM, 377(25):2465-2473)

Date:

12/27/2017

Question:

What is the association between occupational cadmium exposure and the risk for the development of renal cancer?

Answer:

The cited meta-analysis reports “The meta-analysis showed that a high Cd exposure significantly increased renal cancer 1.47 times (OR = 1.47; 95% CI = 1.27 to 1.71, for highest versus lowest category of cadmium categories). The significant association remained consistent when stratified by geographic region and gender, however mixed results were produced when stratified by sample size, study design, NOS score, adjustment for covariates, effects measure, and exposure type. Our results indicated that a high Cd exposure was associated with increased renal cancer risk and the association was higher for occupational exposure compared with non-occupational exposure. This meta-analysis suggests that a high Cd exposure may be a risk factor for renal cancer in occupational population”. (Song J et. al. Association between cadmium exposure and renal cancer risk: a meta-analysis of observational studies. 2015 Sci. Rep. 5, 17976; doi: 10.1038/srep17976)

Date:

12/28/2017

Question:

During 2009, a multistate outbreak of Shiga-toxin producing E. coli (STEC) was linked to ingestion of which foodstuff?

Answer:

The referenced outbreak was linked to (but never proven to be due to) prepackaged cookie dough. (Crowe SJ et al. Shiga-toxin producing E. coli infections associated with flour. 2017 NEJM 377:2036-2043)

Date:

12/29/2017

Question:

How might workers be exposed to so called metal working fluids (MWFs) and what are the adverse health effects that may arise from occupational exposure to MWFs?

Answer:

The cited reference notes: “Some 1.2 million workers in machine finishing, machine tooling, and other metalworking and metal-forming operations are potentially exposed. Workers can be exposed to the fluids by breathing aerosols generated in the machining process, or through skin contact when they handle parts, tools, and equipment covered with the fluids. NIOSH defines MWF aerosol as the mist and all contaminants in the mist generated during grinding and machining operations involving products from metal and metal substitutes. Occupational exposures to metalworking fluids may cause a variety of health effects. Respiratory conditions include hypersensitivity pneumonitis, chronic bronchitis, impaired lung function, and asthma. Work-related asthma is one of today’s most prevalent occupational disorders, imposing significant costs in healthcare and workers’ compensation. Dermatologic exposures are most commonly associated with, but not limited to, allergic and irritant dermatitis. In addition, substantial evidence shows that past exposures to some metalworking fluids were associated with increased risk of some types of cancer. Although actions taken in the last several decades have reduced that risk, it is not known if these actions have totally eliminated the risk.”
(<https://www.cdc.gov/niosh/topics/metalworking/>; accessed December 2017)

Date:

1/1/2018

Question:

What are the current legitimate uses for the drug gamma hydroxybutyrate (GHB)?

Answer:

The cited reference notes “For a long time GHB as sodium oxybate was considered an orphan drug, although has now been registered as a pharmaceutical product and given the proprietary name Xyrem (Janssen Pharmaceuticals, Palo Alto, Ca). The medication is used to treat cataplexy, which is an important symptom in the disease complex narcolepsy.” These authors also point out that “Another therapeutic use of GHB (sodium oxybate, Alcover) is an adjunctive therapy for treating the alcohol withdrawal syndrome. This application of GHB was recently reviewed and found to be just as effective as diazepam or chlormethiazole in alleviating initial withdrawal

symptoms and also as effective as naltrexone or disulfiram in maintaining abstinence and preventing relapse. (Busardo FP and Jones AW. GHB pharmacology and toxicology: Acute intoxication, concentrations in blood and urine in forensic cases and treatment of the withdrawal syndrome. 2015 Curr Neuropharm 13(1):47-70

Date:

1/2/2018

Question:

What is the common name for the organism *Physalia physalis*?

Answer:

Physalia physalis is also known as the Portuguese Man-o-War. (Labadie M et al. Portuguese man-of-war (*Physalia physalis*) envenomation on the Aquitaine Coast of France: an emerging health risk. 2012 Clin Tox 50(9):567-570)

Date:

1/3/2018

Question:

Name the colorless yet highly corrosive liquid that may emanate red fumes when exposed to moist atmospheric conditions.

Answer:

The cited article points out that nitric acid (HNO_3) "is a colorless, highly corrosive liquid that gives off red fumes of nitrogen dioxide or yellow fumes of nitrous monoxide in moist air. It is the most commonly used strong acid in industry. It is mainly used in the preparation of fertilizers and explosives, but it is also found in a wide variety of industries involved in manufacturing of dyes, metallurgy, ore flotation, etching steel, photoengraving and reprocessing of spent nuclear fuel." (Kao SL et al. Acute lung injury after inhalation of nitric acid. 2008 Eur J Emerg Med 15:348-350)

Date:

1/4/2018

Question:

With regard to respirators used in the occupational setting, what is the so-called Assigned Protection Factor (APF)?

Answer:

The Occupational Safety and Health Administration (OSHA) states “Assigned Protection Factor (APF) means the work-place level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program as specified by [OSHA]” (<https://www.osha.gov/Publications/3352-APF-respirators.pdf>; accessed December 2017)

Date:
1/5/2018

Question:
4-Aminopyridine (4-AP) has been used in the treatment of a variety of diseases characterized by poor neuronal transmission including multiple sclerosis, spinal cord injury, botulism, Lambert-Eaton syndrome, and myasthenia gravis. What is the mechanism of action of 4-AP?

Answer:
The cited article notes “4-Aminopyridine (4-AP) selectively blocks voltage-gated potassium channels, prolongs the action potential, increases calcium influx, and subsequently, enhances interneuronal and neuromuscular synaptic transmission.” (King AM et al. 4-Aminopyridine toxicity: A case report and review of the literature. 2012 J Med Tox 8:314-321)

Date:
1/8/2018

Question:
Which chemical has been proposed as a urinary biological marker of worker exposure to the chemical acrylamide?

Answer:
Urinary S-carboxyethyl-cysteine (CEC) has been proposed as a possible biological marker of worker exposure to the chemical acrylamide. (Bull PJ et al. An occupational hygiene investigation of exposure to acrylamide and the role for urinary S-Carboxyethyl-Cysteine (CEC) as a biological marker. 2005 Anna Occ Hygiene 49(8):683-690)

Date:
1/9/2018

Question:
Which epidemiological pre-cursors are required for the development of clinical favism?

Answer:

The cited reference notes “Favism occurs commonly only where the frequency of G6PD deficiency is relatively high and where fava beans (also known as broad beans) are a popular food item (https://readtiger.com/img/wkp/en/Broadbean_Yield.png), which reflects its bifactorial nature. This is true, for instance, in southern Europe, in the Middle East, and in Southeast Asia but not, for example, in northern Germany, where fava beans are grown but G6PD deficiency is rare, or in West Africa, where G6PD deficiency has a high prevalence but fava beans are not grown. (Luzzatto L and Arese P. Favism and glucose-6-phosphate dehydrogenase deficiency. 2018 NEJM 378:60-71)

Date:

1/10/2018

Question:

Who does the American public blame as primarily responsible for the opioid abuse epidemic?

Answer:

The cited article notes “Asked who is mainly responsible for the growing problem, the public placed the most blame on doctors who inappropriately pre- scribe painkillers (33%) and people who sell prescription painkillers illegally (28%). Only 10% believe that people who take prescription painkillers are mainly responsible.” (Blendon RJ and Benson JM. The public and the opioid-abuse epidemic. 2018 NEJM 378:1-5)

Date:

1/11/2018

Question:

What are the known risks of the occupational inhalation of dusts composed of nano- and micro-sized particles of tungsten carbide cobalt in metal manufacturing facilities and mining and drilling industries?

Answer:

The cited article reports “Inhalation of tungsten carbide cobalt dust is known to cause “hard metal lung disease” and an increased risk of lung cancer; however, the mechanisms underlying [inhaled nano particles of tungsten carbide cobalt] toxicity, the inflammatory disease state and progression to cancer are poorly understood. (Armstead A and Li B. Nanotoxicity: emerging concerns regarding nanomaterial safety and occupational hard metal (WC-Co) nanoparticle exposure. 2016 Int J Nanomedicine 11:6421-6433)

Date:

1/12/2018

Question:

Does the maternal prenatal use of fluconazole increase the risk of congenital malformations in offspring?

Answer:

A recent systematic review “aimed to examine the risk of congenital malformations in the offspring of women exposed to fluconazole in the first trimester of pregnancy.” These authors reported “The rate for overall malformations was 1.10 (95% CI 0.98–1.25), for heart defect was 1.29 (95% CI 1.05–1.58), for craniofacial defects was 1.25 (95% CI 0.88–1.77), and for limb/musculoskeletal defects was 0.82 (95% CI 0.59–1.13).” The authors concluded “.....the use of fluconazole in the first trimester does not appear to increase the overall risk for congenital malformations. More studies are needed to address the potential increased rate of heart defects.” (Alsaad AMS et al. Exposure to fluconazole and risk of congenital malformations in the offspring: A systematic review and meta-analysis. 2015 Reproductive Tox 52:78-82)

Date:

1/15/2018

Question:

Is there an association between recent spermicide use and the development of acute pyelonephritis in healthy women?

Answer:

The cited reference reports a study on 788 non-pregnant females 18-49 years of age. The authors report an odds ratio of 1.7 [CI 1.1 to 2.5] with regard to recent spermicide use associated with pyelonephritis. (Scholes D. et al. Risk factors associate with acute pyelonephritis in healthy women. 2005 Ann Intern Med 142:20-27)

Date:

1/16/2018

Question:

What is the current prevalence rate for latex allergy?

Answer:

The cited reference notes “Reported data suggest that the average prevalence of latex allergy worldwide remains 9.7%, 7.2%, and 4.3% among healthcare workers, susceptible patients, and general population, respectively.” (Wu M et al. Current prevalence rate of latex allergy: Why it remains a problem? 2016 J Occup Helath 58: 138-144)

Date:

1/17/2018

Question:

It is unclear if PPIs are adequately efficacious for the treatment of gastro-esophageal reflux in infants and neonates and PPI treatment in this age group should be reserved for cases with serious and proven pathology. What are the adverse effects of PPIs that have been noted in this age group?

Answer:

The cited article notes “Although the toxicity profiles of PPIs are not well understood particularly in children, PPIs have been associated with increased risks of gastrointestinal and respiratory tract infection, vitamin B deficiency, hypomagnesemia, bone fractures, and rebound hyperacidity after discontinuation.” (DeBruyne P and Ito S. Toxicity of long-term use of proton pump inhibitors in children. 2018 Arch Dis Child 103: 78-82)

Date:

1/18/2018

Question:

Hydroxychloroquine is often used in the treatment of systemic lupus and rheumatoid arthritis. The risk of hydroxychloroquine-mediated retinal toxicity is generally considered to be relatively low within the first 5–10 years of therapy. How quickly might hydroxychloroquine-induced retinal toxicity develop?

Answer:

Recent case reports describe that retinal toxicity may develop within only 24 months of the use of high dose hydroxychloroquine therapy. (Leung L et al. Rapid onset of retinal toxicity from high-dose hydroxychloroquine given for cancer therapy. 2015 Am L Ophthalmol 160(4): 799-805)

Date:

1/19/2018

Question:

The article cited below notes “Extracts of the saw palmetto berry are used by many men in the United States as self-treatment for lower urinary tract symptoms due to benign prostatic hyperplasia. While the most recent data from double-blind clinical trials do not support efficacy superior to that of placebo, there are sparse data on saw palmetto toxicity.” What is the toxicity associated with saw palmetto extract?

Answer:

The cited reference reported on 369 patients in the CAMUS trial (Complementary and Alternative medicine for Urological Symptoms) who were randomized to take a variety of ethanolic saw palmetto extracts or placebo. These investigators concluded “The saw palmetto extract used in the CAMUS trial showed no evidence of toxicity at doses up to 3 times the usual clinical dose during an 18-month period.” (Avins AL et al. safety and toxicity of saw palmetto in the CAMUS trial. 2013 J Urol 189:1415-1420)

Date:

12:00:00 AM

Question:

DTPA (Diethylenetriamine pentaacetate) is a medicine that can bind to a variety of radioactive chemicals. Which radioactive chemicals can be bound by DTPA?

Answer:

DTPA comes in two forms: calcium (Ca-DTPA) and zinc (Zn-DTPA). Both forms work by tightly binding to radioactive plutonium, americium, and curium. These radioactive materials (bound to DTPA) are then passed from the body in the urine.

(<https://emergency.cdc.gov/radiation/dtpa.asp>; accessed January 2018)

Date:

1/23/2018

Question:

What are the chemical constituents of diesel exhaust?

Answer:

The cited article reports the “major constituents” (> 1%) of diesel exhaust include water, carbon dioxide, nitrogen, oxygen, carbon monoxide, particulates and hydrogen. These authors report the “minor constituents (< 1%) include oxides of sulfur, oxides of nitrogen, aldehydes, organic acids, alcohols, and PAH hydrocarbons. (Elliott MA et al. The composition of exhaust gases from diesel, gasoline and propane powered motor coaches. 1955 J APCA 5(2):103-108)

Date:

1/24/2018

Question:

Reports have identified serious consequences, including apnea, acidosis, and coma in young children who swallowed alcohol-based (alcohol) hand sanitizer. What is the alcohol content of the majority of hand sanitizer products sold in the USA today?

Answer:

The cited reference notes “Many hand sanitizers contain up to 60%–95% ethanol or isopropyl alcohol by volume”. (Santos C et al. reported adverse health effects in children from ingestion of alcohol based hand sanitizers- United States, 2011-2014. 2017 MMWR 66:223-226)

Date:

1/25/2018

Question:

Diamond polishers are an occupational group that has been reported to develop dust related occupational asthma (OA). What is the etiology for this particular form of OA?

Answer:

The cited article notes “Diamond polishers..... develop asthma as a result of exposure to cobalt dust. The dust is generated from high-speed grinding disks coated with abrasive microdiamonds embedded in binding cobalt powder.” (Wilk-Rivard E and Szeinuk J. Occupational asthma with paroxysmal atrial fibrillation in a diamond polisher. 2001 Env Health Perspect 109:1303-1306)

Date:

1/26/2018

Question:

The relationship between methamphetamine use and the development of psychosis is well known. Which psychiatric symptoms are most consistent with the diagnosis of methamphetamine psychosis?

Answer:

The cited reference notes methamphetamine psychosis symptoms “typically involve persecutory delusions and hallucinations, which usually remit following cessation of methamphetamine”. (Hides L et al. Primary and substance induced psychotic disorders in methamphetamine users. 2015 Psych Res 226:91-96)

Date:

1/29/2018

Question:

Oseltamivir is a neuraminidase inhibitor for influenza A and B virus and is frequently prescribed during epidemics of influenza. What is the potential interaction between oseltamivir and warfarin?

Answer:

While the interactions between oseltamivir and warfarin have not been fully elucidated, several case reports suggest that patients taking both of these drugs simultaneously may manifest prolongation of the INR as well as a reversible coagulopathy. (Shah SP et al. Review of potential drug interaction between oseltamivir and warfarin and why it is important for emergency medicine physicians. 2017 Am J Emerg Med 35:1207.e3-1207.e4)

Date:

1/30/2018

Question:

The EPA has set National Ambient Air Quality Standards (NAAQS) for six (6) principal pollutants, which are called "criteria" air pollutants. These include carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter and sulfur dioxide. Which form of particle pollution, PM 2.5 or PM 10 are included under the rubric of "particulate matter" by the U. S. EPA's NAAQS?

Answer:

Both PM 2.5 and PM 10 are addressed by the NAAQS. Thus, in effect, one may consider there are seven (7), not six(6), "criteria" air pollutants. (<https://www.epa.gov/criteria-air-pollutants/naaqs-table>; accessed January 2018)

Date:

1/31/2018

Question:

What are the placental complications, if any, associated with psychostimulant use in pregnancy?

Answer:

One recent study reported on more than 3000 pregnancies that involved exposed to amphetamine-dextroamphetamine, methylphenidate or atomoxetine as follows: "Among unexposed women, the risks of the outcomes were 3.7% for preeclampsia, 1.4% for placental abruption, 2.9% for small for gestational age, and 11.2% for preterm birth. The adjusted risk ratio for stimulant use was 1.29 for preeclampsia (95% CI 1.11–1.49), 1.13 for placental abruption (0.88–1.44), 0.91 for small for gestational age (0.77–1.07), and 1.06 for preterm birth (0.97–1.16). Compared with discontinuation (n=53,527), the adjusted risk ratio for continuation of stimulant use in the latter half of pregnancy (n=51,319) was 1.26 for preeclampsia (0.94–1.67), 1.08 for placental abruption (0.67–1.74), 1.37 for small for gestational age (0.97–1.93), and 1.30 for preterm birth (1.10–1.55). Atomoxetine was not associated with the outcomes

studied.” These authors concluded “Psychostimulant use during pregnancy was associated with a small increased relative risk of preeclampsia and preterm birth. The absolute increases in risks are small and, thus, women with significant ADHD should not be counseled to suspend their ADHD treatment based on these findings.” (Cohen JM et al. Placental complications associated with psychostimulant use in pregnancy. 2017 *Obstet Gynecol* 130(6):1192-1201)

Date:

2/1/2018

Question:

Does the maternal use of calcium channel blockers increase the risk for neonatal seizures?

Answer:

The cited article reported on more than 2,500,000 completed pregnancies where 22,908 (0.91%) included exposure to calcium channel blockers during the final month of pregnancy. These authors reported “Neonatal seizures occurred in 53 (0.23%) neonates born to mothers exposed to calcium channel blockers and in 4,609 (0.18%) neonates of unexposed women (unadjusted odds ratio [OR] 1.26, 95% confidence interval [CI] 0.96–1.65). After accounting for confounders, there was no increase in risk of neonatal seizures associated with calcium channel blocker exposure (OR 0.95, 95% CI 0.70–1.30). This null finding was robust across multiple sensitivity analysis.” The authors concluded “In this large, carefully controlled, population-based cohort study, there was no significant increase in the risk of neonatal seizures in neonates attributable to maternal calcium channel blocker exposure in late pregnancy. The results suggest that calcium channel blockers can be used by obstetricians in late pregnancy without excess concern about this neonatal complication.” (Bateman BT et al. Calcium channel blocker exposure in late pregnancy and the risk of neonatal seizures. 2015 *Obstet Gynecol* 126:271-278)