

# Common Pediatric Ingestions & Poisonings

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## Goals & Objectives

- Discuss epidemiology of ingestions/poisonings
- Discuss most common pediatric ingestions, how they present and are treated
- Discuss interesting plant toxins

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- >50,000 children aged <5 years present with concern for unintentional medication exposure
- 1/2 of all calls to Poison Centers for children < 6 years of age

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**National Poison Data System (NPDS)** 

- NPDS has
  - more than 62 million exposure case records
  - more than 420,000 products going back to 1983
- NPDS can track poison exposure outbreaks across the country
- Important for exposure trends
- Public health significance

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- **Case data are continually uploaded to NPDS from all AAPCC member poison centers currently every eight minutes, providing a near real-time snapshot of poisoning conditions nationwide.**

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- In 2015, Poison Control centers managed almost 2.8 million cases
- 2 million of these cases were human exposure
- Someone called poison control every 11 seconds in 2015
- These cases are managed by doctors, nurses and pharmacists who have extensive training in poisoning prevention and treatment

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### Mechanism of Poisonings



- Ingestion
- Inhalation
- Dermal
- Ocular
- Bites/Stings

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### What did they take



- Toddlers/Preschools:
  - Most common ingestion : Acetaminophen
  - Most common fatal ingestion : Iron
- Adolescent
  - Most common ingestion: Acetaminophen
  - Most common fatal ingestion: Cyclic antidepressant

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### Poison Prevention Packaging Act - 1970



- Requires child protective packaging of household products
- Now includes medicines, solvents and oils
- 45% reduction of mortality since the expansion of the PPPA

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- 57% of human exposure cases involved medications or pharmaceuticals
- Other exposures included household products, plants, mushrooms, pesticides, animal bites and stings, carbon monoxide, and other non pharmaceutical substances

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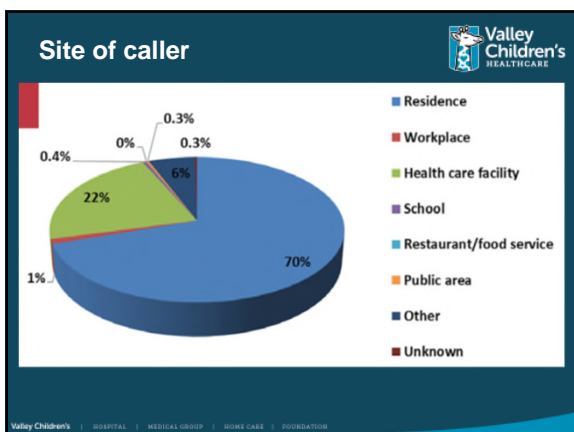
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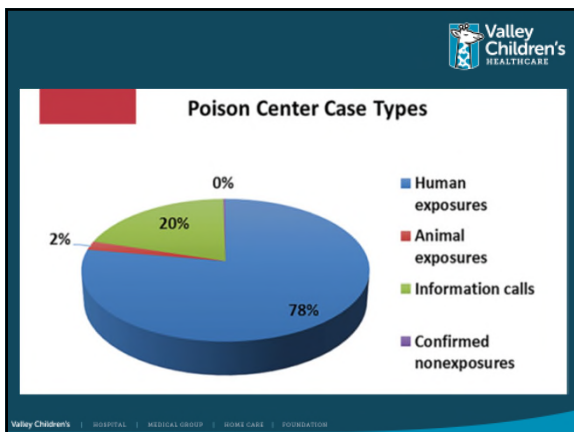
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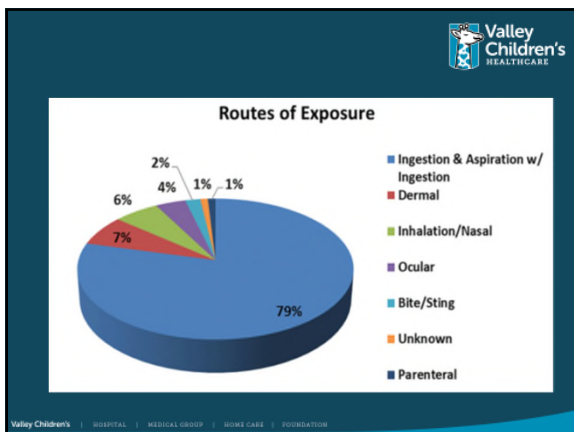
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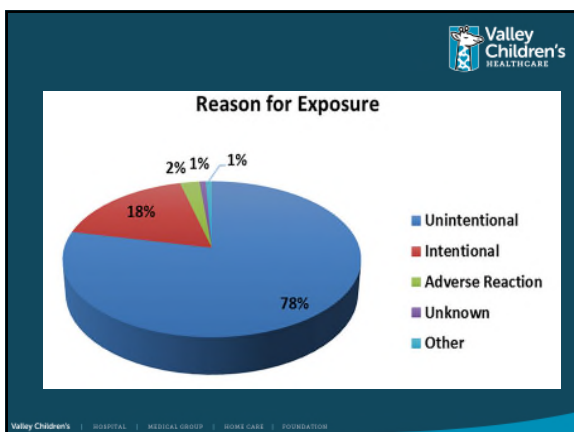
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### Most Frequent Human Exposures, 2015 - ALL AGES



- 11% Analgesics
- 7.6% Cleaning Substances
- 7.4% Cosmetics/Personal Care Products
- 5.8% Sedative/Hypnotics/Antipsychotics
- 4.6% Antidepressants
- 4.1% Antihistamines
- 4.0% Cardiovascular Drugs
- 3.7% Foreign Body/Toys/Miscellaneous
- 3.3% Pesticides
- 2.9% Topical Preparations

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### Most Frequent Human Exposures, 2015 (<6 years age)



- 13.6% Cosmetics/Personal Care Products
- 11.2% Cleaning Substances
- 9.1% Analgesics
- 6.5% Foreign bodies/toys/miscellaneous
- 5.3% Topical preparations
- 4.6% Vitamins
- 4.4% Antihistamines
- 3.3% Pesticides
- 3.0% Dietary supplements/Herbals/Homeopathic
- 2.7% Plants

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### Most Frequent Adult Exposures, 2015 (>20years of age)



- 11.6% Analgesics
- 10.3% Sedative/Hypnotics/Antipsychotics
- 6.9% Antidepressants
- 6.1% Cardiovascular drugs
- 5.4% Cleaning substances
- 4.7% Alcohols
- 3.9% Anticonvulsants
- 3.6% Pesticides
- 3.4% Stimulants/Street Drugs
- 3.1% Antihistamines

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**January 1-July 31, 2017**



- 6397 kids 5 and younger exposed to single-load laundry packets



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**Laundry detergent pods:  
Serious side effects**



- Coma
- Respiratory arrest
- Pulmonary edema
- Cardiac arrest
- Death

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**Energy drinks**



- Not the first thing that comes to mind in pediatric ingestions
- Contains high concentration of caffeine among other herbal supplements
- Include: guarana, kola nut, yerba mate – all additional sources of caffeine

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## Energy Drinks



- 2010: US Poison control began tracking energy drink overdoses
- 40% of these calls involved children younger than 6 years of age
- MC side effect: cardiovascular, neurological
- Other side effects:
  - Liver, kidney, respiratory, seizures, agitation

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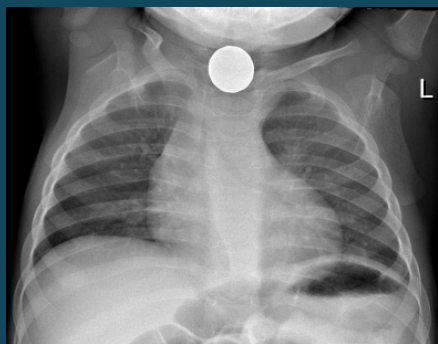
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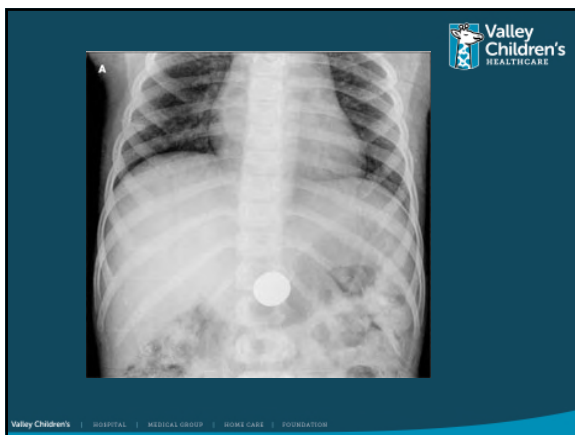
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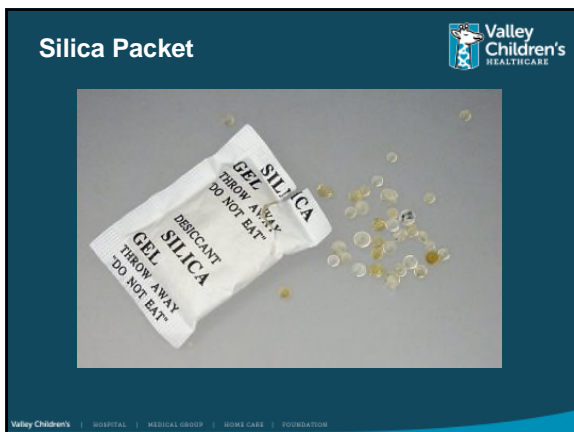
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### Single dose fatal ingestions in children

- Low body mass of children results in easily becoming more toxic
- Younger children tend to explore their environments and may ingest substances with foul taste or odors that older children would stay away from
- Metabolic pathways of young children are less developed – use sulfonation vs glucuronidation to process some toxins

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### What substance can kill a pediatric patient in a single sip?



- Vick's Vapor-Rub - camphor
- Liquid Tylenol - acetaminophen
- Ethanol
- Liquid Bleach – alkali agent
- Air freshener- inhalants, pthalates

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### Fatal doses – one time exposure



- Opioids – methadone, prescription analgesics, fentanyl patches, diphenoxylate-atropine (Lomotil)
- Central alpha adrenergic receptor agonists – Clonidine, guanfacine, eye drops, nasal decongestants
- Sulfonylureas – glipizide, glimepiride, glyburide
- Calcium channel blockers – verapamil, diltiazem, amlodipine, nifedipine
- TCAD – imipramine, amitriptyline, mirtazapine
- Camphor
- Methyl salicylates – oil of wintergreen
- Toxic alcohols – methanol, ethylene glycol
- Laundry detergent pods

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### GI decontaminants



- Activated Charcoal



- No role for Syrup of Ipecac
- Limited/no role for Gastric Lavage
- Limited role: Whole bowel irrigation

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### Toxins & Antidotes



- Opioids
- Benzodiazepines
- Methanol/Ethylene glycol
- Acetaminophen
- Cholinesterase inhibitor
- Digoxin
- Naloxone
- Flumazenil
- Fomepizole
- N-acetylcystine
- Pralidoxime
- Digibind

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### Toxidromes



- Many ingestions/poisonings have features which distinguish them
- This is helpful when planning initial treatment
- Often can be recognized long before the confirmatory test is resulted

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### Opioids



- These include: methadone, buprenorphine, morphine, oxycodone, heroin
- Presentation is typically a sleepy patient
- Irregular/slow respirations
- Bradycardia
- Hypotension
- Hypothermia
- Pupils: Pinpoint
- Bowel sounds : Normal/decreased

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**Cholinergic**



- Moist patients!
  - Diarrhea, urination, bronchorrhea, bronchospasm, emesis, lacrimation, salivation
- These are your PESTICIDES:
  - Organophosphates – insecticides, nerve agents
  - Carbamates – physostigmine, neostigmine, pyridostigmine
  - Alzheimer's medications
  - Myasthenia treatments

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**Cholinergics**



- Bradycardia, normal blood pressure and temperature
- Often confused, comatose w/wo fasciculations
- Small pupils
- Diaphoretic
- Hyperactive bowel sounds

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**Cholinergic OD Side Effects**



**DUMB BELS**

- D iarrhea
- U rination
- M iosis/muscle weakness
- B ronchorrea
- B radycardia
- E mesis
- L acrimation
- S alivation/sweating

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**Anti-cholinergics**

- DRY patients
  - Hot as a hare, Dry as a bone, Blind as a bat, Red as a beet, Mad as a hatter
- These are: antihistamines, TCADS, atropine, Jimson weed
- Patients present with: hypertension, tachycardia, hyperthermia
- They are agitated, delirious, comatose, convulsing
- Pupils are dilated
- Skin is dry and hot
- Diminished bowel sounds

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**Anticholinergic toxidrome**

- Hot as a hare**
- Blind as a bat**
- Dry as a bone**
- Red as a beet**
- Mad as a hatter**

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**Sympathomimetic**

- These are:
  - Amphetamines, Cocaine, PCP, bath salts, ADHD meds
- Hypertension, tachycardia, hyperthermia
- Dilated pupils
- Agitated, psychosis, delirium, violent
- Skin will be diaphoretic
- Normal/increased bowel sounds

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### Sedative/Hypnotics



- Include Barbiturates, benzodiazepines, ethanol
- Results in respiratory depression, heartrate/blood pressure, temperature - all normal to decreased
- Somnolence, coma
- Small or normal pupils
- Normal skin

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### Serotonin syndrome (similar to Neuroleptic Malignant Syndrome)



- Most common medications: SSRI, lithium, MAOIs, linezolid, tramadol, meperidine, dextromethorphan
- Present with hyperthermia, tachycardia hypertension or hypotension
- Agitated, confused, comatose
- Dilated Pupils
- Diaphoretic skin
- Clonus, hyper-reflexia LE>UE

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### Salicylates



- Aspirin, methyl salicylate
- Results in tachypnea, hyperpnea, tachycardia, hyperthermia
- Agitated, confused, comatose
- Normal pupils,
- Diaphoretic skin
- Nausea, vomiting, tinnitus, Respiratory alkalosis, Metabolic acidosis on ABG

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### The answer is in the eyes...



- Ingestions which causes miosis:
  - Cholinergics
  - Opioids
- Ingestions which causes mydriasis:
  - Those which cause serotonin syndrome
  - Sympathomimetics

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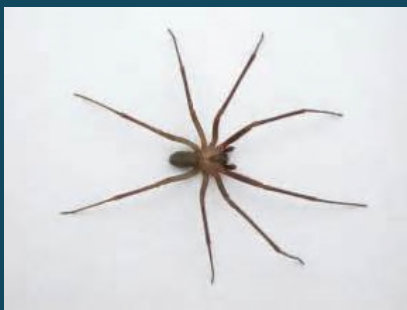
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### Brown Recluse Spider Bites



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### Hemlock



- Used in ancient Greece as a means of execution
- Juice of hemlock frequently administered to criminals
  - Fatal poison of Socrates
- Smells delicious
- Attacks the nervous system – burning sensation in the mouth, vomiting, confusion, seizures and ascending paralysis
- Leads to respiratory paralysis and death

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### Hemlock



- Tall, branched plant with elegantly cut foliage and white flowers
- 5 petals in a grouping



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### Oleander



- “Desert rose” – reference made in the Bible
- Mesopotamians – used for healing properties in 15<sup>th</sup> century BC
- Babyloians – mixed oleander and licorice to treat hangovers
- Arab physicians – 8<sup>th</sup> Century used for cancer treatment
- Raw portions – poisonous, extracts - medicinal

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### Oleander



- Widely decorative shrub
- Funnel shaped blooms



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### Oleander



- Toxic elements
  - Cardiac glycosides, digitoxin, nerioside
- Found in all parts of the plant
- Symptoms:
  - Skin rash, blurred vision, vomiting, loss of appetite, arrhythmia, weakness, headache, fainting, lethargy
- Treatment: supportive care, digibind

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### Aconitum



- Also known as Devil's Helmet, wolfsbane, monkshood
- Known for generations for use in preparation of poison – tipped arrows (killing of wolves)
- Cleopatra – scholars believe many component of suicide drink was monkshood
- Present day – mentioned in Harry Potter and the Prisoner of Azkaban
  - Severus Snape mocks Harry for not knowing wolfsbane, aconite and monkshood are all the same plant

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## Aconitum



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- Traditionally used in Chinese medicine and Ayurveda
- Used as an anesthetic, painkiller, sedative
- Humans – accidental ingestion – fatal
- Contain neurotoxins, cardiotoxins
- Lead to GI complications, motor weakness, heart/lung paralysis



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## White snakeroot



- Also known as *Ageratina altissima*
- Contains toxin: tremetol
  - Leads to trembling, vomiting, GI issues
  - Within hours – abdominal pain, polydipsia, vomiting
  - Death within 2-10 days
  - Treatment: laxatives, glucose, IV fluids, symptomatic care
- Triad of symptoms so common in the 19<sup>th</sup> century
  - illness was known as : Milk Sickness

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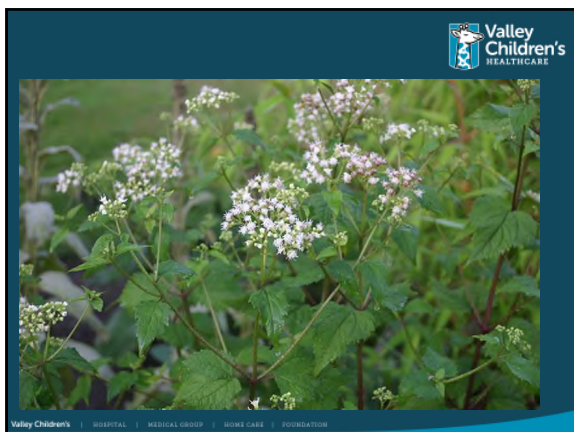
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### Milk Sickness

- Brought on by ingested milk from a cow who fed on white snakeroot plant
- Claimed thousands of lives in the 19<sup>th</sup> century near the Ohio River
- Thought to be responsible for the death of Abraham Lincoln's mother: Nancy Hanks Lincoln

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### Angel's trumpet

- Also known as Brugmansia
- Name from the large, hanging trumpet shaped flower

A photograph of an Angel's trumpet flower, which is a large, trumpet-shaped flower with a yellow-orange color and a green stem. The image is part of a slide from Valley Children's Healthcare, with the logo in the top right and a navigation bar at the bottom.

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Valley Children's HEALTHCARE

- Used in modern medicine: scopolamine, hyoscyamine, atropine
  - Spasmolytic, anti-asthmatic, anticholinergic, narcotic, anesthetic properties
- Seeds and leaves are the most dangerous part of the plant
- Often made into tea “brugmansia tea”

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Valley Children's HEALTHCARE

- As recently as 1994, 112 teenagers in Florida were admitted for ingesting brugmansia
- Leads to prohibition of the purchase, sale or cultivation of the plant

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### Additional plant poisonings

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- Jimson weed
- Apple seeds – contains amygdalin – cyanogenic glycoside
- Deadly nightshade - belladonna
- Foxglove - digitalis



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