Common Patient Poisonings

Management of the Exposed Patient

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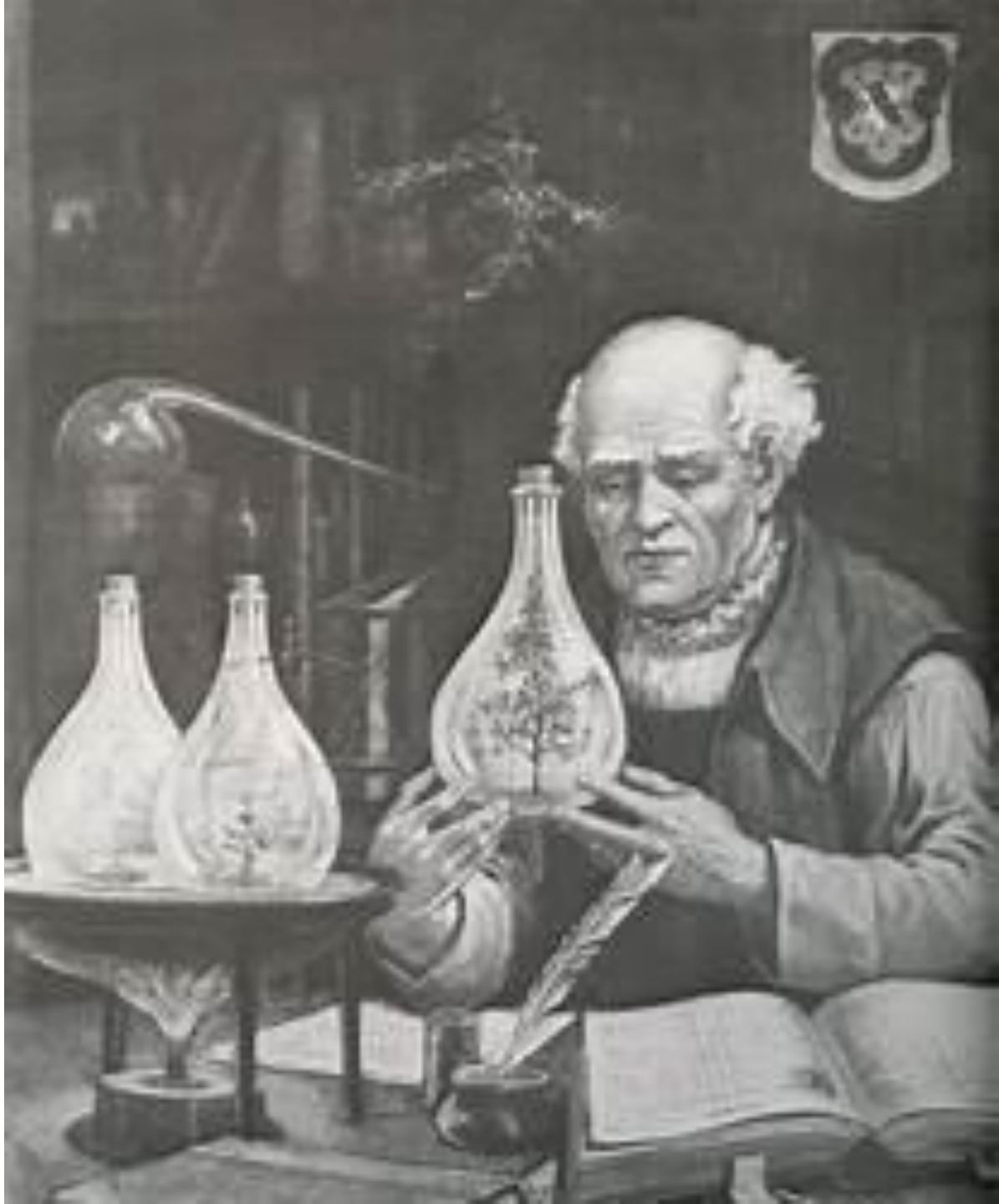
Paramedic Shift Commander

Sussex County Emergency Medical Services

Objectives

- Epidemiology of poisonings
- History gathering in suspected poisoning
- Assessment of the poisoned patient
- Treatment of poisoned patients



Situations

Unintentional (77%)

- Medication error
- Misuse
- Bite/sting
- Occupational
- Food poisoning

Intentional (19%)

- Self-harm
- Harm to others
- Abuse

Source: 2019 Annual Report of the American Association of Poison Control Centers' National Poison Data System

Vulnerable Populations

- Pediatrics
  - Age 1-2 (27.61%)
- Adults
  - Age 20-29 (9.08%)

- Fatalities
  - 50-59 years (19.8%)
  - 30-39 years (17.3%)

Source: 2019 Annual Report of the American Association of Poison Control Centers' National Poison Data System

Routes of Exposure

- Ingestion (79%)
- Dermal (7%)
- Inhalation / Nasal (6%) [9.2% of fatal exposures)
- Occular (4%)
- Bite/sting
- Parenteral

Source: 2019 Annual Report of the American Association of Poison Control Centers' National Poison Data System

Most Common Agents

- Analgesics*
- Cleaning Agents
- Cosmetics
- Sedative/Hypnotic/Antipsychotics
- Antidepressants*
- Cardiovascular Drugs*
- Antihistamines*
- Foreign Bodies
- Pesticides
- Alcohols*
- Stimulants and street drugs*
- Anticonvulsants*
- Topical preparations
- Dietary Supplements
- Vitamins
- Hormones
- Cold & Cough Meds
- Antimicrobials
- Gastrointestinal Preparations
- Chemicals
- Bites and Envenomations
- Plants
- Fumes/Gases/Vapors
- Other/Unknown
- Electrolytes and Minerals

Source: 2019 Annual Report of the American Association of Poison Control Centers' National Poison Data System

Most Fatalities

Adult

- Sedative/Hypnotics/Antipsychotic
- Stimulants and street drugs
- Opioids
- Alcohols
- Acetaminophen
- Calcium Antagonists
- Beta-blockers

Pediatric

- Fumes/gases/vapors
- Analgesics
- Antihistamines
- Stimulants and street drugs
- Anesthetics
- Batteries
- Cardiovascular drugs

Source: 2019 Annual Report of the American Association of Poison Control Centers' National Poison Data System

Scenario # 1 – Sick Subject – Not Alert

- 60 y/o male
- Family came to his home for a visit and found him lethargic
- They report no recent illnesses
- Patient does not abuse alcohol
- His wife died a few weeks ago and family reports their father has been very depressed.

SAMPLE

- S = Confused, sleepy, does respond when shouted at
- A = none
- M = metoprolol, coated aspirin
- P = hypertension (controlled)
- L = unknown, lives alone
- E = unknown, family spoke with him yesterday. He sounded “sad” but voiced no complaints

Vital Signs

- HR = 112
- RR = 32
- BP = 160/90

- O2 Sat = 97% (RA)
- FSBS = 88 mg/dL

Physical Examination

- CNS – arousable, confused
- ABCs – intact
- Skin – diaphoretic, flushed
- Lungs – clear and equal
- Pupils – reactive, midposition
- Other – no signs of injury, no odors on breath, no signs of drug abuse

Patient Priority?

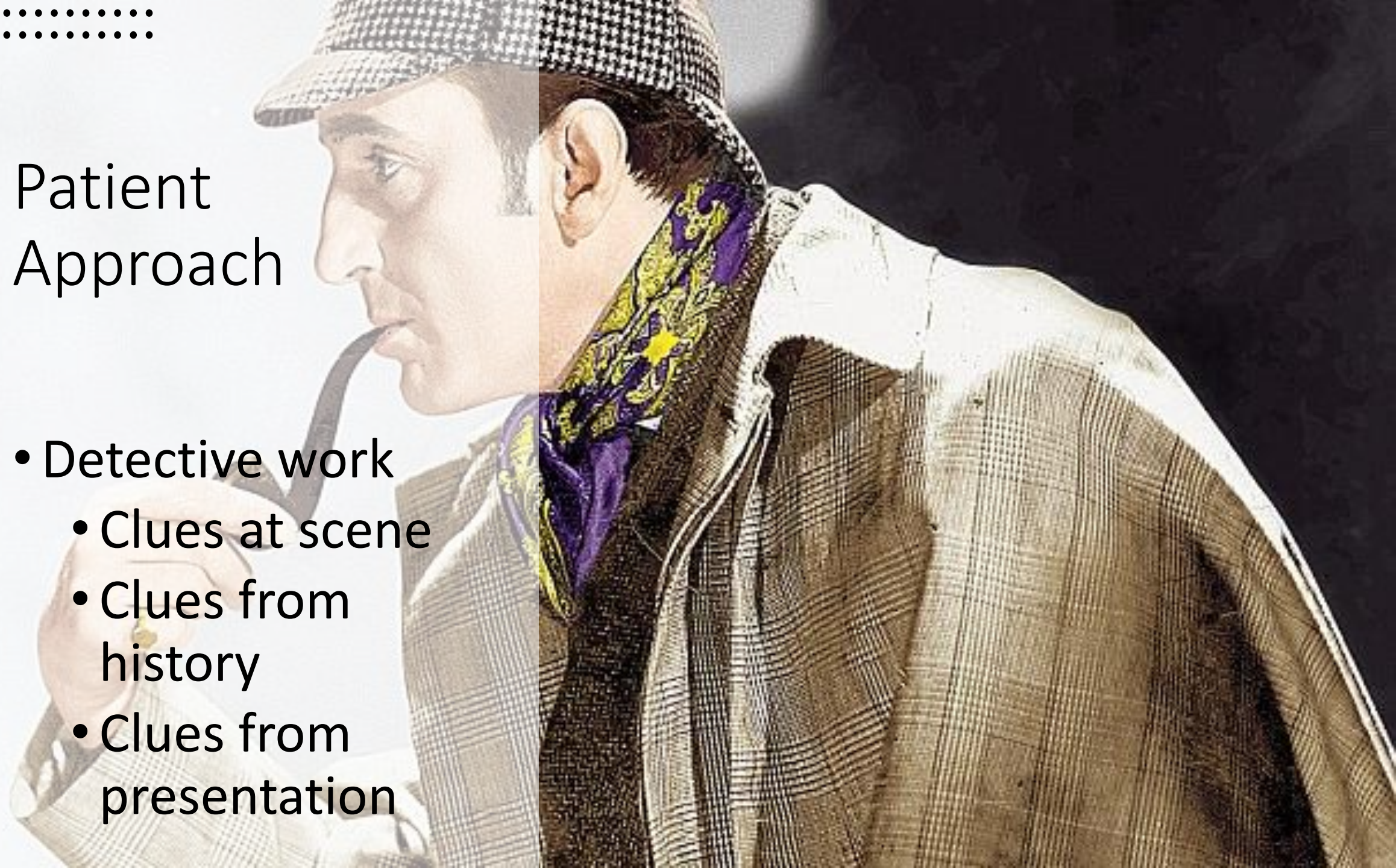
Thoughts?

Assessment or History?

Interventions?

Patient Approach

- Detective work
  - Clues at scene
  - Clues from history
  - Clues from presentation



Scene Clues

- Signs of drug paraphernalia
- Location
- Pill bottles on scene
- Non-prescribed medications
- Any chemicals present
- Other people ill on scene

Medication Bottles

- Number of pills when filled
- Date filled
- Number of pills now present
- Today’s date

History Clues

- Substance abuse history
- Scenario playing out
- Information from family/friends
- Activities at scene
- Medical history
- Mental health history

Presentation Clues

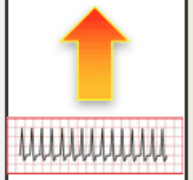
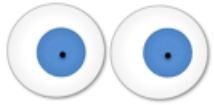
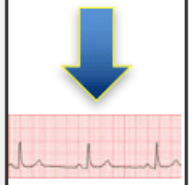
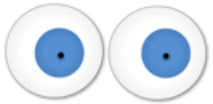
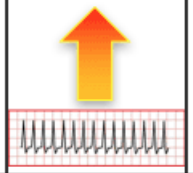
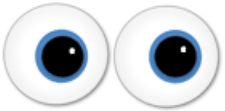
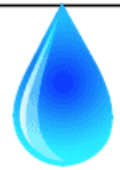
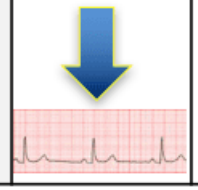
- Thorough assessment important
- Mental status
- Skin
  - Color, condition, temperature
  - Signs of exposure – punctures, contact
- Pupils
- Vital signs

Poison Impact

- Direct damage – corrosive
- Products of metabolism
  - Methyl alcohol + aldehyde dehydrogenase → formic acid + formate
  - Effect optic nerve
- Direct effect on cells and systems
  - Opioid
  - Hydrazine – inhibits GABA

Toxidromes

- Families of poisons present similarly

	HR & BP	Resp.	Temperature	Pupils	Bowel Sounds	Diaphoresis
Anticholinergic **Anticholinergics** –Atropine, scopolamine, glycopyrrolate benztropine, trihexyphenidyl **Antihistamines** – Chlorpheniramine, Cyproheptadine, Doxylamine, Hydroxyzine, Dimenhydrinate, Diphenhydramine, Meclizine Promethazine		No change 		Dilated 		
Cholinergic Organic Phosphorous Compounds: Carbamates • Arecholine, Pilocarpine, Urecholine (Betanechol), Carbachol, Choline, Metacholine, Mushrooms	No change 	No change 	No change 	Pinpoint 		
Opioid Morphine • Codeine • Tramadol • Heroin • Meperidine • Diphenoxylate • Hydromorphone • Fentanyl • Methadone • Propoxyphene • Pentazocine • DXM • Oxycodone • Hydrocodone				Pinpoint 		
Sympathomimetic Caffeine, cocaine, amphetamines, methamphetamines, Ritalin, LSD, Theophylline, MDMA				Dilated 		
Sedative-Hypnotic anti-anxiety agents, muscle relaxants, antiepileptics and preanesthetic medications –Barbituates –Benzodiazepines				No change 		

Toxidromes and Vital Signs – Heart Rate

Tachycardia

- Stimulants
- Anticholinergics

Bradycardia

- Beta-blockers
- Calcium-channel blockers

Toxidromes and Vital Signs – Respiratory Rate

Tachypnea

- Aspirin
- Stimulants
  - Amphetamines
  - Cocaine

Bradypnea

- Opioids
- Alcohol
- CNS depressants
  - Anticonvulsants

Toxidromes and Vital Signs – Blood Pressure

Elevated

- Stimulants
- Tricyclic antidepressants (TCAs)
- Cholinergics (antihistamines)

Depressed

- BP medications
  - Beta-blockers
  - Calcium-channel blockers
- Opioids

Toxidromes and Vital Signs – Temperature

Elevated

- Aspirin
- Anticholinergics
- Cocaine

Depressed

- Opioids
- Sedatives

Consider all causes of altered mental status

- A = Alcohol/Abuse, Acidosis
- E = Environmental, Epilepsy, Electrolytes, Encephalopathy, Endocrine
- I = Infection
- O = Overdose, Oxygen
- U = Uremia
- T = Trauma, Tumor
- I = Insulin
- P = Psychogenic, Poisons
- S = Stroke, Shock

Consider all causes of altered mental status

- A = Alcohol/Abuse, Acidosis
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Consider all causes of altered mental status

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“Field Treatable” AMS

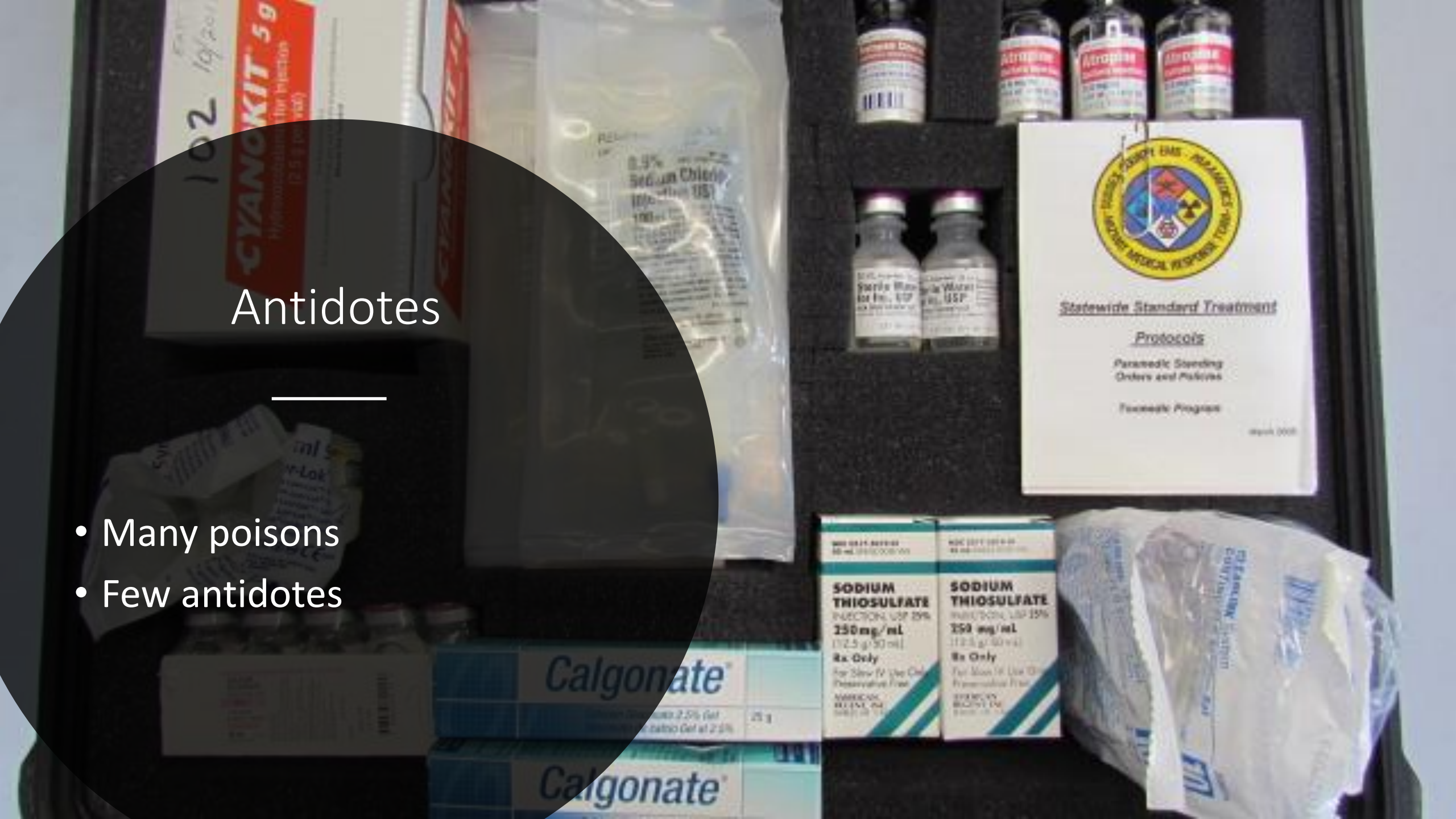
- Hypoxia
- Hypoglycemia
- Hypotension
- Herniation (?)
- Toxins (?)

Poisoning Treatment Plan

- Support the basics
- Antidotes?
- Decontamination?

Basic Care

- Airway maintenance
  - Obtunded patients
- Breathing
  - Ventilatory support
    - Oxygenation
    - Ventilation
- Circulation
  - Shock management
  - Cardiac function
    - EKG



Antidotes

- Many poisons
- Few antidotes

Available Antidotes

BLS

- Oxygen
- Dextrose
- Naloxone

ALS

- Atropine
- Pralidoxime
- Calcium Chloride
- Glucagon
- Sodium Thiosulfate
- Hydroxocobalamin
- Sodium Bicarbonate

Antidotes in PA Protocols (MC Order Req'd)

- TCA overdose with hypotension
  - Sodium Bicarbonate 1 mEq/kg
- Calcium channel blocker or beta blocker overdose with hypotension:
  - Calcium chloride 10% - 0.2 mg/kg over 5-10 min or,
  - Glucagon 3-10 mg over 3-5 min
- Opioid overdose with decreased respiratory rate (on protocol)
  - Naloxone
    - 2 mg IN, or
    - 1 – 4 mg (commercial nasal device), or
    - 0.4 mg IM

Antidotes in PA Protocols (MC Order Req'd)

- Smoke inhalation (CN) or hydrogen sulfide
  - Sodium thiosulfate – 12.5 g over 1-2 min*
- Cyanide
  - Hydroxocobalamin – 70 mg/kg (max 5 g)
- Cholinergic Inhibitors
  - Duodote

Decontamination

- Skin exposure = wash
- Inhalation exposure = ventilate
- Ingested exposure = activated charcoal

Activated Charcoal

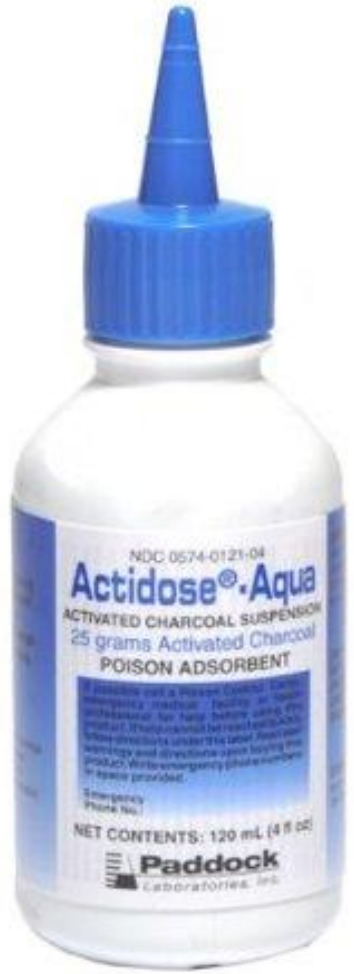
- Medical control or Poison Control consult required
- Indicated: Ingested poisoning
- Contraindicated:
  - Unable to swallow/protect airway
  - Seizures
  - Hydrocarbon ingestion
  - Caustic ingestion
- Cautions:
  - > 1 hour since ingestion
  - Pesticides

LIST OF ADSORBED TOXINS

Agents WELL Adsorbed by Activated Charcoal				Agents POORLY Adsorbed by Activated Charcoal
Acetylsalicylic Acid	Chloroquines	Indomethacin &	Phenylbutazone	Cyanide
Aflatoxin	& Primaquine	other NSAIDs	Phenylpropanolamine	Ethanol
Amphetamines	Cimetidine	Kerosene, Benzene,	Piroxicam	Ethylene Glycol
Antidepressants	Dapsone	Dichloroethane	Phenol Syrup of	Iron
Antiepileptics	DDT	Malathion & other Pesticides	IPECAC constituents	Isopropanol
Antihistamines	Dextropropoxyphene	Meprobamate	Quinidine & Quinine	Lithium
Aspirin/	& other opioids	Nefopam	Strychnine	Methanol
Other Salicylates	Digitalis	Methotrexate	Tetracyclines	Strong Mineral Acids & Alkali
Atropine	DIQUAT &	Mexiletine	Theophylline	
Barbiturates	other Herbicides	NSAIDS	Torbutamide,	
Benzodiazepines	Glycosides Disopyramide	(e.g. Tolfenamin Acid)	Chlorpropamide	
Beta-blockers	Ergot Alkaloids	*Paracetamol	Carbutamide,	Source: Medictests.com
Biphenyls	Furosemide	PARAQUAT	Tolazamide	

Activated Charcoal Dose

- Adult: 25 – 50 g PO
- Pediatric: 1 g/kg (approx. 12.5 – 25 g)



Patient Management

- Perform appropriate assessment to rule out other AMS causes
- Supply oxygen as appropriate
- Contact Poison Control and medical direction
- Activated charcoal?
- ALS?

Pathophysiology of Aspirin Overdose

- Respiratory centers activated
  - Increased rate of respiration
  - = respiratory alkalosis (CO_2 being lost is increasing the pH)
- Aspirin = acetylsalicylic acid
  - Interferes with the energy production pathways in the mitochondria
  - Produces a lactic acidosis (aneorbic metabolism)

ALS?

Consult with medical control

IV fluid therapy may be indicated

Treating acidosis?

Scenario #2 – Police Action

- 32 y/o female
- Found by her mother unresponsive
- History
  - Patient depressed over recent divorce and job loss
  - An empty bottle of Unisom was found at the scene

SAMPLE

- S = Unresponsive
- A = none
- M = multi-vitamins
- P = none
- L = dinner approximately 3-hours prior
- E = unknown, mother spoke with her just after dinner before she left for BINGO

Vital Signs

- HR = 160
- RR = 28
- BP = 190/90

- O2 Sat = 76% (RA)
- FSBS = 220 mg/dL

Physical Examination

- CNS – unresponsive
- ABCs – compromised
- Skin – dry, flushed
- Lungs – clear and equal
- Pupils – non-reactive, midposition
- Other – no signs of injury, no odors on breath, no signs of drug abuse

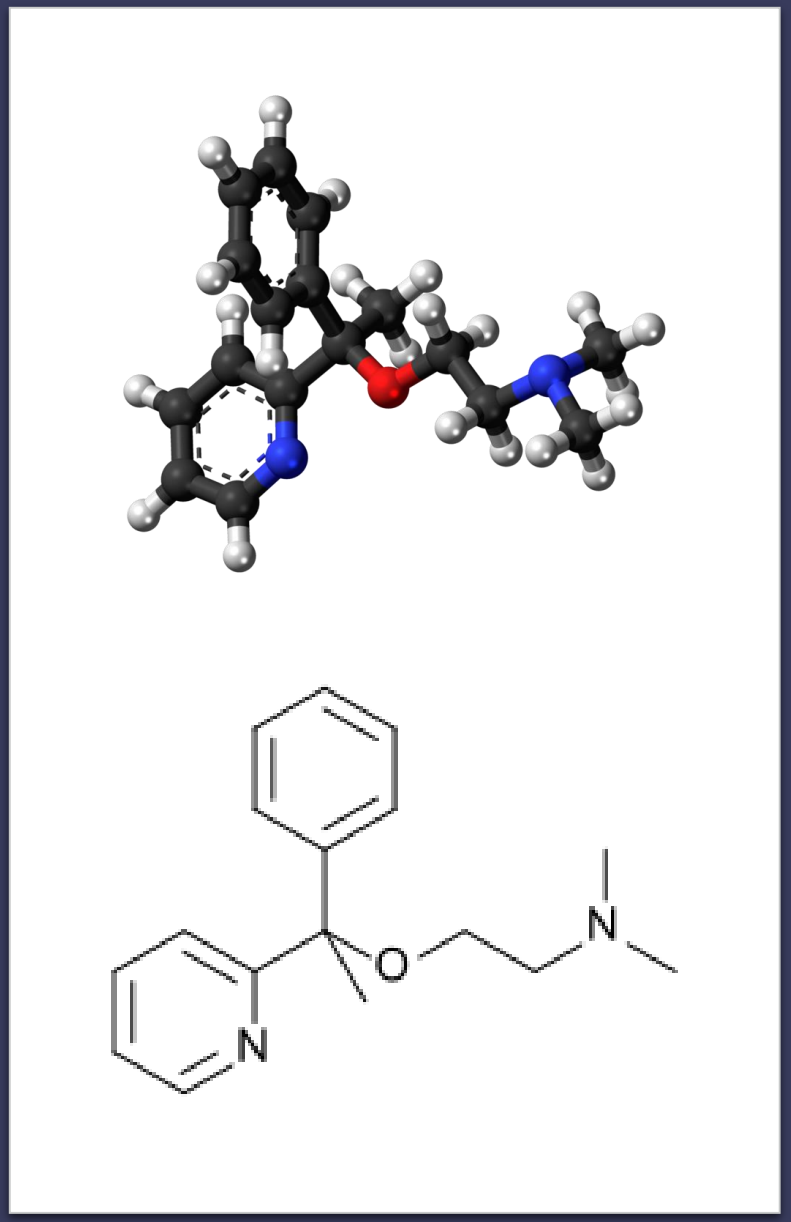
Initial Care Plan

- Airway management
  - OPA or NPA
  - BVM as needed
  - Oxygen as appropriate
- Antidote?
- Decontamination?

Unisom

- OTC sleep aid
- “Fall asleep 33% faster!”

- Active ingredient: Doxylamine succinate 25 mg/tablet
  - Box as sold contains 32 tablets
  - Normal does: 1 tablet



Doxylamine

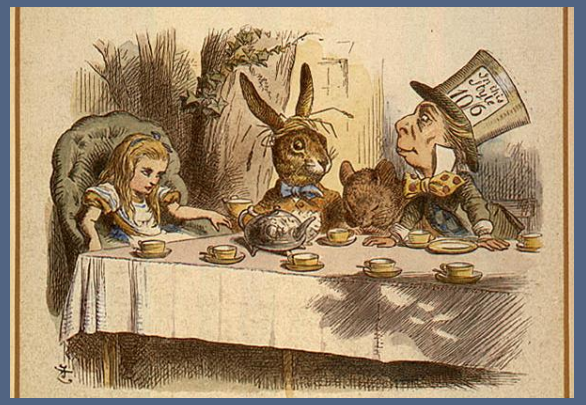
- Antihistamine
- Anticholinergic

Anticholinergic Toxidrome

- Hyperthermia
- Dry skin
- Urinary retention
- Tachycardia
- Delirium, agitation
- Mydriasis (dilated pupils)

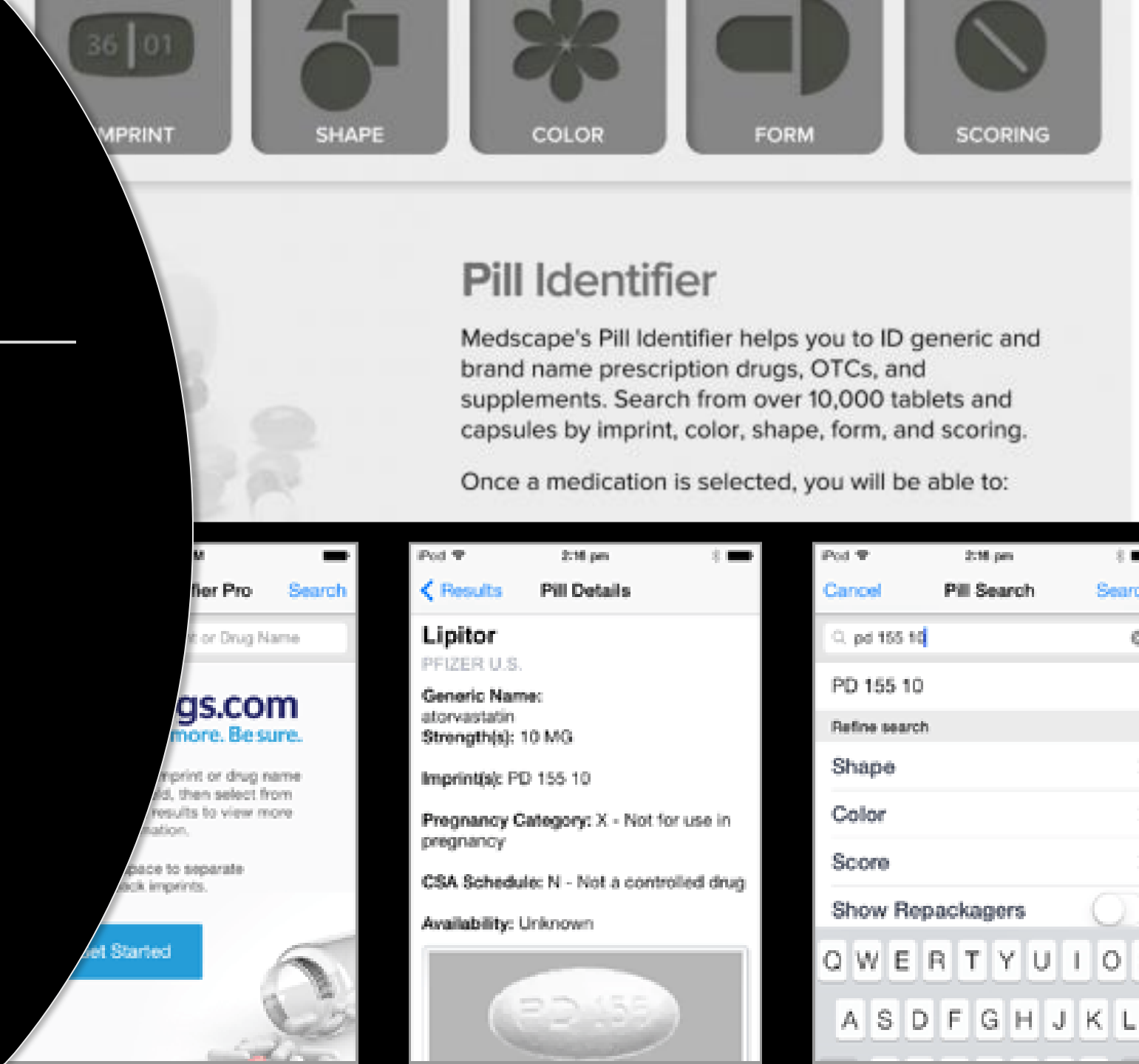
- Hot as a hare
- Dry as a bone

- Red as a beet
- Mad as a hatter
- Blind as a bat



Information Sources

- Medscape
- Drugs.com



webPoisonControl

- https://www.webpoisoncontrol.org/
- **1-800-222-1222**

Scenario #3 – Subject Injured in a Fall

- 57 y/o male
- Fell from the top of a tractor while loading
- Unconscious

SAMPLE

- S = Unresponsive
- A = none
- M = metformin, metoprolol, diuretic, NTG
- P = diabetic, hypertension, CAD, CHF
- L = breakfast 3 hours prior
- E = unwitnessed, appears as though he was loading a tank on a trailer when a boom struck him knocking him to the ground

Vital Signs

- HR = 52
- RR = 32 labored
- BP = 160 palp

- O2 Sat = 80% (RA)
- FSBS = 70 mg/dL

Physical Examination

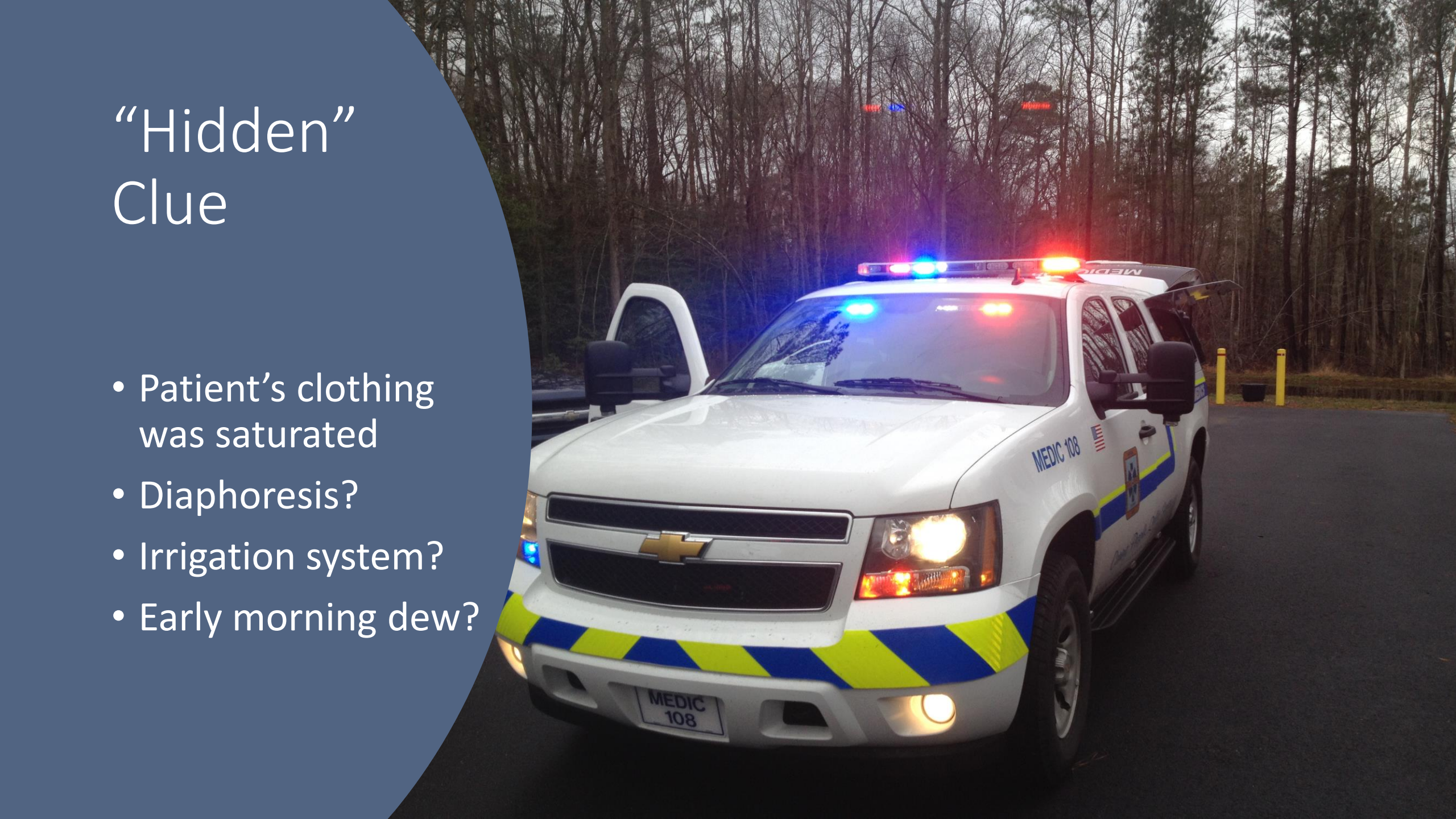
- CNS – unresponsive
- ABCs – compromised, respirations labored with excessive oral secretions present
- Skin – pale, diaphoretic
- Lungs – congested
- Pupils – non-reactive, constricted
- Other – bruise to left shoulder, no other signs of significant trauma, no head injury, patient was incontinent (both urine and stool)

Initial Care Plan

- Airway management
  - OPA or NPA
  - BVM as needed
  - Oxygen as appropriate
- Antidote?
- Decontamination?
- ALS?

“Hidden” Clue

- Patient’s clothing was saturated
- Diaphoresis?
- Irrigation system?
- Early morning dew?



The Story

- Patient was loading pesticides
  - Malathion
- Struck by boom during loading
  - Momentary LOC
  - Knocked to ground
  - Contaminated by spilled material

Signs and Symptoms of Exposure

- D = diarrhea
- U = urination
- M = miosis (pinpoint pupils)
- B = bradycardia, bronchorrhea, bronchospasm
- E = emesis
- L = lacrimation
- S = sweating, seizures

Treatment Plan Additions

- Decontamination
- Advanced airway management
  - Caution with use of succinylcholine
- Atropine
- Pralidoxime

General Plan

- Consider safety
- Detailed assessment and history are essential
- Intervene immediately for primary insults
- Consult expert advice
- Consider antidote (if available)
- Consider decontamination if necessary

Summary

- Poisons often present subtlety
- Consider all possibilities
- Care should initially be aimed at the basics
- Few antidotes exist (or are appropriate in the field)
- Don’t forget patient mental health support
- Assessment and history are critical

Contact Information

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References

- Gummin, et. al. (2019). 2018 annual report of the American association of poison control centers' national poison data system (NPDS): 36th annual report. Clinical Toxicology. Retrieved from https://www.poison.org/~/media/files/aapcc-annual-reports/npds2018.pdf?la=en

- Lawson, Arnold. (2018). Quick and dirty guide to poisonings. Retrieved from https://legacy.medictests.com/medictests-com-quick-dirty-guide-poisonings/