

Toxidromes and the Pitfalls of Recreating in Altered States of Consciousness

Jessica Kroll, MD



Roadmap

Part I: Most common substance used in the backcountry

Part II: General principals of toxicology

Part III: Toxidromes



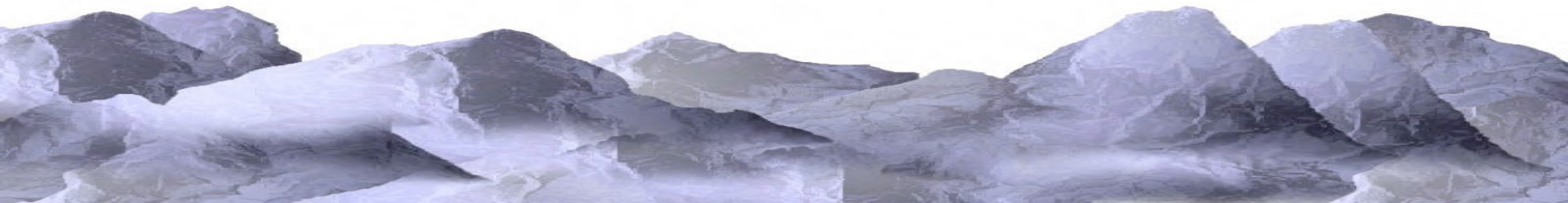
Part I:
**Most common substance used in
the backcountry**



Skiing and Drugs, how reckless are you?

We all know ski towns are party towns, and I see plenty of people drinking and smoking on the slopes, Any stories of times you were a bit too fucked up? Any stories of times you ascended to the next plane of reality?

PS: I do not condone drugs or drug use on the mountain, and whatever you do, get the fuck off groomers and stay away from other people. That being said I know it happens and I want to hear about the weirdest shit you got.



Skiing and Drugs, how reckless are you?



Dick_Wellington · 9 yr. ago

Aside from smoking a lot of weed (which is obviously common), I went skiing on mushrooms ^{the} once.

Incredibly fun, would recommend it. Just keep the dose pretty low and you'll be good.

I also have ridden MTB on mushrooms which was also great, and gave me the idea for shrooming and skiing.



3



Reply



Share



[deleted] · 9 yr. ago

We used to call it shroomboarding. Super fun. I'm too old for that shit now, but years ago we did it all the time.



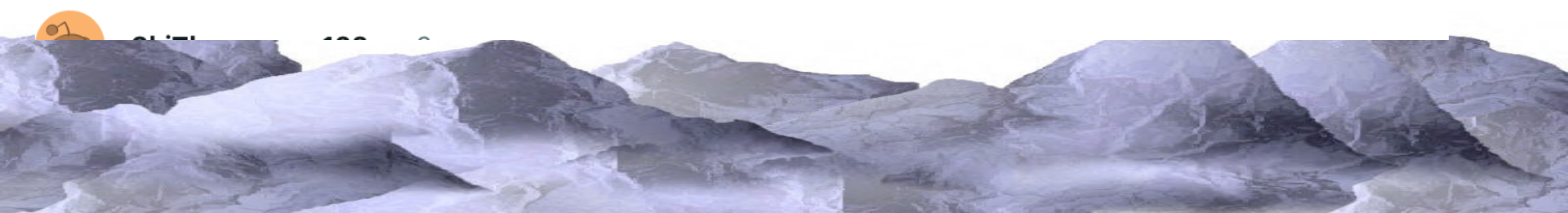
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Reply



Share



Skiing and Drugs, how reckless are you?



Dick_Wellington · 9 yr. ago

Aside from smoking a lot of weed (which is obviously common), I went skiing on mushrooms the once.

Skiing and LSD

Incredik

I'm thinking of trying skiing while on a small dose of LSD, I think it will be awesome. Have any o

I also ha tried it? What do you guys think

shroom



↑ 3 ↓

↑ 22 ↓

💬 60

🔗 Share



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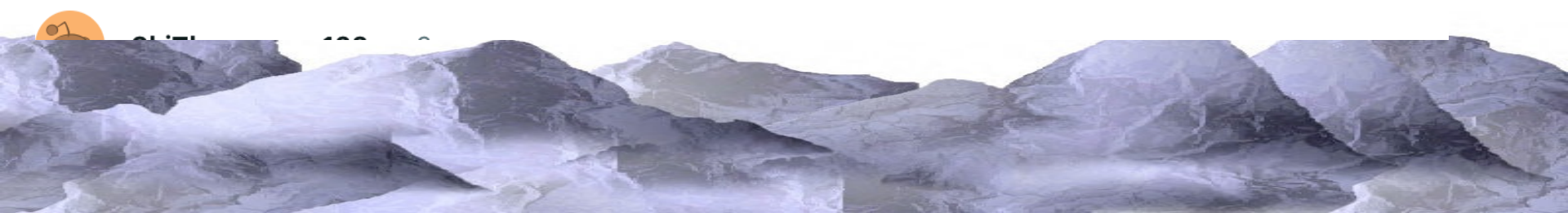
We used to call it shroomboarding. Super fun. I'm too old for that shit now, but years ago we did it all the time.

↑ 2 ↓

💬 Reply

🔗 Share

⋮



Skiin



LIP ◦
Skandahooooovian

Join Date: Jan 200
Location: Deeeeeenve
Posts: 79



Dick_Wel

Aside from
once.

Incredibly

I also had
shroom

Fuck the haters. Drop 3-4 hits and just send it. What could possibly go wrong?

Been a loooooooooooooooooong time but I seem to remember being able to ski pretty damn well after a sugar cube of good liquid. Could just be rose colored glasses though.

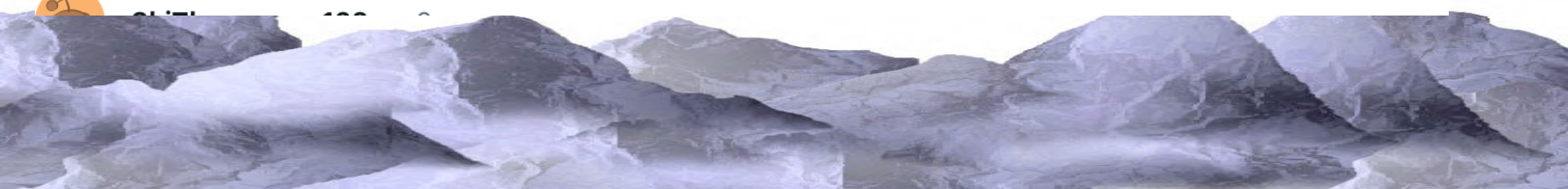
3 22 60 Share



[deleted] • 9 yr. ago

We used to call it shroomboarding. Super fun. I'm too old for that shit now, but years ago we did it all the time.

2 2 Reply Share ...



Skiin



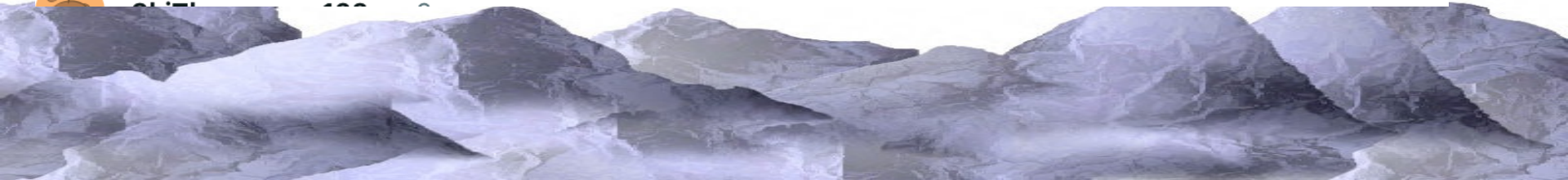
LIP ◦
Skandahooooovian

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IS IT ILLEGAL TO SKI
OR SNOWBOARD
WHILE UNDER THE
INFLUENCE IN UTAH

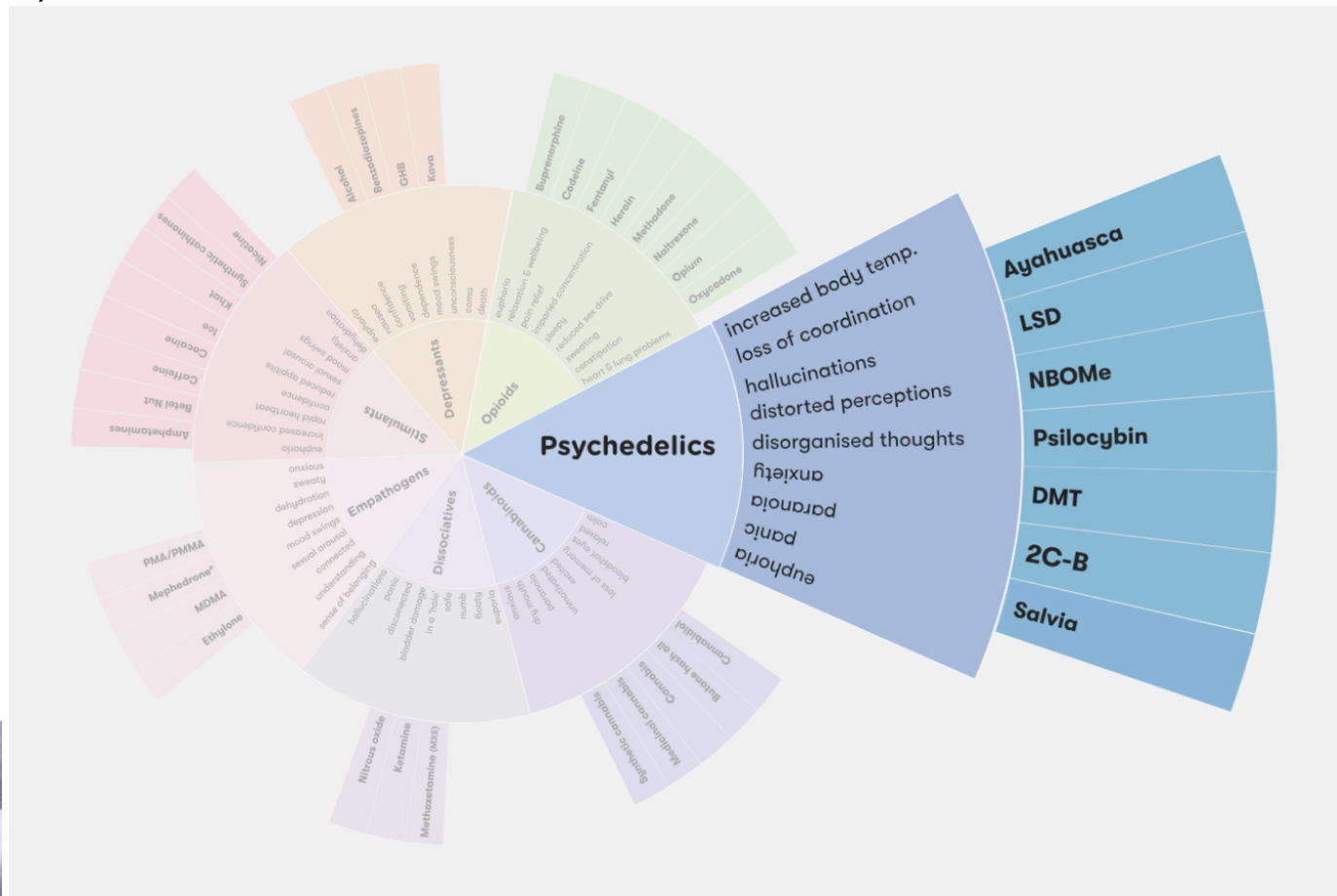


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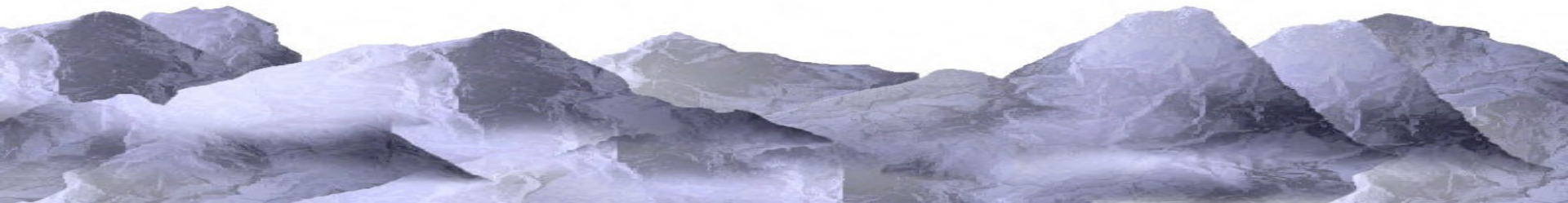
Psychedelics

- "psychedelic" comes from the Greek words psyche (mind, soul) and deloun (to manifest)



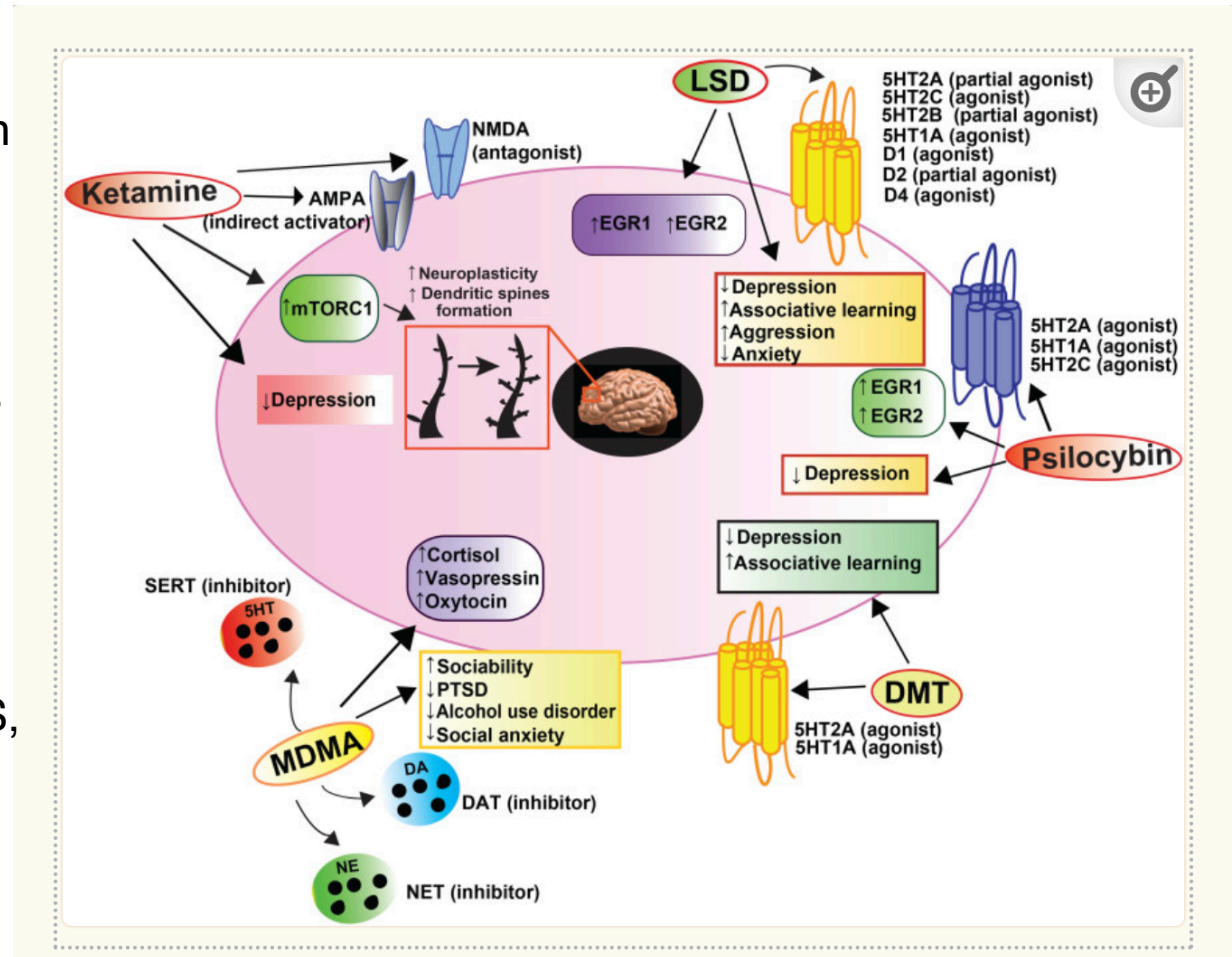
Type of Psychedelics

- LSD (Lysergic acid diethylamide) is made from a substance found in ergot, which is a fungus that infects rye.³
- Psilocybin is a naturally occurring substance found in mushrooms
- Mescaline is derived from the Mexican peyote and San Pedro cactus and produces similar effects to LSD.⁵
- DMT (Dimethyltryptamine) is structurally similar to psilocin, an alkaloid found in psilocybin mushrooms. It can be synthesised in the laboratory but is also a naturally occurring component of several plants.⁴
- 2C-B (4-Bromo-2,5-dimethoxyphenethylamine) is a psychedelic drug first synthesized in 1974. 2C-B is considered both a psychedelic and a mild entactogenic. 'Entactogen' means 'touching within'
- Peyote (*Lophophora williamsii*) psychedelic cactus, although the smallest and slowest growing. Instead of growing upward to form a column, it grows as 'buttons' low to the ground. It has been used by Native Americans for over 5000 years.⁵
- 25[-x]-NBOMe (N-methoxybenzyl) is the name for a series of drugs that have psychedelics effects. Reports indicate that there are a number of different versions of NBOMe available – all with differing effects.
 - N-Bomb, Bom-25, 2C-I-NBOMe, 25-I-NBOMe, 25I, Pandora, Solaris, Divination, Wizard, and Smiley Paper



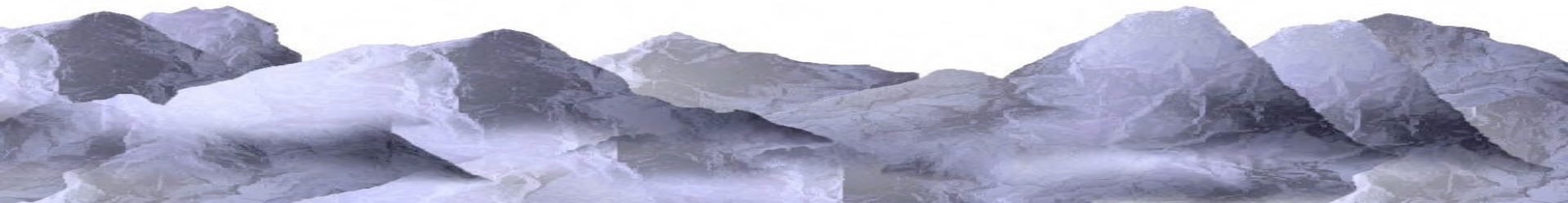
Mechanism of Action

- Binding to serotonin 5-HT2A receptors, which are located on the surface of neurons throughout the brain
- SSRIs + psychedelics can increase risk serotonin syndrome
- Mydriasis, Shivering, Tachycardia, AMS, **Hyperreflexive, clonus**



Physical Exam

- Vitals: Temp, BP, HR, RR increased
- General: alertness and orientation may be off from baseline; diaphoretic
- HEENT: mydriasis, xerostomia, nystagmus
- Respiratory: increased respiratory rate
- Cardiovascular: increased heart rate and blood pressure
- Skin: hyperhidrosis (increased sweating)
- Neurologic: impaired coordination
- Psychiatric: auditory and visual hallucinations, panic, psychosis, paranoia, synesthesia, time perturbations, emotional lability, aggression, depersonalization, suicidal ideation, religiosity, depression



Risks and Treatment

- Higher risk younger age and mixing with other substances
- Dehydration, over heating, reports of seizures
- Of those who seek EMT care 46% hospital admission
- Low mortality overall, except when injected
 - Injected LSD, attempt to expand effects of micro dosing
 - septic shock, DIC, multi-organ failure essentially fungal septicemia

Management: Supportive

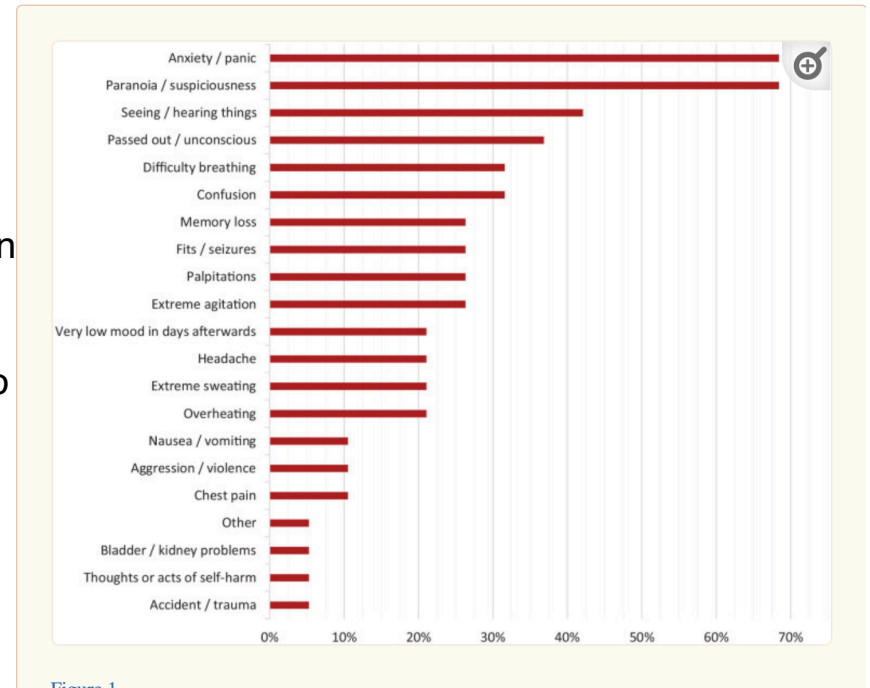


Figure 1

SIDE EFFECTS REPORTED



Amanita phalloides – Death cap



Amanita phalloides

Death caps², photograph by Adolf Ceska.



Deadly

Medium to somewhat large introduced European mushrooms that grow from the ground near introduced broadleaved trees in urban and suburban environments along the Pacific coast. They often have a rather tall stature.



Gills: Narrowly attached to free, white



Spore print: White

GI Phase: N/V, diarrhea, abd pain

Latent Phase: 12-36 hours

Hepatorenal Phase: liver kidney failure



Part II: Background and General Principles



Background: Types of Tox Emergencies

- Accidental poisoning
 - Dosage errors
 - Idiosyncratic reactions
 - Childhood poisoning
 - Environmental exposure
 - Occupational exposure
- Intentional poisoning/overdose
 - Chemical warfare
 - Assault/homicide
 - Suicide
- Drug/alcohol abuse



Background:

Poisoning by Ingestion

- 80% of accidental ingestions occur in kiddos
 - 1-3 year olds
 - Household products
- Poisoning in adults usually intentional
 - Accidental from exposure to chemicals in workplace
- Toxic effects may be immediate or delayed
 - **Depends on substance and body mass**

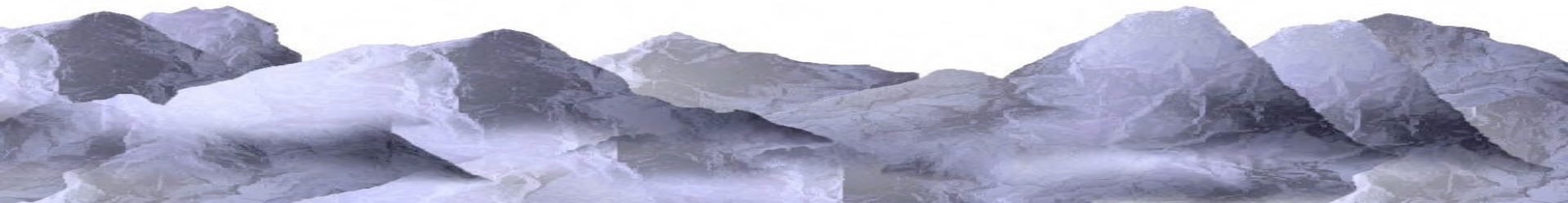
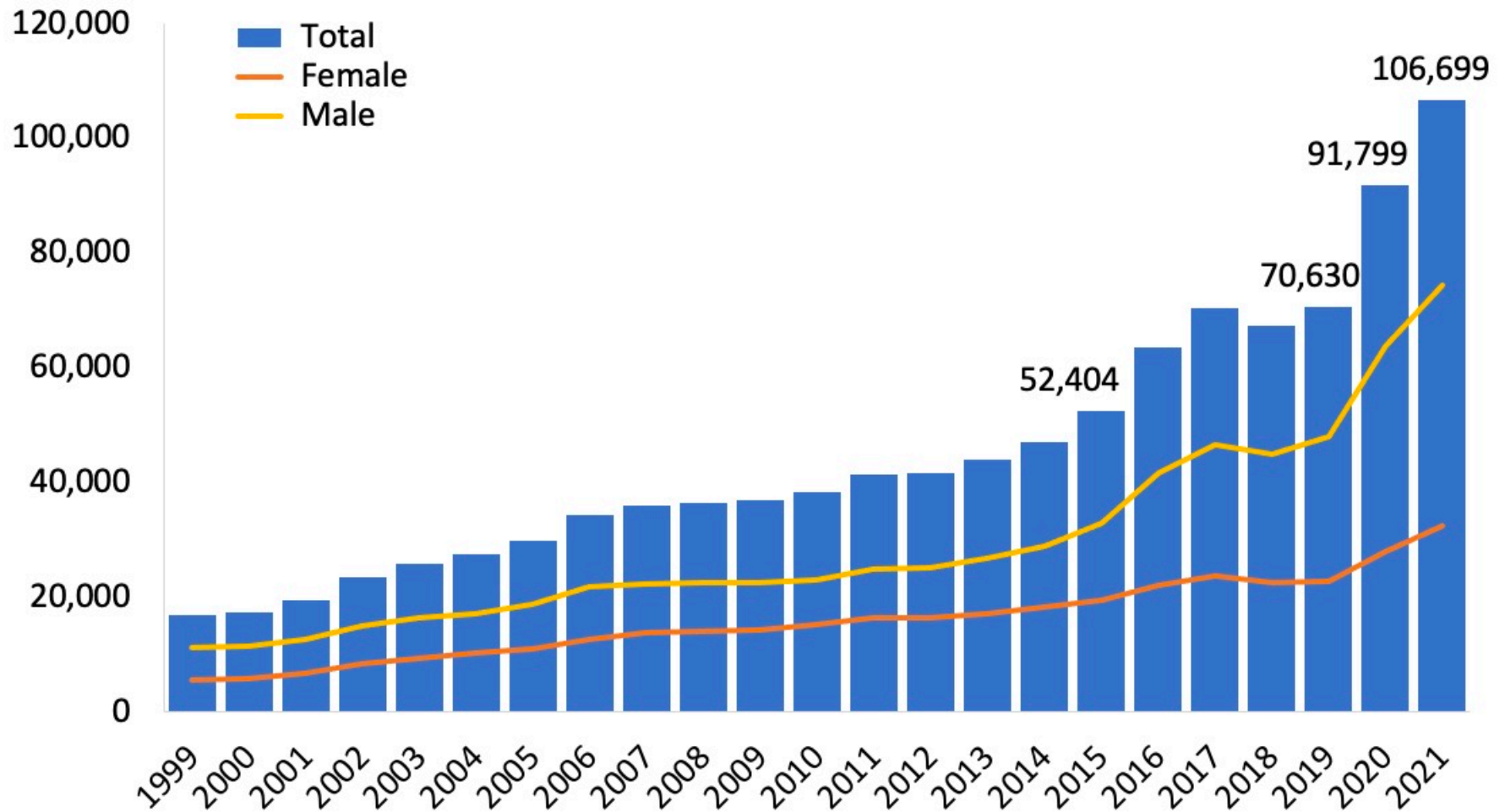


Figure 1. National Drug-Involved Overdose Deaths*, Number Among All Ages, by Gender, 1999-2021



*Includes deaths with underlying causes of unintentional drug poisoning (X40–X44), suicide drug poisoning (X60–X64), homicide drug poisoning (X85), or drug poisoning of undetermined intent (Y10–Y14), as coded in the International Classification of Diseases, 10th Revision. Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2021 on CDC WONDER Online Database, released 1/2023.

General Principles

The ABCs of Toxicology are...

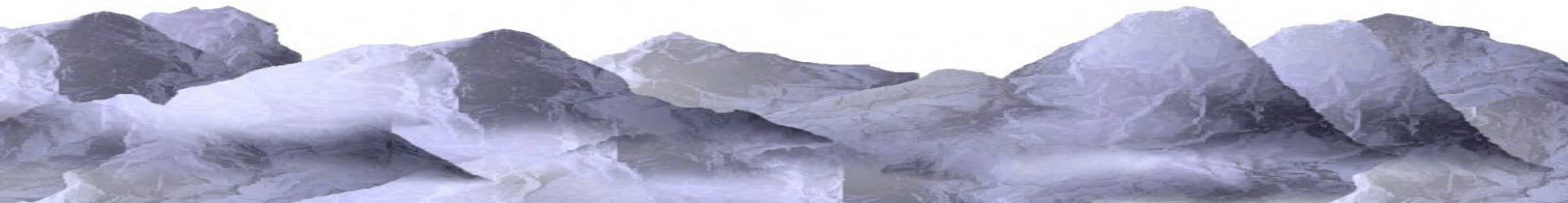
Airway

Breathing

Circulation/**C**spine

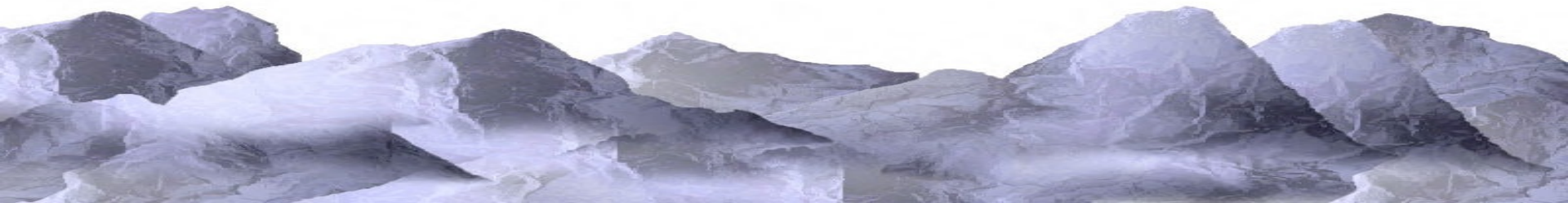
Decontamination/**D**extrose

Enhanced elimination/**E**xpose



General Guidelines

- Scene Safety
- **Time of ingestion**
- Obtain ingested substances or containers safely
- Co-ingestions?



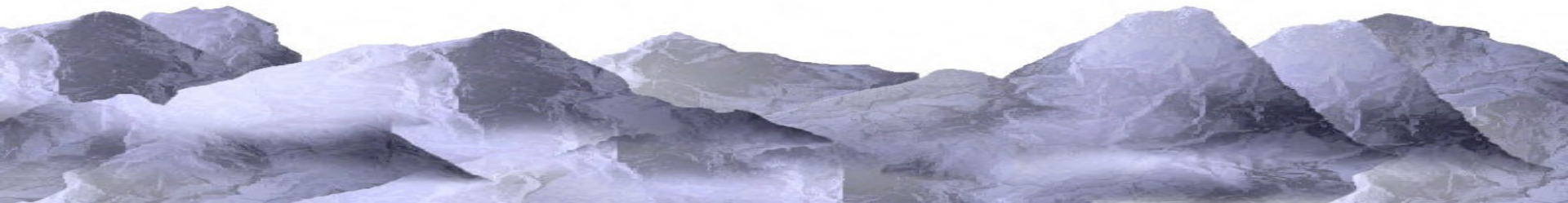
Risk Stratification

- Once you know what's wrong, how worried should you be?
- 3 major factors
 - **Drug**
 - **Dose**
 - **Patient**



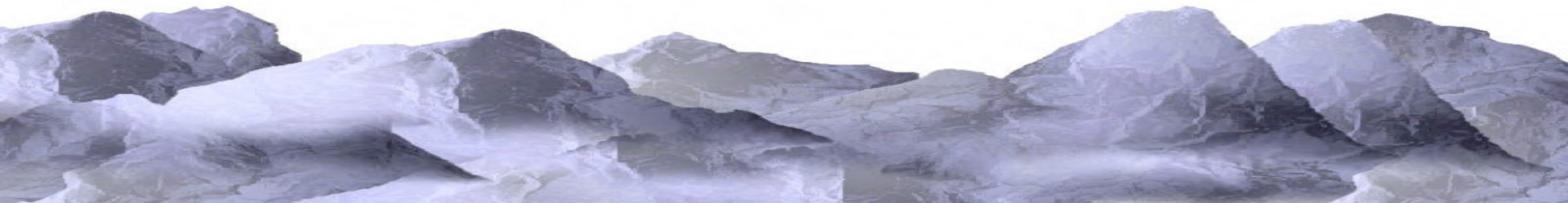
Toxicology Physical Exam

- **Skin** (moisture, alopecia, rashes, burns)
- **HEENT** (pupil size and reactivity, nystagmus, mucus membranes, gingiva)
- **Lungs** (wheezing, crackles, respiratory rate and depth)
- **Cardiovascular** (ectopy, gallops, wide QRS)
- **Abdomen** (bowel sounds, bladder size)

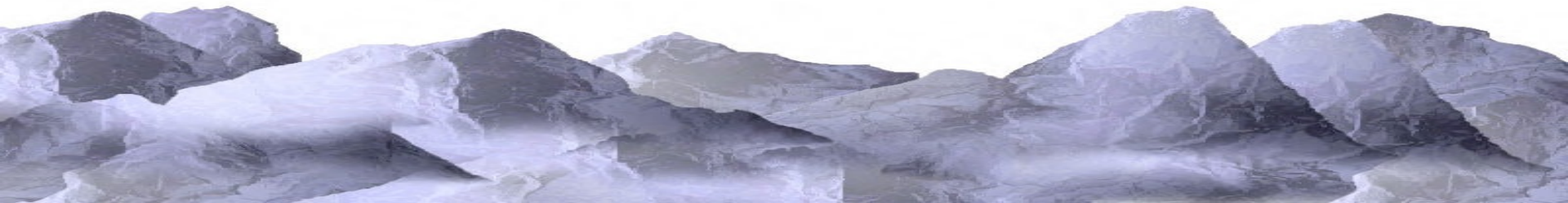


Assessment and Management

- Five signs of major toxicity
 - CNS
 - Agitation, depression, delirium, seizures
 - Cardiac (EKG)
 - GI (did they vomit?)
 - Respiratory depression
 - Hypotension or hypertension



Decontamination



AHLS for Tox-Medics™

General Decon

Decon

Chemical Incidents

Skin

Use Dry-Wet-Dry Decon with soap & tepid water, washing for 3 minutes. Acids & bases should be irrigated until wound pH = 7.

Eye

Irrigate for a minimum of 20 minutes, ideally continue during transport, if resources allow. Acids & bases should be irrigated until eye pH = 7.

Biological Incidents

Skin

Generally not necessary & may be done at home by patient

Eye

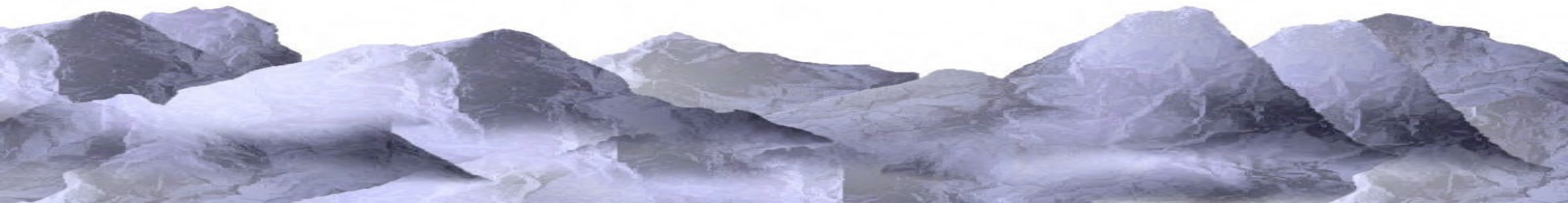
Generally not indicated

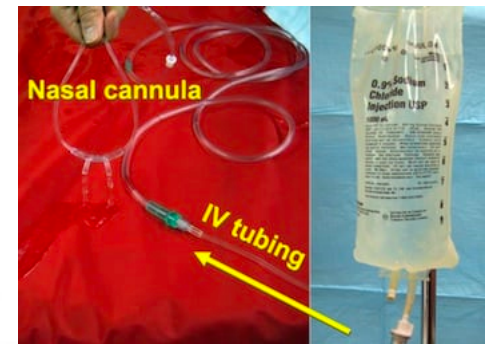
Radiation & Nuclear Incidents

Patient treatment takes priority over decon. Use a detector to locate contaminants.

Medically stable patients:

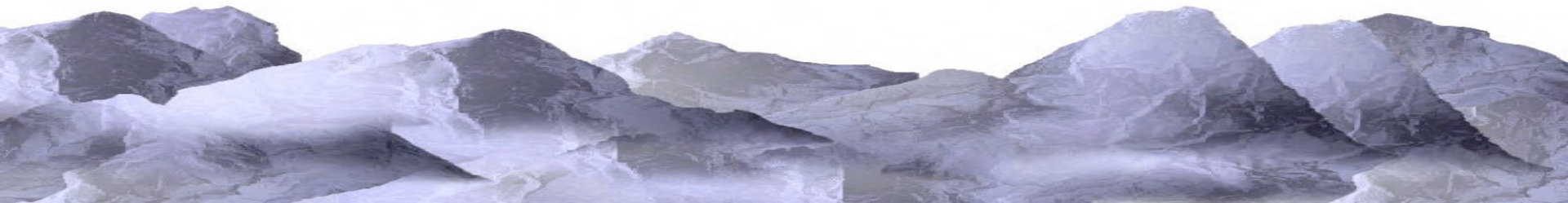
- Dry: Remove contaminated clothing & roll contamination up within clothing. Consider removing powders with towels or lint-removing adhesive roller
- Wet: Identify skin contaminants, use moist gauze, gently wiping until detector reads $\leq 2x$ the background radiation level. Avoid skin irritation.
- Dry: Use non-abrasive material.





Decontamination

- GI Decontamination
 - Goal is to prevent toxic substance from reaching small intestine
 - For patients with very toxic substance but no good antidote



Syrup of Ipecac

- Not recommended for routine use
 - Complications
 - Many contraindications
 - Induces vomiting
 - Not proven to improve outcomes



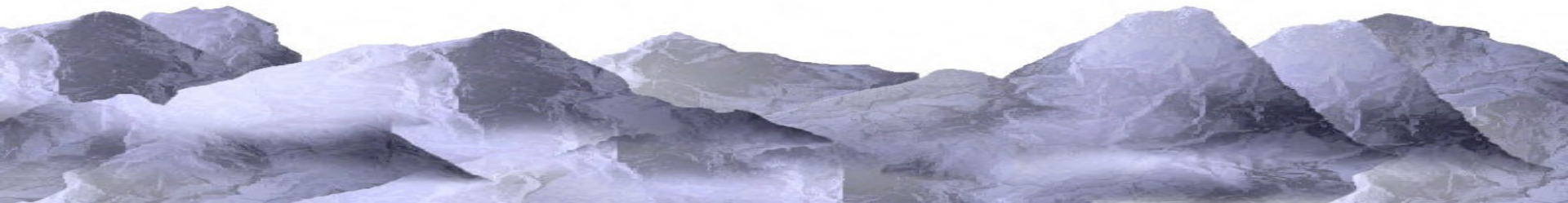
Activated Charcoal

- Nontoxic wood product
- Adsorbs many toxins
- Most effective in first hour
- Beware in pt with AMS
- Not used for:
 - Caustics
 - Ethanol & the toxic alcohols
 - Metals



Gastric Lavage

- Recovery of gastric contents
 - Within 1 hour of ingestion
 - Limited effectiveness
 - Large-bore orogastric tube
- Contraindications:
 - Altered LOC with unprotected airway
 - Low-viscosity agents
 - Caustics





Diphenhydramine



Methocarbamol

Aspirin



Acetaminophen



Clonidine

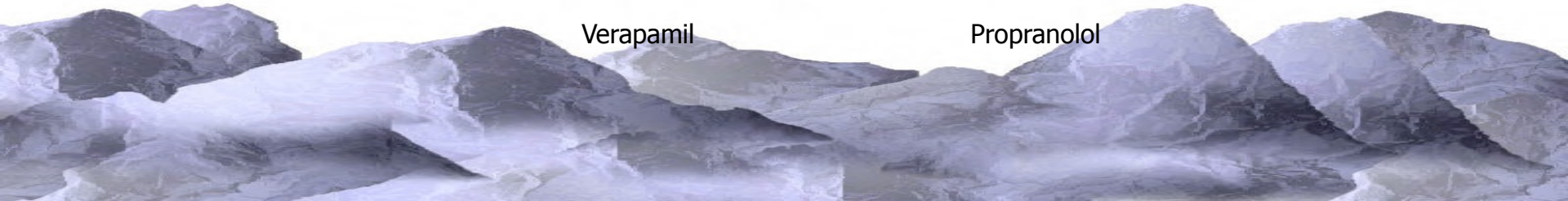
Dilantin

Digoxin

Metoprolol

Verapamil

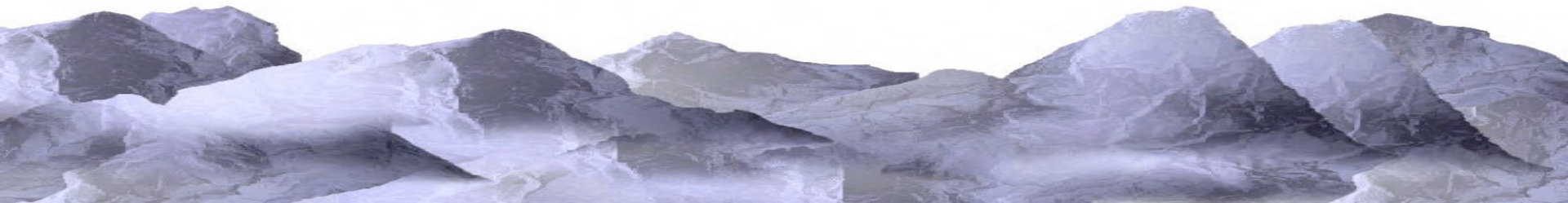
Propranolol



Whole Bowel Irrigation

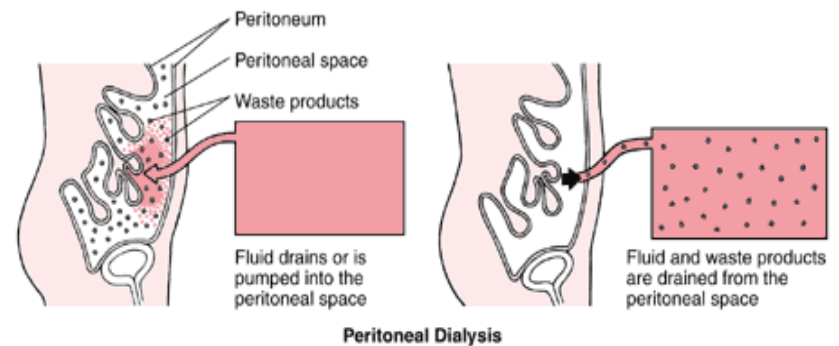
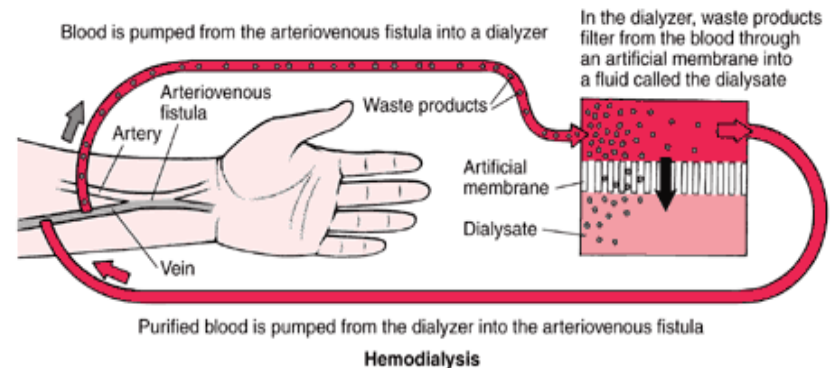


- Indications
 - Body Packers
 - Sustained release preparations with significant toxicity
 - Things that may not bind charcoal



Enhanced elimination

- Hemodialysis
- Urinary alkalization (bicarbonate drip)
- Multiple dose charcoal





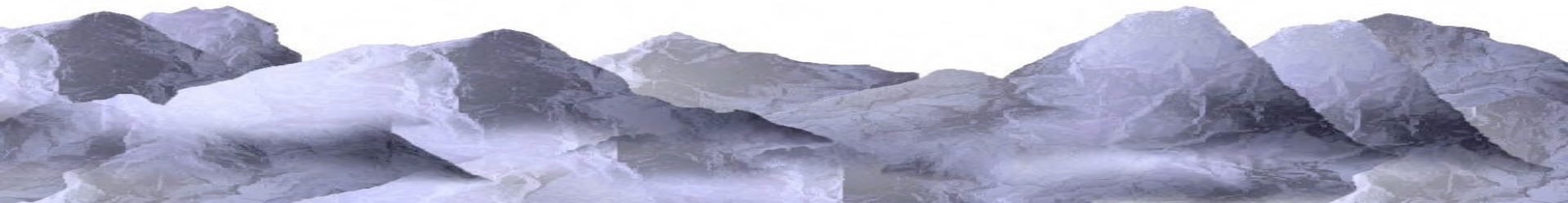


















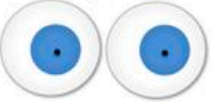






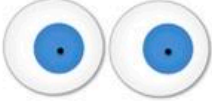
















Part III: Toxidromes



Toxidrome

- Signs & symptoms referable to one toxic substance or class of toxic substances
- 5 Toxidromes
- Utilized with unknowns
 - Wet
 - Dry
 - Cold
 - Hot



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

Opioid Toxidrome

- Opioid
 - Opiates: morphine, heroine, codine
 - Opioids: synthesized (methadone, fentanyl, hydrocodone)
- Triad
 - Miosis
 - Respiratory Depression
 - Altered Mental Status

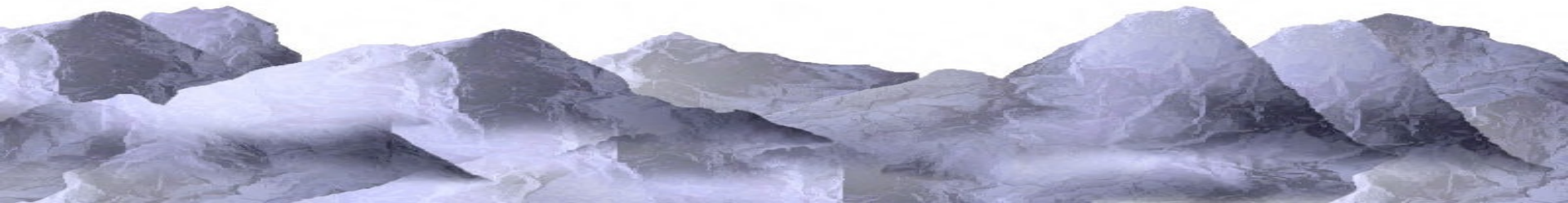
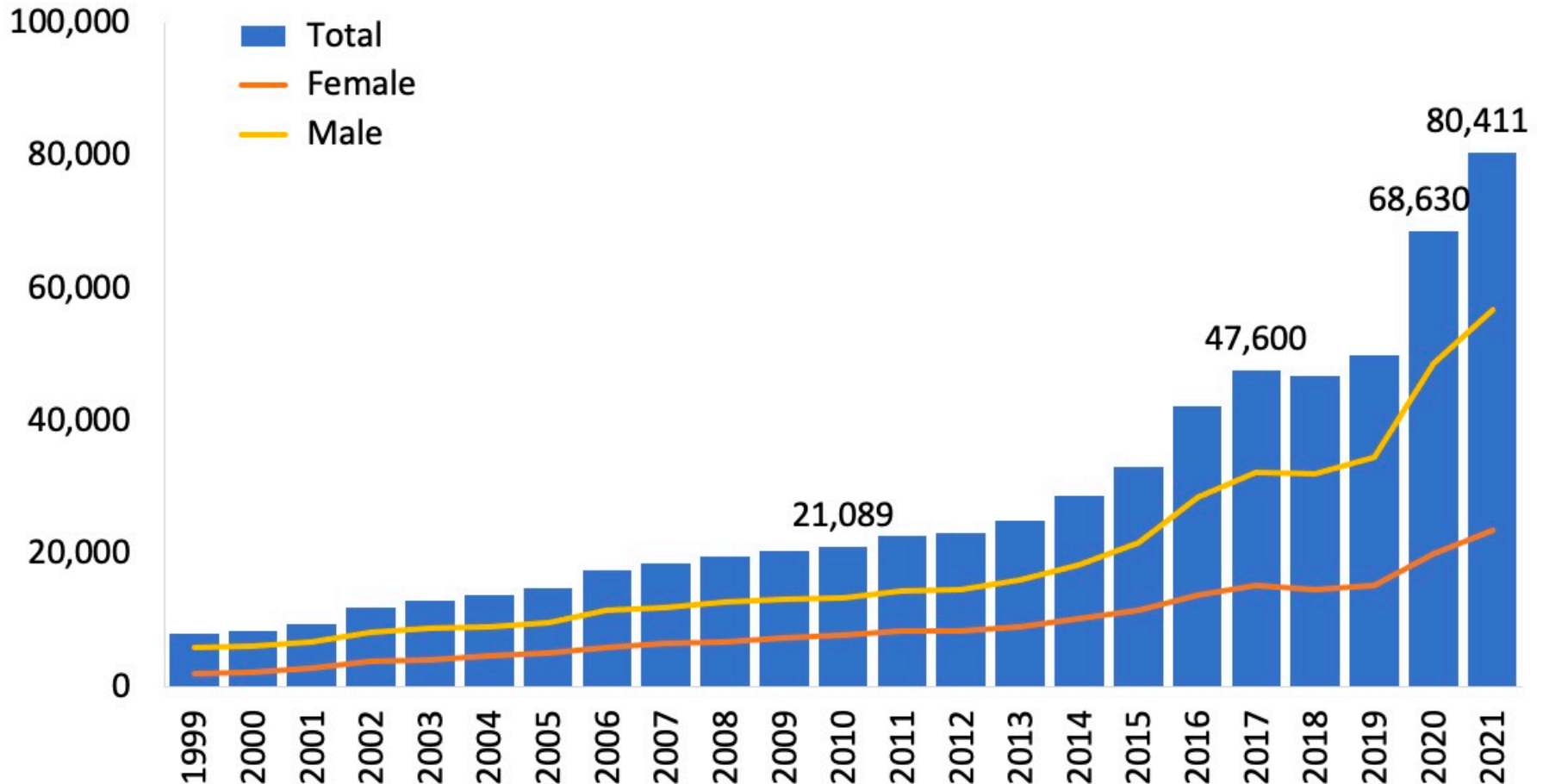


Figure 3. National Overdose Deaths Involving Any Opioid*, Number Among All Ages, by Gender, 1999-2021



*Among deaths with drug overdose as the underlying cause, the “any opioid” subcategory was determined by the following ICD-10 multiple cause-of-death codes: natural and semi-synthetic opioids (T40.2), methadone (T40.3), other synthetic opioids (other than methadone) (T40.4), or heroin (T40.1). Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2021 on CDC WONDER Online Database, released 1/2023.

Naloxone

- Opioid Antagonist
- Utilize in small, incremental doses starting low
 - Synthetics
- Ventilation Life Saving
- Major untoward effect is vomiting
- Know desired clinical effect
- Re-dose based on needs
 - Half Life ~2hr (4mg)



Sedative Hypnotic Toxidrome

- Can look similar to Opioid but no pupillary changes
- Binds to GABA receptors
- Increased Mortality when combined with Opioids
- Types:
 - Phenobarbital, Barbiturates, GHB, benzodiazepines
 - Street names: Lilly, pink ladies, Christmas Trees, goof balls
- Treatment
 - Supportive
 - Narcan? won't be very effective on respiratory depression



Cholinergic Toxidrome

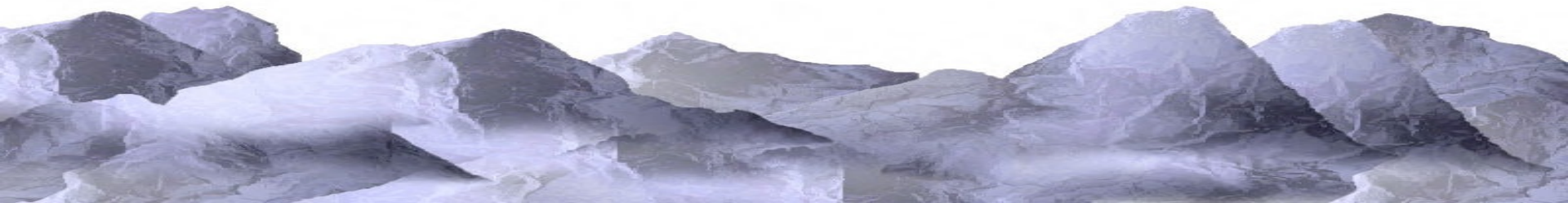
- **Cholinergic**

- Organophosphates, carbamates (pesticides/warfare/
Sarin, [Amanita muscaria](#))
- CNS
 - Weakness, fasciculations
- “SLUDGE”
 - Salivation, lacrimation, urination, defecation, gastric (diarrhea), emesis
- Killer Bs
 - Bradycardia, bronchorrhea, bronchospasm



Treatment of Organophosphate Poisoning

- **Decon:** Protective clothing to prevent secondary poisoning to health care workers, handle and dispose of all cloths as hazardous waste; wash patient with soap and water; handle and dispose of water runoff as hazardous waste
- **Atropine:**
 - every 5min until tracheobronchial secretions stop
 - 2mg IV/IO in adult
 - Age <10: 0.02 mg/kg IV/IO or 0.04 mg/kg IM
- **Seizures:** Benzos
- **Pralidoxime:** 1-2 gm for adults or 20-40mg/kg up to 1gm in children, infuse over 5-10min IV, not recommended for symptomatic patients, effectiveness controversial



The Streak

- 23 M found naked in the park
 - HR: 120 ,BP: 155/90
 - Skin hot and dry with no track marks
 - Pupils 5 mm non-reactive
 - Responding to internal stimuli
 - Non-focal neuro exam
 - Picking at things in the air



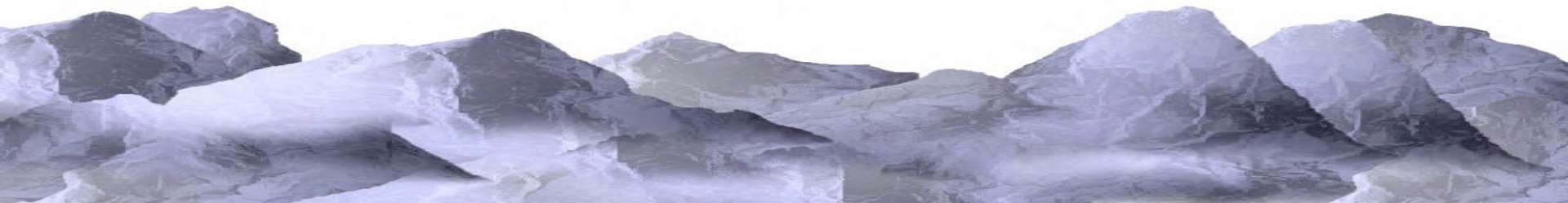
Anticholinergic Toxidrome

- ☠ Red as a Beet
- ☠ Hot as a Hare
- ☠ Mad as a Hatter
- ☠ Blind as a Bat
- ☠ Dry as a Bone
- ☠ Full as a flask
(can't urinate)
- ☠ Seizing like a Squirrel
- ☠ Tachy like a pink flamingo



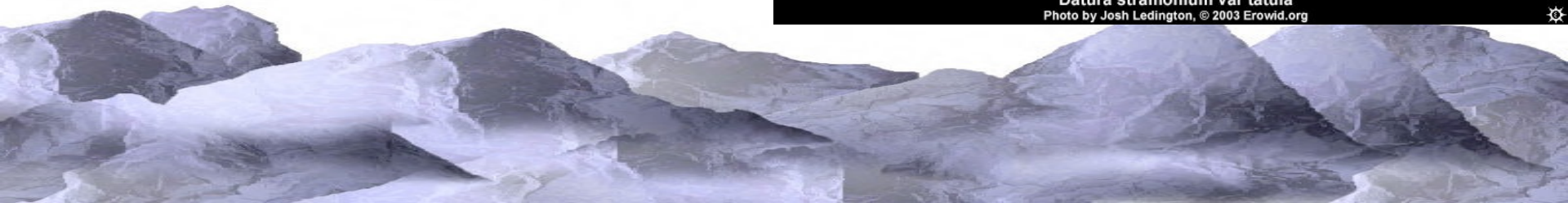
Anticholinergic Toxidrome

- What are the potential “bad” complications?
- What substances can cause this presentation?
- How should this patient be managed?



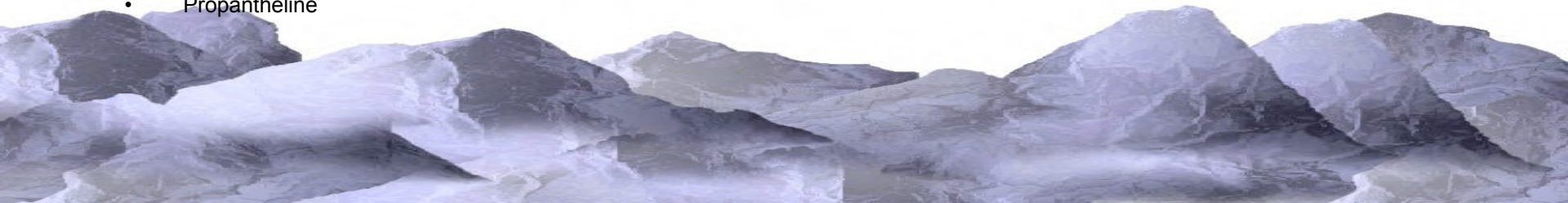
Badness

- Overly agitated
- Hyperthermia
- Self-injury
- Seizures
- EKG changes
- Hypoglycemia



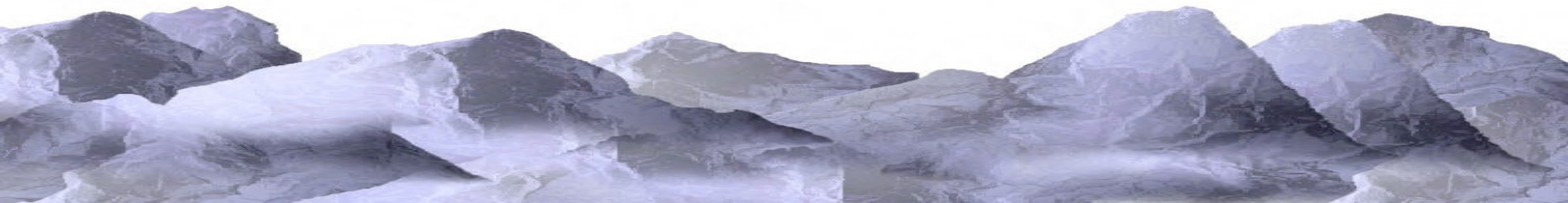
Anticholinergic Substances

- Anticholinergics
 - Atropine, scopolamine
 - Glycopyrrolate
 - Benztropine, trihexyphenidyl
- Antihistamines
 - Chlorpheniramine
 - Cyproheptadine
 - Doxylamine
 - Hydroxyzine
 - Dimenhydrinate
 - Diphenhydramine
 - Meclizine
 - Promethazine
- Antipsychotics
 - Chlorpromazine
 - Clozapine
 - Mesoridazine
 - Olanzapine
 - Quetiapine
 - Thioridazine
- Antispasmodics
- Clidinium
- Dicyclomine
- Hyoscyamine
- Oxybutynin
- Propantheline
- Mydriatics
 - Cyclopentolate
 - Homatropine
 - Tropicamide
- Plants
 - *Amanita muscaria* (fly agaric)
 - *Amanita pantherina* (panther mushroom)
 - *Arctium lappa* (burdock root)
 - *Atropa belladonna* (deadly nightshade)
 - *Cestrum nocturnum* (night blooming jessamine)
 - *Datura suaveolens* (angel's trumpet)
 - *Datura stramonium* (jimson weed)
 - *Hyoscyamus niger* (black henbane)
 - *Lantana camara* (red sage)
 - *Solanum carolinensis* (wild tomato)
 - *Solanum dulcamara* (bittersweet)
 - *Solanum pseudocapsicum* (Jerusalem cherry)
 - *Solanum tuberosum* (potato)
- Miscellaneous other meds including carbamazepine, cyclobenzaprine, etc.
- Cyclic antidepressants



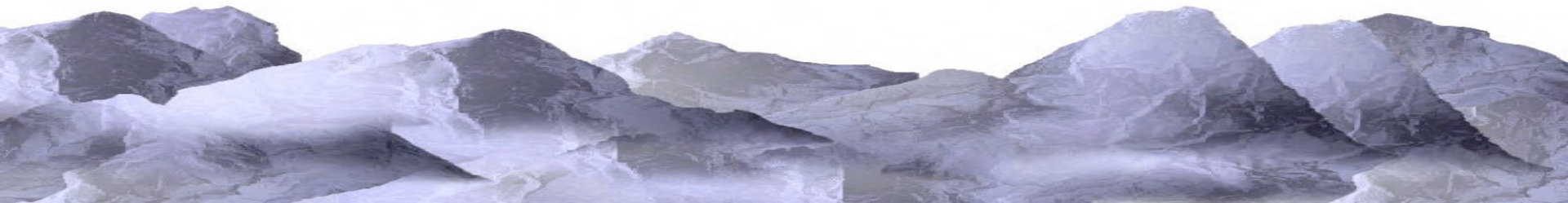
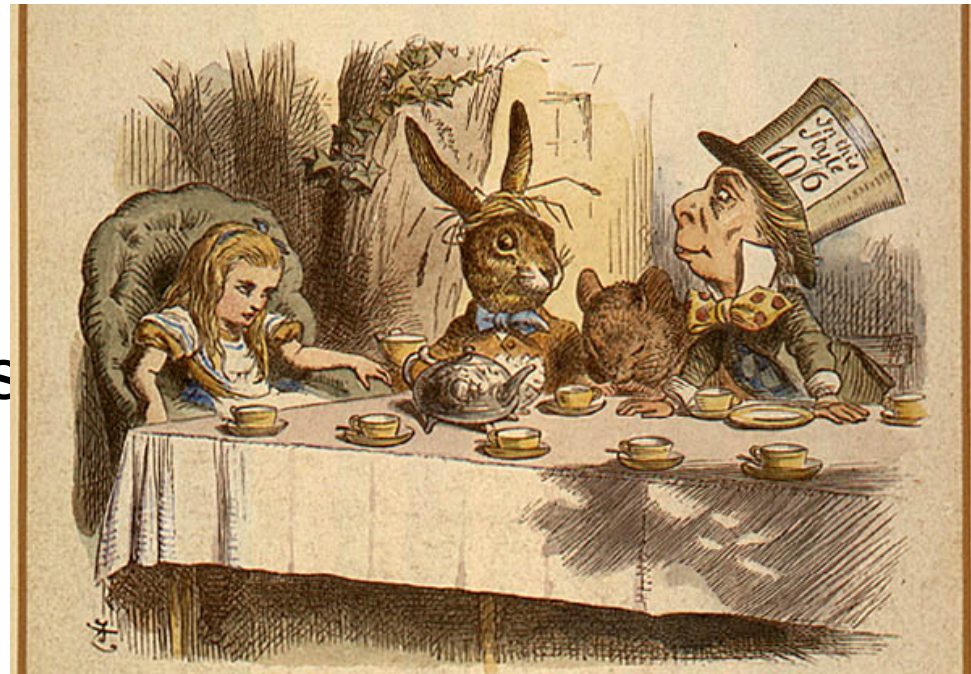
Biggies

- Diphenhydramine
- Plants
 - Jimson Weed



Treatment

- Treatment for agitation or seizures
 - **Benzos, benzos, benzos**
- IVF
- Look for EKG findings (**QRS, give bicarb**)
- Physostigmine and intra-lipid



Sympathomimetic Toxidromes

- **Sympathomimetics**

- Cocaine, methamphetamines, methylphenidate...

- Tachycardic, hypertensive

- Psychomotor agitation

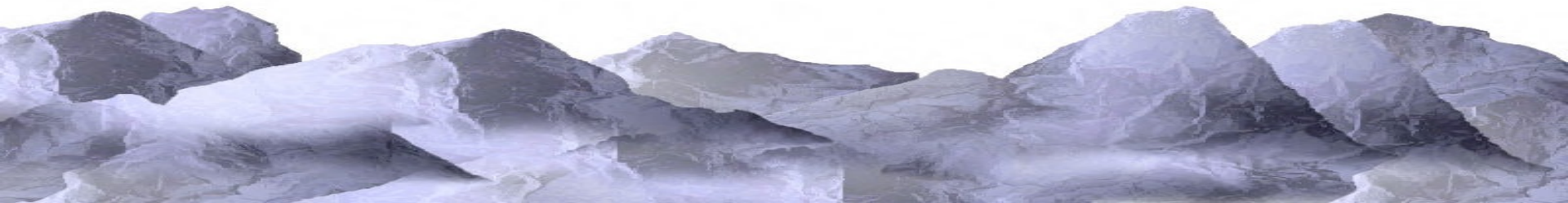
- Mydriasis



- Similar to anticholinergic toxidrome except...

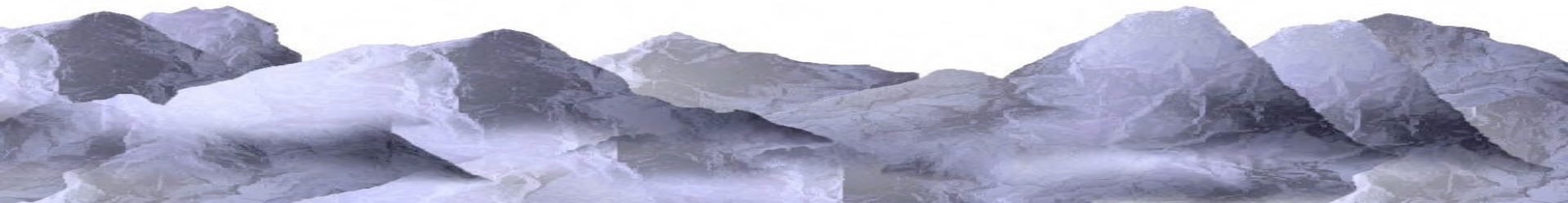
Diaphoresis (sweating)

Treatment: supportive care, benzos, avoid beta blockers



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Poison & Drug Center
Call often & call early!





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