

Bites and Stings: the venomous truth



Susanne J Spano, MD, FACEP
Director, Wilderness Medical Education
UCSF Fresno
Assistant Clinical Professor, UCSF
May 24, 2017

Objectives:

- Identify venomous snakes & spiders
- Develop treatment strategies for potential envenomations
- Distinguish limb-threatening from life-threatening envenomations







Question:

- Package # 1: Take a look at the specimen on your table. Identify the specimen and state some of the clinical side effects of its bite.

**Latrodectus
mactans or
hesperus :
Black Widow**



Spiders



- Black Widow (*Latrodectus*)
- Common worldwide
 - all species have similar clinical presentation
- North American Species
 - Black widow spider (*L. hesperus*)
 - Red-backed spider (*L. mactans*)
 - Brown widow spider (*L. geometricus*)
 - Red-legged widow (*L. bishopi*)

Latrodectus geometricus: **Brown widow**



**Latrodectus
bishopi:
Redleg
Spider**



Latrodectus Bites

- Relatively Aggressive spiders
 - Outhouses, dumps, woodpiles
 - Immediate pinprick
- GI: N/V +/- Cramps
- MS: Muscle spasms, Rigid abdomen
- Peds: seizure or fasciculations



Lactrodectus treatment

- Calcium gluconate?
 - Case review: 163 bites graded 1-3 (severity)
 - 96% of grade 2 & 3 bites required opioids/analgesia after Ca+Gluconate



Question

- Package # 2: Look at your spider. Do these spiders live in California?



Hobo Spider



Spiders: necrotic bites?

- Brown Recluse: *Loxosceles* species
- Reclusive Spliders
 - Woodpiles, cellars
 - Delayed pain
- Local effects: Volcano Lesions
 - NO Ice
- RX: Dapsone, HBO, surgery
 - No Antivenom in US (+ S. America)

**Brown
Recluse
bite at six
hours**

**Brown
recluse
bite with
early
central
necrosis**





**Brown
Recluse Eschar**

Brown Recluse



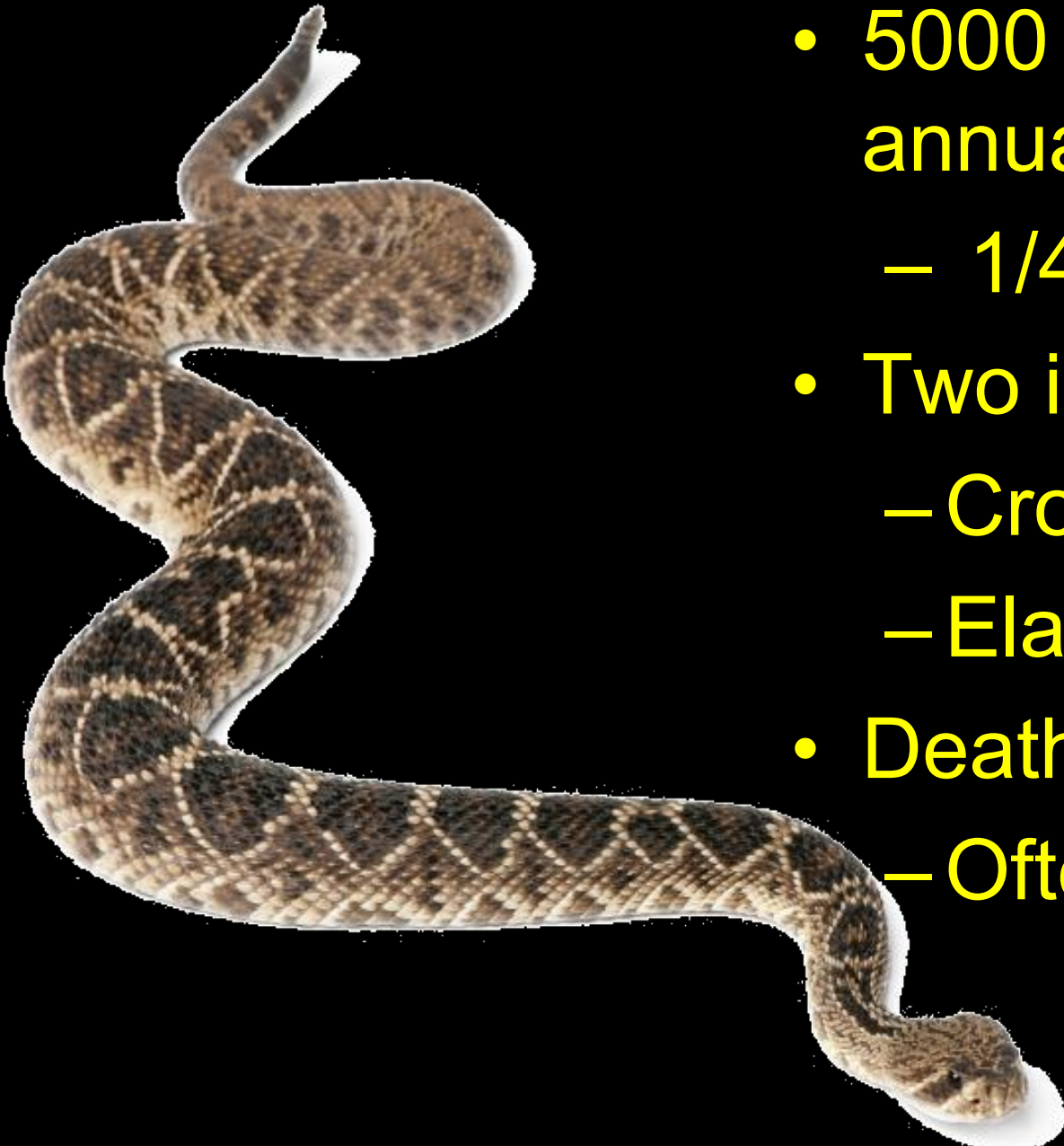
Question

- Package # 3: You have just been bitten by the specimen on your table.

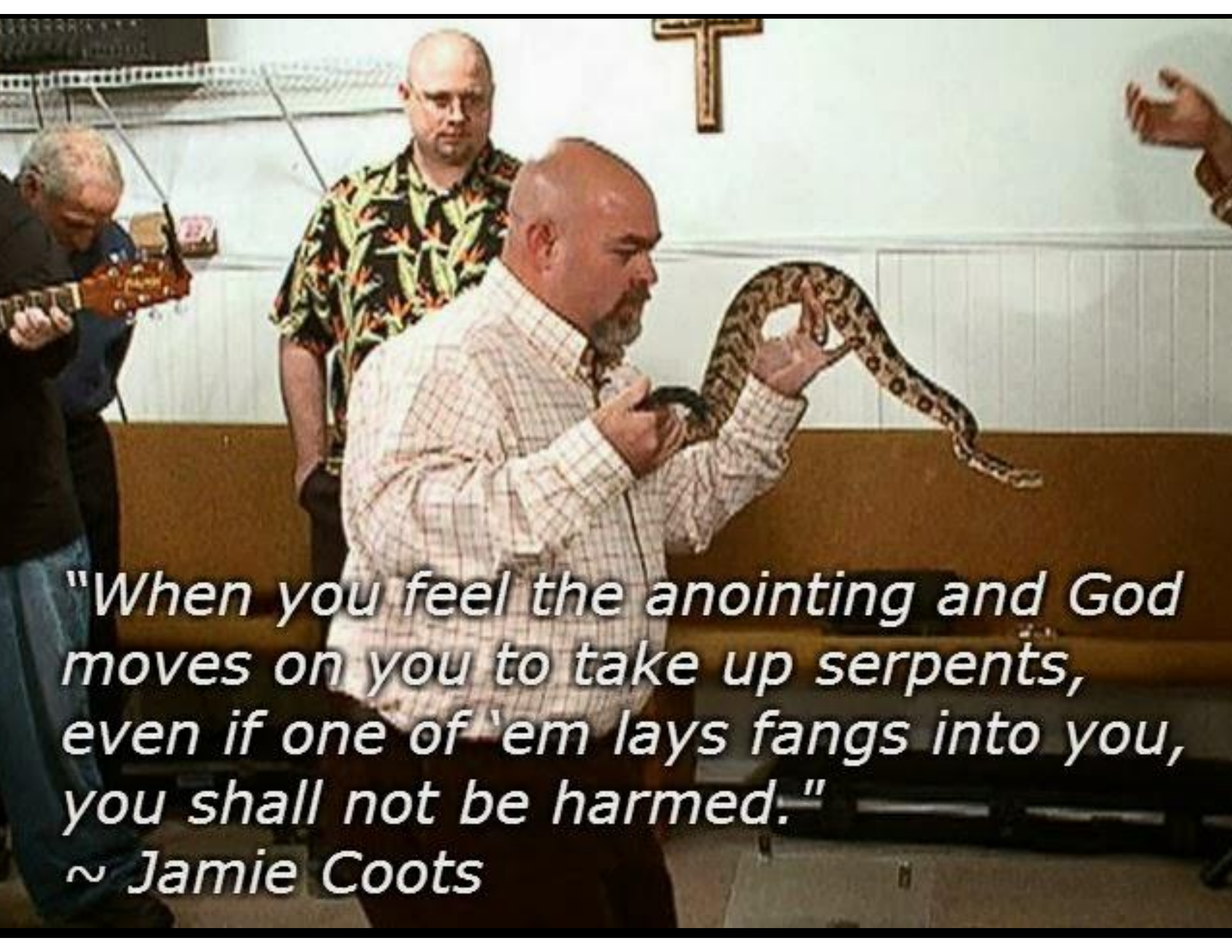


- Do you anticipate a clinically significant envenomation?

Snakes



- 5000 American bites annually (underreported*)
 - 1/4 are poisonous
- Two indigenous families:
 - Crotalidae (pit vipers)
 - Elapidae (coral)
- Death in 0.5%
 - Often a delay in care



"When you feel the anointing and God moves on you to take up serpents, even if one of 'em lays fangs into you, you shall not be harmed."

~ Jamie Coots

Question

- Package # 4: You have several snakes. Are they all in the same





Family Crotalidae

- Crotalids have triangular-shaped heads
- Elliptical pupils (daylight)
- Mobile Front Fangs (retractable)
- Infrared heat-sensing pits (“pit viper”)
 - enable them to locate prey
 - guide the direction of strike
 - determine the amount of venom released
- +/- Rattle
- Single row of subcaudal scales

RATTLESNAKES

HAVE BEEN OBSERVED

PLEASE

STAY ON SIDEWALKS

Question

- Package # 5: Snake parts! Please itemize all the distinguishing features of Crotiladae you can see on these parts.

Copper head Snake



Vertical Pupils

← Infrared sensory pit

Triangular head



Rattlesnakes

- “Hemato-paths”
 - Exception!
 - Mojave ‘two-step’
 - Neurotoxic
- Venom directly injures cells
 - Swelling, ecchymosis, necrosis, pain
 - Coagulation: ↓platelets, ↓fibrinogen =>DIC



Rattlesnake bite at 30 minutes



Rattlesnake bite of the arm



Rattlesnake Bite Management

- Tourniquets?
 - ↓ venom spread (lymphatic)
- Incision and suction?
 - Only in Australia!
 - Oral flora contamination
 - Neurovascular injury



Cardinal Sins of Rattlesnake Rx

1. Inadequate or delayed antivenom
 - Systemic effects
 - Hypotension
 - Confusion
 - Nausea/Vomiting
 - Paresthesias or fasciculations
2. Consulting a surgeon

Size Matters?



Question

- Package # 6: Is this a venomous snake?



Coral Snake



Family Elapidae





Dangerous?



Bees & Wasps

- Lethal dose of venom?
 - 19 stings/kg
 - 500-1,400 stings per human
- Systemic Toxicity
 - Can be delayed 8-24 hours
 - More likely if >50 stings
(Africanized bees)



Question

- Package # 7: Name the signs and symptoms that would cause you to administer this medicine.



Anaphylaxis (IgE Mediated)

- Respiratory first
 - Laryngeal Edema
 - Bronchospasm
 - Stridor
- Circulatory collapse
 - ↓ Blood pressure, arrhythmias, arrest
- Cause of most sting deaths
 - Usually only 1-2 stings (onset 10-30 min)
 - 50/yr

Africanized Honey Bees

- “Killer Bees” = ↑ # of stings
- Personality problem = swarming
- Venom symptoms:
 - Nausea
 - Vomiting
 - Headache



Yellow jackets

- Solitary attack, ground nest
- Can swarm, but not in massive #s



The National Commission, based in Denver, Colo., is a research project on the Education Commission of the States. It is funded by the National

Women may enter the traditional male professions.

"Curriculum must be unbiased to give women the opportunity to make their own

get credit, just as the women have females in physical sciences. In the biological sciences, however, males and females are about even.

In U.S. by 1988

Killer bees getting closer

By CHARLES W. BELL

Ann Arbor, Mich. (UPI) — So-called killer bees from South America will cross into the United States by 1988 even if the U.S. government carries out a proposed full-scale battle to stem their invasion, entomologist Orley R. Taylor says.

Taylor, an entomologist from the University of Kansas, told

1988 and 1994."

But Taylor said Americans should not panic as the bees get closer, despite recent stories that they can cause a wave of death to humans and animals.

"It's not like some science fiction scare story," he said. "Not all of them are aggressive all the time, and there's nothing to suggest they are a

narrow isthmus of Panama to genetic and chemical warfare.

Taylor said he doubted anything would completely stop the bees.

The bees, a strain originating in South Africa, began swarming north in 1957 after their escape from a Sao Paulo research station.

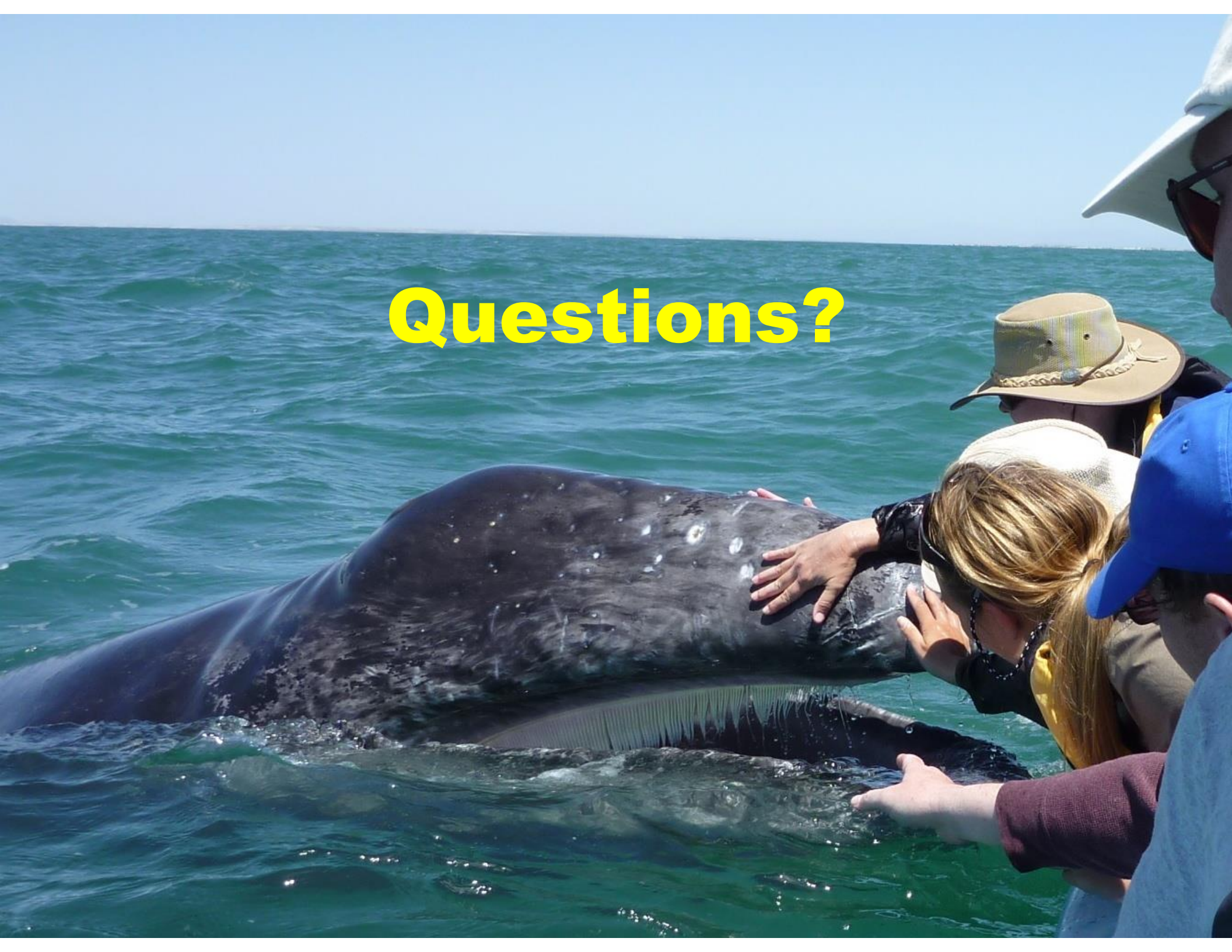
Taylor said experts have

Summary

- ❖ Avoid concentrating venom
 - NO ice, NO constriction
- ❖ Identify Crotalids
 - Triangle Head, Rattle
- ❖ Rattlesnake bite= Antivenom
- ❖ Stings: Recognize anaphylaxis
- ❖ Stay alive, get inside!



Questions?



- Please feel free to come look at the more fragile specimens during the break
 - Rattlesnake skull
 - Western Diamondback snake specimen

References

1. Clark RF, Wethern-Kestner S, Vance MV, Gerkin R. Clinical presentation and treatment of black widow spider envenomation: a review of 163 cases. *Ann Emerg Med.* 1992, 21:782-7.
2. Dart et al. Black Widow Spider Antivenin for Patients With Systemic Latrodectism, Phase III trial. 2011. Currently recruiting patients.
3. Peterson ME. Black widow spider envenomation. *Clin Tech Small Anim Pract.* 2006. 21:187-90.
4. Spiller HA, Bosse GM, Ryan ML. Use of antivenom for snakebites reported to United States poison centers. *Am J Emerg Med.* 2010. 28:780-5.
5. Hall EL. Role of surgical Intervention in the management of crotaline snake envenomation. *Ann Emerg Med.* 2001. 37:175-180.
6. Alberts MB, Shalit M, LoGalbo F. Suction for venomous snakebite: A study of “mock venom” extraction in a human model. *Ann Emerg Med.* 2004. 43:181-6.
7. Dart RC, Seifert SA, Biyer LV, et al. A randomized multicenter trial of crotaline polyvalent immune Fab (ovine) antivenom for the treatment for crotaline snakebite in the United States. *Arch Intern Med.* 2001. 161:2030-2036.
8. James D, Bush S, Kolluru G. Large snake size suggests increased snakebite severity in patients bitten by rattlesnakes in Southern California. *Wilderness & Environmental Medicine.* 2010. 21:120-126.