Snake Safety in Idaho: Living, Recreating, and Working Safely in Rattlesnake Country

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Modified after previous presentations by Sarah Cooper-Doering, John Lee, Chris Jenkins, and Scott Cambrin.
Outline

• Idaho Snake Identification
• Rattlesnake Natural History
• What is the risk of snake bite?
• How can you avoid being bitten?
• What are the consequences of snake bite?
• What should you do if bitten?
• Live snake demonstration
• Questions?
Snakes of Idaho

**Boidae**
- Northern Rubber Boa

**Colubridae**
- Racer
- Striped Whipsnake
- Ringnecked Snake
- Desert Nightsnake

**Gophersnake**
- Long-nosed Snake
- Ground Snake
- Terrestrial Garter Snake
- Common Garter Snake

**Viperidae**
- Prairie Rattlesnake
- Western Rattlesnake
Snake Identifying Characteristics

- Length
- Body shape
- Head
- Eyes
- Tail
- Color Pattern
- Scalation
- Behavior
Racer (*Coluber constrictor*)

- **Medium size**
  - Total length: 20-48 inches / 51 – 122 cm

- **Uniform dorsal color** of tan, olive, or grayish brown (adults)

- **Blotched juveniles**

- **Large eyes** with round pupils

- **Smooth scales**

- **Pointed tail**
Gopher Snake (\textit{Pituophis catenifer})

- Large, up to 170 cm (67”) in Idaho.
- Light colored dorsally (white to beige), with contrasting dark saddles and blotches.
- Dark line that extends across the snout and on past each eye.
- Eyes with round pupils
- Keeled scales
- Pointed tail
Western Rattlesnake (*Crotalus oreganus*)

- Relatively large size
  - Total length: 15 - 48 inches / 38 - 120 cm
  - Stout body
- Light ground color, dark blotches, rings on tail
- Triangular head, narrow neck
- Vertical pupils
- Loreal pits
- Keeled dorsal scales
- Rattle
Idaho Rattlesnake Distribution

- Crotalus o. oreganus
- Crotalus o. lutosus
- Crotalus viridis

Regions:
- Northern Pacific
- Prairie
- Great Basin
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Great Basin Rattlesnake Natural History

- Medium size
- Long lived >17 years
- Viviparous
- Low reproduction
  - first reproduction 3 – 5 years
  - reproduce every 2 – 5 years
  - 4 – 14 young per litter
- Parental care
- Communal denning
- Seasonal migrations
Activity Patterns

- **Hibernation:** September – May
- **Activity:** May – September
  - emergence: May
  - migration from den: mid May – mid June
  - Gestation: June – August
  - Foraging: June - August
  - Breeding: late July – August
  - Birth: August
  - Migration to den: September
  - Retreat: late September
“Laying out” at the dens
(Early Fall / Late Spring)
Why are the snakes migrating?

- Away from dens
  - Foraging
  - Breeding
  - Gestation
- To den
  - Thermally appropriate over wintering sites

Vince Cobb
What are the spatial migratory patterns?

Male

Pregnant Female

Chris Jenkins
Why rattlesnakes are seldom seen during the summer.

Radius = 5000 m

Area = 7854 ha

Population = 800 rattlesnakes

= 9.8 ha/snake

Cobb, 1994

John Lee
Visualizing movements and habitat use

John Lee
In Idaho, rattlesnakes mostly eat:

- ground squirrels
- voles
- cottontail rabbits
- deer mice
The main use of rattlesnake venom:

- Kill prey
- Start digestion
- Contains digestive enzymes and spreading factors
- Also used for defense.
Feeding Adaptations: Rattlesnake Skull

- Hollow fangs to deliver venom for:
  - immobilizing prey
  - speeding digestion of food
  - defending against enemies

- Lower jaw bones loosely connected for swallowing large prey
The strike:

Range: 1/3 to 1/2 of the snake's body length (usually)
Defense: How may rattlesnakes react to you?

- Stay hidden
- Rattle and escape
- Strike
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### Risk of Snake Bite in the U.S.
(1997 Emergency room admissions)

<table>
<thead>
<tr>
<th>Cause</th>
<th>Annual Injuries</th>
<th>Annual Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dog Bite</td>
<td>1,500,000</td>
<td>15</td>
</tr>
<tr>
<td>Insect Stings</td>
<td>500,000</td>
<td>75</td>
</tr>
<tr>
<td>Horses</td>
<td>71,500</td>
<td>220</td>
</tr>
<tr>
<td>Snake Bite</td>
<td>7,000</td>
<td>15</td>
</tr>
</tbody>
</table>

- Only 3000 are estimated to be “accidental”.
- Up to 50% are “dry” bites.
IF YOU SEE A SNAKE

HOW TO TELL IF A SNAKE IS DANGEROUS

Are you leaving it alone?

Does it have a chance to escape?

Are you trying to harm it, kill it, grab it, or harass it in any way?

It is dangerous

Although it is in fact your actions that have put you in danger, not the snake’s

The Biodiversity Photoblog hebiodiversityphotoblog
How can you avoid being bitten?

• Minimize potential contact with snakes
  – Dress appropriately for field work – e.g., long pants and boots
  – Avoid denning areas in the fall and spring
  – Simply go around snakes in your way
  – Step on rocks (not next to or over them)
  – Lift objects by grasping the far edge and pulling up
  – Do not handle live or recently killed snakes

• Maximize your chances of detecting snakes
  – Listen for rattling snakes
  – Look where you step or reach
    • Stay on trails
    • Check potential hand holds when climbing
What are the consequences of a rattlesnake bite?

- Highly variable.
- No effects from dry bites (< 50%)
- Death (very rare) – no adult deaths in Idaho from snakebite?
- Tissue damage and necrosis is common.
- Medical treatment may be very expensive.
World’s Deadliest Animals

Number of people killed by animals per year

- 475,000 Human
- 725,000 Mosquito
- 1,000 Crocodile
- 2,000 Tapeworm
- 2,500 Ascaris roundworm
- 500 Hippopotamus
- 100 Elephant
- 100 Lion
- 10 Wolf
- 10 Shark
- 10,000 Freshwater snail (schistosomiasis)
- 10,000 Assassin bug (Chagas disease)
- 10,000 Tsetse fly (sleeping sickness)
- 25,000 Dog (rabies)
- 50,000 Snake

SOURCES: WHO, crocodile attack info, Kasturiratne et al. (2011), P琉璃er et al. (2019), FAO (2017), Lennells et al. (2018), Madalena et al. All calculations have wide error margins.
Many factors influence snakebite severity

- Species and size of the snake
- Amount of venom injected
- Number of times victim was bitten
- Constituents in the venom
- Site of the injection
- Body mass of the victim
- General health of the victim
- Time delay prior to medical treatment
What to do if someone is bitten:

- Get away from the snake
- Check for the presence of other snakes
What NOT to do:

- Old fashioned cures (whiskey, etc.)
- Cutting and sucking
- Applying a tourniquet
- Applying ice or a cold pack
- Applying electricity

Recommended treatments change over time.
What to do if someone is bitten:

- Slow (but don’t stop) spread of the venom
  - Remain calm
  - Minimize physical activity
  - Keep the bite site still and just below heart level
  - Remove rings, watches or other tight items

- Obtain proper medical treatment
  - Inform emergency facility of incoming victim
  - Arrive at emergency facility as soon as possible
  - DO NOT attempt to take the snake in for identification
SnakeBite911
for the General Public

The essential complement to your patients’ outdoor First Aid Kit

FEATURES

- Emergency Support for snakebites
- Quick Dial 911
- Checklist of Actions to Avoid
- Time-stamped Venom Tracker Tool
- Hospital Locator
- North American Pit Viper Species Information
- How to Stay Snake Safe
- Snake Sightings Map to show and add snake sightings

Download on the App Store
Get it on Google Play
Poison Control Centers

Need help now? Call the Poison Help line at 1-800-222-1222 or visit PoisonHelp.org

American Association of Poison Control Centers

Poison Control Centers

There are 55 poison control centers in the United States. Each provides free, 24-hour professional advice to anyone in the 50 states, Puerto Rico, the Federated States of Micronesia, American Samoa, the U.S. Virgin Islands and Guam. On occasion, some have even helped American soldiers serving overseas.

Poison centers provide poison expertise and treatment advice by phone. All poison centers can be reached by calling the same telephone number, 1-800-222-1222. Poison centers are staffed by pharmacists, physicians, nurses and poison information providers who are toxicology specialists.

1-800-222-1222
### Medical Treatment

#### NEW MEXICO POISON CENTER SNAKEBITE FLOWSFHEET

**Wyeth Crotalidae Antivenin**

| MEASUREMENTS | Date/Time of Bite | Site Near | Site Mid | Site Far | Blood Pressure | Pulse | PT | INR | PTT | Fibrinogen | d-dimer | Platelets | Hgb | Hct | WBC | Urine | Cr | CKP |
|--------------|------------------|----------|---------|---------|----------------|-------|----|-----|-----|-----|---------|--------|-----------|-----|-----|-----|-------|----|-----|

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Perform measurements every 15 minutes until stable, then every 1 hour until no more swelling is observed for 6 hours, or a minimum of 8 hours, whichever is less.

#### ASSESSMENT OF ENVENOMATION SEVERITY

<table>
<thead>
<tr>
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<th>Initial Antivenin Dose</th>
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<tbody>
<tr>
<td>□ Minimal Envenomation:</td>
<td>5 - 10 vials</td>
</tr>
<tr>
<td>Swelling, pain and ecchymosis present but limited to the immediate area of bite site.</td>
<td></td>
</tr>
<tr>
<td>Systemic signs and symptoms absent.</td>
<td></td>
</tr>
<tr>
<td>Coagulation parameters normal. No clinical evidence of bleeding.</td>
<td></td>
</tr>
</tbody>
</table>

| □ Moderate Envenomation: | 10 - 15 vials |
| Swelling, pain and ecchymosis involving less than one extremity. If on trunk, head or neck, extending less than 50 cm from bite site. | |
| Systemic signs and symptoms may be present, but not life-threatening. These may include nausea, vomiting, oral paresthesias or unusual taste, fasciculations, mild hypotension (systolic blood pressure less than 100 but greater than 80 mm Hg), mild tachycardia (heart rate less than 150 beats per minute) and tachypnea. | |
| Coagulation parameters may be abnormal, but no clinical evidence of bleeding is present. Minor hematuria, gum bleeding and nose bleed may be present. | |

| □ Severe Envenomation: | 10 - 20 vials |
| Swelling, pain and ecchymosis which involves more than one extremity or threatens the subject’s airway. | |
| Systemic signs and symptoms are markedly abnormal, including altered mental status, severe hypotension, severe tachycardia, or respiratory insufficiency. | |
| Coagulation parameters abnormal with serious bleeding present or severe threat of bleeding with platelet count less than 10,000/mm³ | |

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*On patient, measure at bite site, 1 site distal, and 2 sites proximal and mark leading edge for swelling measurements.*
Antivenin

CroFab

Dr. Robert Norris
Stanford Emergency Medical Center
Economics of Snake Bite Treatment

Price components of a vial of antivenom
Percentage of antivenom sticker price, by category

- OTHER COSTS, INCLUDING LICENSING FEES, FDA FEES, REGULATORY AND LEGAL COSTS, WHOLESALER FEES, HOSPITAL PROFITS, ETC.: 27.7%
- CLINICAL TRIALS: 2.1%
- COST OF MAKING THE ANTIVENOM: 0.1%
- HOSPITAL Markup, LATER DISCOUNTED FOR INSURERS: 70.1%

What to watch for after you leave the hospital:

- Unusual bleeding
- Signs of infection around the bite wound
- Signs of allergy to antivenin
- In the event of any of these symptoms, you should consult a physician.
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