Each year there are approximately 7,000 to 8,000 venomous snake bites in the U.S. with about 5 fatalities.\(^1\)

Approximately 70 to 80% of the bites occur to males, whether in a professional (occupational) or non-professional context.

The most common scenario of legitimate bites are where the victim inadvertently puts their foot or hand in the vicinity of a snake.

About 60% of bites are illegitimate, or caused when the victim sees the snake and tries to handle it.

Alcohol consumption is involved in about 60% of illegitimate bites.

\(^1\) Statistical references available upon request
North American Venomous Snakes

- There are four groups of venomous snakes in North America
  - Rattlesnakes
  - Copperheads
North American Venomous Snakes

- Cottonmouths
- Coral Snakes
Venomous snakes are found in 48 of the 50 states plus parts of Canada.

Rattlesnakes are found in all continental US States.

Cottonmouths are present primarily in the southeast (Florida to Texas to Mid-Atlantic States).

Copperheads range in areas slightly larger than Cottonmouths.

Rattlesnakes, Copperheads and Cottonmouths are considered to be pit vipers while Coral snakes are not pit vipers.
Venomous vs. Non-Venomous Snakes

**Venomous snakes**
- *Crotalus atrox*
  - Western diamondback rattlesnake
- Triangle-shaped head
- Elliptical pupil
- Heat-sensing pit
- Retractable fangs
- Venom duct
- Venom gland
- Anal plate
- Single row of subcaudal plates
- Rattle (rattlesnakes)

**Nonvenomous snakes**
- *Elaphe guttata*
  - Corn snake
- Rounded head
- Round pupil
- No heat-sensing pit
- No fangs
- Skull of a member of family Colubridae
- Anal plate
- Double row of subcaudal plates
Snake Bite Characteristics

- Pit Vipers have two long fangs in the front of their jaws which are used to inject the venom from a venom gland.

- Coral Snakes have shorter fangs and have to chew their prey to inject the venom.

- In the US nearly 99% of venomous snake bites are from pit vipers.

The bite marks from venomous and non-venomous snakes are usually significantly different.
Snake venom can be classified as hemotoxic (attacking blood and tissue) and neurotoxic (damaging or destroying nerve tissue).

Pit viper venom is hemotoxic, except for some Mojave rattlers, which is neurotoxic.

Coral Snake venom is neurotoxic.

Acute symptoms of hemotoxic venoms include intense pain, edema, weakness, swelling, numbness, rapid pulse, internal hemorrhaging, vomiting, and confusion. Delayed or non-treatment of a bite can cause tissue necrosis, permanent neuro-muscular damage and/or death.

Bleeding disorders may occur up to 2 weeks after a bite from a pit viper.
Venom Toxicity

- Acute symptoms of neurotoxic venoms include moderate or minor pain, drooping eyelids, weakness, numbness, double vision, sweating, salivation, hypoflexia and respiratory depression. Delayed or non-treatment of bites can cause permanent neurological damage or death.

- Children usually have more severe effects from snake bites due to their smaller body mass and increased dose.

- Systemic effects of both hemotoxic and neurotoxic venoms can be very difficult to reverse once they develop.

- Bacterial infections may also occur at the puncture site.
Treatment of Snakebites

- The priority is to promptly get the victim to medical care.

- First Aid should consist of avoiding excessive activity, immobilizing the extremity, monitoring respiration and circulation and comforting the patient.

- Identify the snake if it can be done safely without handling it or risking another bite.

- As many as 25% of bites are “dry bites” without envenomation, but this may not be distinguishable immediately after the bite so seek medical attention for all bites.
How NOT to Treat Snakebites

- Do **not** try to suck out the venom or make a wound incision

- Do **not** try to “shock” the wound or use tourniquets.
Clinical Treatment of Venomous Bites

- Much of the treatment involves treating the symptoms (pain, muscle and tissue damage, etc) and airway and circulation support.

- Cro-fab is the most commonly used antivenin treatment for pit viper snake bites in the U.S. and only appropriate for North American pit viper envenomation cases.

- Cro-fab is made by injecting sheep with pit viper venom and processing the serum. It is a powder that needs to be prepared in a saline solution for IV delivery. A small amount should be given at first to see if there are any adverse reactions.
Ideally antivenin should be issued within 4 hours of the bite but may be effective up to 24 hours later.

Some individuals have allergic reactions to Cro-fab so patients must be closely monitored when it is used. Treatment often requires the use of 20 or 30 vials of Cro-fab and several days of hospitalization.

Epinephrine and antihistamines must be kept close by in the event of anaphylaxis from the Cro-fab administration.

The wound must also be cleaned and a tetanus shot should be considered for non-immunized patients.

Snake bite patients without symptoms should still be closely monitored for at least 24 hours.
Clinical Treatment of Venomous Bites

- The treatment for coral snake bites is similar although there may not be any antivenin available. It was last made several years ago and there is very little left. It is not clear when there will be more FDA-approved coral snake antivenin produced.

- The progress of swelling and numbness from the bite must be closely monitored and should be marked on the patient.
Clinical Treatment of Venomous Bites

- In some cases (< 5%) the swelling from the venom may lead to compartment syndrome and require a fasciotomy or other surgery.
Long Term Effects of Venomous Snake Bites

- In cases with compartment syndrome or severe tissue damage the patient may permanently have reduced range of motion in a limb or at a joint.
- Bites on a finger may potentially result in the loss of a digit.
- Other potential long-term or chronic effects can include neurological effects such as numbness or peripheral neuropathy.
- The general health of the patient, their age, the promptness of treatment, the dose of venom and the treatment method will all impact the potential long-term and chronic effects.
Prevention of Snake Bites

- Be aware of your environment and where snakes might potentially be present.
- Watch before putting your hands or feet into dark or small spots such as under a log, into a burrow, etc.
- If possible mow down high grasses and remove debris from the work area.
Prevention of Snake Bites

- Consider PPE if you are working in an area that is known to have snakes
  - Snake boots, chaps and/or leggings made of bite-resistant material

Not Recommended
Most snakes are not aggressive and only bite when handled, cornered or threatened. Not handling snakes greatly reduces the likelihood of getting bit. Leave it to the professionals.