

VENOMOUS SNAKE SAFETY

Best Practices for OSH Professionals & Employers

By Kelly Triece

Meaningful conversations in wildlife management and human-wildlife conflict cannot effectively take place until initial safety concerns are addressed. In the U.S., approximately 7,000 to 8,000 people are bitten by venomous snakes each year (NIOSH, 2021).

While deaths are rare, lasting injuries such as amputation or permanent disability are more common. Snakebite envenoming can be controlled through preventive measures.

Venomous snakes are a neglected workplace hazard. It is estimated that at least 14% of bites occur while on the job (Spyres et al., 2016). A study found that landscapers, construction workers, oil field workers, mechanics, engineers, truck drivers and first responders are among the most likely occupations to be bitten by a venomous snake (Figure 1; Spyres et al., 2016). In addition, 56% of these bites occurred in an outdoor work environment.

The number of venomous snakebites has been gradually increasing in most states, partially due to a changing climate (Schulte, 2017). The risk of worker

encounters is predicted to increase as venomous snake species may continue to expand their range to occupy more favorable habitats (Yañez-Arenas et al., 2016). Additionally, extreme weather events such as hurricanes, floods and droughts may affect the risk of worker encounters with venomous snakes (Wozniak et al., 2006).

Workers who encounter venomous snakes while on the job seldom receive adequate training in how to address this risk management situation. Most workers need simple training on prevention, avoidance and encounter safety. In addition, some workers may need to be trained in proper handling and relocation. Even though it is usually safest for both people and snakes to leave the animal alone, circumstances often call for intervention by trained personnel to

prevent a potential encounter from escalating further. Attempting to kill a snake is riskier than leaving it alone or having a trained responder capture and contain it. This article lays the groundwork for snake safety best practices for outdoor workers and their employers.

Identifying a Snake Habitat on the Jobsite

Venomous snakes live in various habitats such as forests, wetlands, grasslands and deserts. With the exception of Rhode Island, Maine, Alaska and Hawaii, snakes can be found in every U.S. state, although they are more common in the southern and western U.S. A jobsite in a rural environment or near open space may be near a snake habitat. One way to identify whether a jobsite is near a venomous snake habitat is to use the iNaturalist online community and database (www.inaturalist.org), which allows users to search crowdsourced observations by specific species and location. Another option is to check with local or national experts to determine the likelihood of venomous snakes occupying a jobsite.

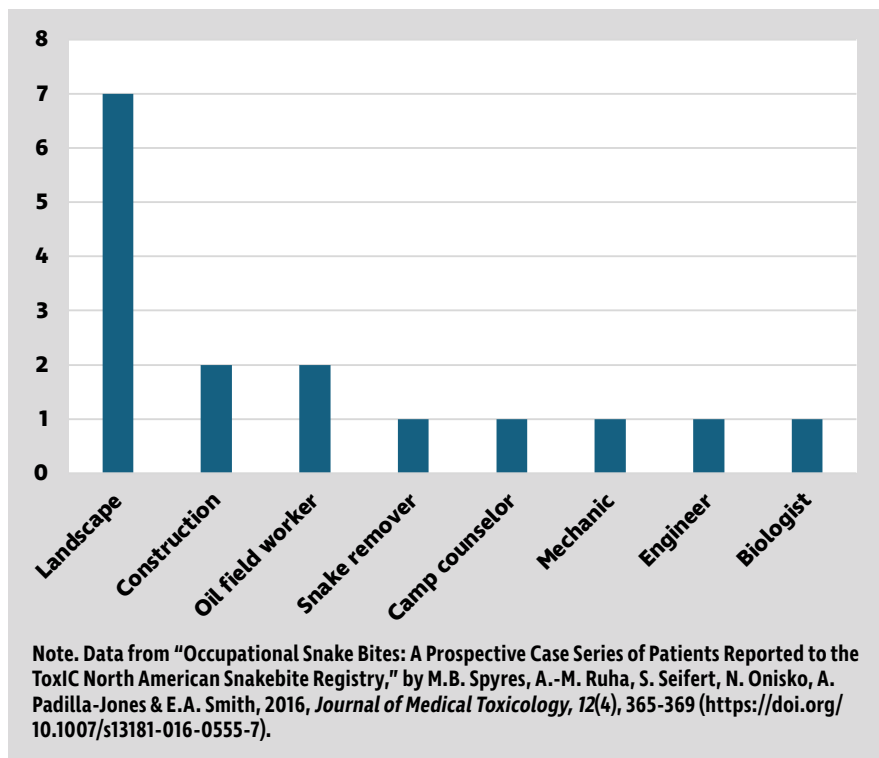
Tips for Employers

Treat the possibility of venomous snakebites as a workplace hazard.

Outdoor jobsites are more likely to see venomous snake encounters. However, if a workplace has a large campus with nearby open space, snakes may find their way inside.

Identify hot spots around the workplace. Snakes move throughout their habitat to find food, water and shelter. They may enter a campus, jobsite or building. Rodents and water both attract snakes looking for a meal. Additionally, snakes seek shelter for safety or to find their preferred climate conditions, lay eggs, birth young or shed their skin. Snakes can be found underneath trees, bushes and rocks, and in secluded areas where they can take shelter and hide. Small spaces, debris and piles of construction material can all serve as shelter for a snake. Photo 1 shows a snake under

FIGURE 1
OCCUPATIONS WITH MOST SNAKEBITES





construction material in Denver, CO. Warning signs that a snake may be near include a snake's shed skin or signs of a rodent infestation, especially near gaps in buildings or large piles of debris. Once these hot spots are identified, either remove them from the workplace or designate them as potential hazardous zones. Close entry gaps around buildings, as snakes can get into openings in the foundation, crawl spaces, conduit, piping and cracks under doors.

Create a snake safety and bite plan.

A snake safety plan is a document that defines staff behavior and establishes best practices to avoid snakebites. This includes best practices when encountering snakes and decision-making guidance (e.g., what staff should do or who they should call in the event of a snake encounter), details for trained snake handlers (e.g., how and when to move a snake or when to leave it alone), snake handling protocols (e.g., how to properly handle a snake, proper tools such as hooks, tongs, buckets and gaiters), and best practices for removal and relocation (e.g., logistics of capturing, storing and relocating a snake). Additionally, establish a snakebite management plan and standard operating procedures for addressing a snakebite. The prehospital bite plan should include emergency contact information, the proper communication method in the



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event of a bite, first aid, and hospital name and address. Employers should call the hospital annually to make sure antivenom is available and to understand the hospital's snakebite protocols.

Train workers and staff. Staff and workers should be trained on how to avoid venomous snake encounters, basic identification, and what to do if a snake is on the jobsite or someone is bitten. Many workers and staff members only need to be trained in avoidance, prevention, identification and first aid.

Because the presence of a snake can create a safety issue and stop work, such as if a snake is located on or under work materials or under a vehicle, it may be prudent to train select workers to properly handle and move snakes from a jobsite. It is recommended that facilities operating near venomous snake habitats have one or more team members trained to properly

Photo 1 (top left): A prairie rattlesnake coiled under construction material.

Photo 2 (left): Worker participating in a venomous snake safety training, learning best techniques for moving a snake.

Photo 3 (above): Worker putting on sturdy boots and gaiters for PPE.

move venomous snakes. Attempting to kill a snake is riskier than leaving it alone or having a trained responder capture and contain it. Waiting for a licensed wildlife control operator may not be feasible before a snake moves out of view or retreats further into a building or work area. Team members designated to move snakes should be trained in identification, behavior, safety planning, bite first aid and proper handling techniques. Snakes also must be safely contained and relocated once they are captured.

Proper Training

Proper snake safety training is taught by experienced professionals who have received formal training (Photo 2). Such training can take place online or in person, depending on the needs of the company. Ideally, these professionals will have experience working with government agencies and businesses alike, and understand issues related to risk management. They should also be properly insured and permitted to handle and teach with venomous snakes. Proper training will fulfill the needs of the safety manager and their team at or near the location

to address site-specific issues and concerns. Additionally, look for professionals who can provide snake safety planning services. An organization would benefit from working with the training professional even after training takes place and as the company completes its snake safety plan.

Tips for Employees

Dress properly. Wear protective attire while working in high-risk locations to reduce the risk of injury or death when working with or around venomous snakes. PPE includes close-toed shoes (preferably sturdy boots) and loose pants when near or around a snake habitat. This is an important first line of defense to protect the lower leg from a snakebite.

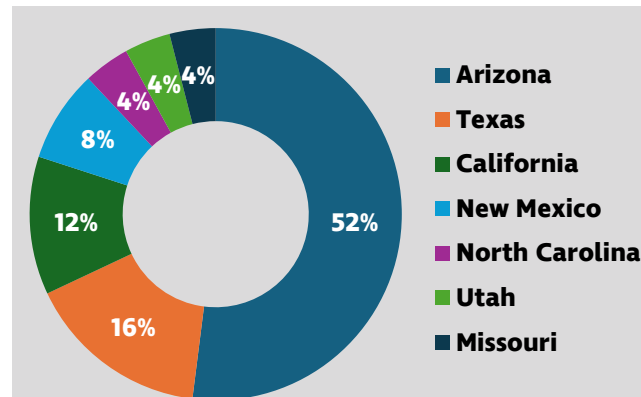
It is recommended that snake gaiters or chaps be worn over leather boots and pants to further secure the wearer against snakebites to the lower leg. Gaiters or chaps may be more important for workers walking through grass or brush (Photo 3, p. 13). Do not reach under items or step on piles or rocks without carefully checking the area first. Use tools to move brush piles, leaves, wood, metal and debris by lifting the far side toward you.

Know when snakes are active in the area. In most of the U.S., snakes are generally most active from March through October. The greatest number of snakebite cases are reported between May and September (Spyres et al., 2016). However, this snake activity period can vary considerably between areas, and snakes may be encountered year-round in many areas.

Arizona, Texas and California are the top states where occupational snakebites are reported (Figure 2). North Carolina has the highest number of overall snakebites each year, with 157.8 snake encounters per million inhabitants (Laybourne, 2023). Snake activity is affected by factors including elevation, climate, topography and habitat. Safety managers should check with a local biologist or other experts for more specific information relating to snake activity in their area.

Know basic snake identification. It is not necessary to know how to identify all species of snakes in the region; however, the ability to identify a venomous versus a nonvenomous snake is helpful.

FIGURE 2
OCCUPATIONAL BITES BY STATE



Note. Data from "Occupational Snake Bites: A Prospective Case Series of Patients Reported to the ToxIC North American Snakebite Registry," by M.B. Spyres, A.-M. Ruha, S. Seifert, N. Onisko, A. Padilla-Jones & E.A. Smith, 2016, *Journal of Medical Toxicology*, 12(4), 365-369 (<https://doi.org/10.1007/s13181-016-0555-7>).

Knowing the five most common snakes in an area is often enough.

Rattlesnakes, copperheads, cottonmouths and coral snakes are four venomous snake species native to the U.S. with rattlesnakes being the most numerous. Seek out or create a concise identification guide that can be distributed during training or displayed on a worksite.

What If the Team Sees a Snake?

A worker just encountered a snake on a jobsite. Now what? Following are a few critical steps.

Remain calm. When encountering a snake, it is important to remain calm. If the snake is in a location where it can be avoided, it is best to leave the snake alone. Give the snake space and time to leave the area on its own. Follow the company's decision-making guidance and best practices.

Determine whether action is necessary. When would it be appropriate to act? Not all snake encounters require direct intervention. If a snake is in a natural area, the situation is not necessarily dangerous and the snake should be left alone.

In some situations, however, presence of a snake may pose a danger to people or to the animal itself, or may cause work to stop. In such cases, it is appropriate to remove the animal. Examples include when a snake is:

- under a vehicle. This situation is highly unsafe for people attempting to

enter or exit the vehicle, as well as for the snake itself, as it can be struck when the vehicle moves.

- in a building, facility or around a home. Snakes sometimes enter man-made structures and subsequently become trapped within them, unable to leave on their own. A snake in this situation is a danger to people and itself, and should be removed. The employer should try to identify how a snake could enter the structure and take steps to prevent additional snakes from entering.

- in a location that prohibits work. It may be in a construction zone or on a piece of equipment.

Call the appropriate responder. Once you have determined that it is necessary to move a snake, call a trained

team member. On-site wildlife professionals, facilities workers or other staff can be trained to properly move snakes. It is recommended that facilities operating near venomous snake habitats have a trained team member that can properly move venomous snakes. This requires that the team member be trained in identification, behavior, safety planning, bite first aid, and proper handling techniques. Snakes must be safely contained and relocated once they are captured. A trained employee, worker or professional will use proper tools to move the snake into a secure bucket.

If an unsafe situation requires a snake to be moved but a trained team member is not present, call a professional to remove it. Monitor the snake's movement from a safe distance until the trained responder arrives. Remember that if a team member encounters a snake, know that the animal likely only wants to get away and will not usually strike unless cornered, stepped on or surprised.

Consider relocation. The safety manager should have a plan for what to do with captured snakes. As noted, it is typically recommended to relocate rather than kill a snake, because the latter can be more dangerous. First, identify the likely origin of the snake. Move the snake as close as possible to the capture site (less than 1 mile from the original location) while keeping a safe distance from high-use public areas, such as trailheads and playgrounds, homes, and

areas frequented by pets. Next, find a suitable microhabitat—an area similar to where the snake was found. However, if it was found on a road or in a building, it should be released to an area with natural cover (e.g., rocks or vegetation) at least several hundred yards from a residence, trail or playground. (Some exceptions may be warranted depending on species and location, but the strategy should maximize human and pet safety.) Consider the time of day, avoiding mid-day sun for release. The ideal temperature for release is between 50 and 80 °F. The safety manager may designate a release location—one spot near or off the property where snakes should be taken when captured.

Conclusion

Businesses and project locations are increasingly engaging with wildlife including snakes. Awareness of the problem and a basic understanding of how to prevent injury can help protect employees and the business, and mitigate conflicts from escalating further. Proper

training is effective and saves valuable time and resources. **PSJ**

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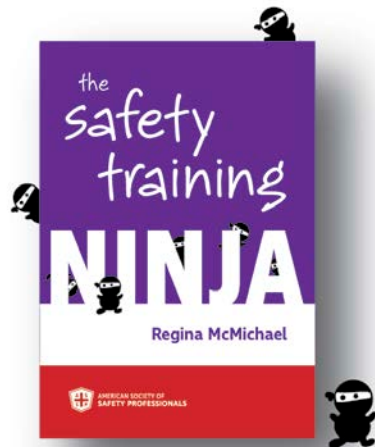
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