Arthropod Infestation and Envenomation in Travelers

Traveler Summary

Key Points

- **Ticks** : Ticks found in grass or brush transmit a large variety of infections, some serious or fatal. Travelers should wear long, light-colored trousers tucked into boots and apply a DEET-containing repellent. The longer a tick is attached, the higher the risk of infection. Ticks should be pulled straight out with tweezers by grasping close to the skin to avoid crushing the tick.
- **Fly larvae (myiasis, maggots)** : Botfly or tumbu fly infestation results from deposition of eggs under the skin, which causes a boil-like bump to form. Simple surgical removal may be necessary.
- **Spiders** : Most spiders do not have toxic venom. Harmful species include recluse, black or brown widow or hourglass, and Australian funnel-web spiders. Investigate damp, dark spaces (such as outdoor toilets, kayaks, and damp shoes) before entering.
- **Fleas** : A flea engorged with eggs burrowing into the foot may result in painful tungiasis; surgical removal is always required. Fleas rarely may transmit plague. Travelers should avoid dusty areas and exposure to rodent fleas.
- **Scorpions** : Most fatal scorpion bites occur in tropical and dry desert regions. Size of the scorpion does not indicate potential toxicity. Favorite hiding places for scorpions are cool, shaded areas, such as under rocks or furniture. The affected area should be immobilized, iced (if feasible), and immediate medical help sought.

Lice

Lice are blood-eating insects found worldwide but most commonly transmitted in conditions of overcrowding and poor hygiene. Budget travelers staying in basic accommodations may encounter lice under these conditions. Lice not only cause itching and rash, they can also cause disease. Three types of lice can cause disease in humans:

- **Head lice** usually infect children but can occur in any age group. Travelers can acquire head lice through contact with infested persons or contaminated clothes, hats, combs, hairbrushes, sofa, carpet, and so forth. Symptoms include intense itching of the scalp and back of the neck and sores caused by scratching, sometimes becoming infected.
- **Body lice** live in the seams of clothes and travel to the skin only to eat. Symptoms are similar to those of head lice but can occur elsewhere on the body. This type of louse can carry infections such as relapsing fever, epidemic typhus, and trench fever.
- **Pubic lice** are mainly transmitted through sexual contact. Symptoms include itching and a flat, bluish rash. In addition to the pubic area, any area with short, thick hairs can be affected, including the trunk, underarms, beard, eyebrows, and eyelashes.

Prevention: To prevent lice, avoid overcrowded accommodations, observe good personal hygiene, and avoid sharing clothes, combs, hairbrushes, and so forth. Condoms do not prevent pubic lice, so be very cautious in selecting sexual partners in order to prevent this and other sexually transmitted diseases.

Treatment: Treat lice with preparations of permethrin 1% or lindane 1% (shampoo is used for the scalp or pubic area and lotion is used for the rest of the body). Lice that are resistant to these agents may be treated with malathion 0.5%. Because lindane does not kill the eggs (nits), it should be reapplied 1 week later. In many countries, these products are available over the counter. For head lice, remove nits by soaking the hair in a half-strength vinegar solution and combing out the eggs using a fine-toothed comb. (Discard the comb afterwards.) For body lice, wash clothes and bed linens in hot water (as hot as possible but not less than 125°F) and tumble-dry. Dry clean clothes that cannot be washed; clothes that cannot be washed or dry-cleaned should be sealed tightly in a plastic bag for 2 weeks. Vacuum infested floors and furniture.

Bed Bugs

Bed bugs are small, oval, wingless, reddish-brown insects that require blood meals from humans, other mammals, or birds to survive. Typically they feed every 5-10 days but can survive for a year or more without feeding. After feeding, the bed bug's color changes from brown to purplish-red and will appear larger and more cigar-shaped. Bed bugs are normally about ¼-¾" (5-9 mm) in length; young bed bugs are smaller and nearly colorless (except after feeding).

Bed bug infestations are increasing in the US and internationally, likely due increased international travel and insecticide resistance. While bed bugs do not transmit disease, their bites can produce allergic reactions and emotional distress.

Prevention: The most effective protection from these pests while traveling is through prevention. The following precautions can help travelers avoid or reduce exposure to bed bugs:

- Research before booking a hotel room. Check online reviews of a particular hotel (e.g., the hotel website, reservation sites such as tripadvisor.com; or bed bug-specific sites such as http://bedbugregistry.com or http://bedbugger.com).
- Upon arrival at the hotel, inspect mattresses and mattress tags, box springs, headboards, bedding, furniture, drawers, and closets.
    - Peel back the bed sheets and check the mattress, running fingers along the upper and lower seams. If possible, remove and examine the headboard.
    - Check for blood spots (which will appear brown rather than red and will dissolve when touched with a damp tissue), tiny black spots (excrement) smaller than poppy seeds, cast-off translucent light brown skins, and live bugs.
- Travelers who observe evidence of bed bug activity should seek alternative lodging or request another room.
- Keep suitcases closed and off the bed and floor. Use a luggage rack after carefully inspecting the cloth straps and legs. Some travelers keep suitcases in the bathroom.
- Clothing and personal items should be taken from the suitcase only when in use and carefully inspected before returning them to the suitcase, preferably packed into sealable plastic bags so other clothing is not contaminated.
- Before leaving, inspect the luggage and each item being packed.
- After arriving home, unpack dirty or suspect laundry directly into the washing machine. Wash with detergent and hot water and dry at high heat for at least 30 minutes. Dry cleaning can also kill all bed bugs; if using a dry cleaning service, mention that the items may have bed bugs so they can keep the articles in the plastic bags until just before loading into the machines.
- Suitcases may be hand-washed using soapy water and the hottest water possible. (A target temperature of 113°F/45°C should be sufficient.) Use a scrub brush along the seams and folds.
- Items that cannot be washed or dry cleaned can be treated with very high temperatures (at least 113°F/45°C) for 1 hour or very low temperatures (at least 0°F/-18°C) for 5 days or longer.
- Some travelers use a portable heat unit to heat luggage and kill any potential bugs. Others spray their luggage with a pesticide designed for bed bugs. (***See EPA website below***.)
- If bed bugs are introduced into a home following travel, see the EPA website for suggestions for chemical disinsection and names of service providers: http://cfpub.epa.gov/oppref/bedbug/.

Mites

Scabies is caused by a mite that burrows under the skin. It occurs most commonly in the tropics but is found worldwide. Human scabies is mainly transmitted by person-to-person close contact but can also be transmitted by combs, towels, clothing, and so forth. Symptoms include intense itching followed by an elevated rash—usually at the waist, underarms, inner thighs, and/or back of legs. Scratching can cause sores that may become infected.

Treatment: The preferred treatment for scabies is 5% permethrin cream, massaged into the skin from the neck down, including all skin folds and crevices, left in place overnight, and then washed off. An alternative for adults is 1% lindane used in the same way. In developing countries, benzyl benzoate 10% is cheap, readily available, and reasonably effective. Clothes and bed linen should be processed as described for lice or placed in a tightly closed plastic bag for at least 7 days.

Fly Larvae

Myiasis is an infection caused by fly larvae that have invaded human (or animal) tissue. Myiasis is typically a disease of the tropics, although cases have been described worldwide. Travelers at highest risk are those traveling to tropical destinations and those doing lots of outdoor activities, particularly near cattle-raising areas or other environments conducive to the proliferation of flies. The most common species causing myiasis are the Central-South American botfly, the North American botfly, and the African Tumbu fly. Adult flies deposit their eggs either on the skin or in areas near the host's environment. When the eggs hatch, larvae penetrate the skin and attach themselves to the deep tissues. The result is a nodule beneath the skin that resembles a boil, with a small central opening that corresponds to the larva's breathing tube. Usually patients state that the movement of the larva can be felt or seen under the skin. Botfly infestation usually results in a single lesion while Tumbu fly infestation is usually multiple.

Prevention: To prevent larva infestation, observe standard insect precautions and avoid sandy areas where animal or human feces are found. Tumbu larvae often are laid on clothing hanging out to dry, so in Africa all clothing and sheets should be ironed prior to use.

Treatment: All forms of myiasis are self-limited: eventually the larva will mature, extrude itself from the skin, and drop to the ground to complete its transformation into an adult. However, the suffocation of the larva can be attempted by applying petrolatum or beeswax to the respiratory opening. In many cases, this will cause enough distress for the larva to crawl out of the skin. Alternatively, local practitioners frequently use bacon or other meat in an attempt to lure the larva out of the host's skin and into the meat. If these measures are unsuccessful, surgical removal may be necessary.

Fleas

Fleas are tiny, wingless bugs that feed on the blood of animals and humans. They travel by jumping from host to hosts, sometimes over considerable distances, so travelers should check their knees and arms for fleas, in addition to feet and bedding. Flea bites cause small raised red spots that itch intensely. Fleas can also carry diseases such as **plague**, **murine typhus**, and, perhaps, **cat-scratch disease**.

A distinct entity associated with flea infestation is jiggers (not the same as chiggers), which is the sand flea ***Tunga penetrans***. This flea causes **tungiasis** and is found in Central and South America, as well as parts of Africa and South Asia. The fertilized female parasite burrows into cracks in the skin, usually on the soles of the feet, between the toes, or at the base of nails, where it begins producing eggs that eventually distend the insect to the size of a small pea. The ensuing irritation and scratching help release the eggs into the environment, and eventually the insect is dislodged, leaving an ulceration that can become infected. Lesions typically are seen in the feet and lower legs due to the fact that jigger fleas are not good jumpers. Human infection is easily acquired in dusty places in poor houses, courtyards, villages, and farms, or above the tide line on beaches in Central America, the Caribbean, sub-Saharan Africa, and parts of South Asia.

Prevention: Preventive measures include standard insect precautions, wearing foot-enveloping shoes, and staying in clean lodgings. When possible, vacuum the floor, carpet, and furniture to get rid of fleas, eggs, and flea larva.

Treatment: The treatment is very careful removal of the insect with a needle, ideally before it is so swollen that the possibility of removing it intact is small. Caution should be exerted during these procedures, as superinfection is common. Topical creams with cortisone can be used for the itching as long as there is no sign of infection.

Harvest Mites

The larva of the trombiculid or harvest mite causes **chiggers**, which are found worldwide but most commonly are found in tropical and subtropical climates, including the southern US. This is a seasonal disease, occurring during the summer and fall. The larva attaches itself to a warm-blooded host, feeds for a few hours, and drops off. Symptoms include red, intensely itchy raised areas and hive-like elevated lesions at the sites of the bites. Occasionally, the actual larvae can be found still attached to these lesions.

Prevention: Risk can be reduced by avoiding walking through shrubs or other vegetation where larvae frequently live. If such an exposure is inevitable, impregnating clothes with permethrin or DEET can keep the mites from attacking.

Treatment: Treat with antihistamines and topical corticosteroids.

Ticks

Ticks are blood-sucking parasites found worldwide. Humans are usually only occasional hosts; with the possible exception of some African species, most ticks primarily parasitize wild and domestic animals, including cattle. Accordingly, persons at highest risk are those who spend lots of time outdoors in rural areas.

- **Tick bites** : Most uncomplicated tick bites show no symptoms. While individuals may experience itchy, elevated lesions at the site of the bite, they are usually self-limited. Any attached ticks should be removed carefully to avoid crushing the tick between the fingers. Use a pair of fine tweezers (if available) to pull directly upward without crushing the tick. Ticks should be removed as soon as possible since the longer a tick is attached, the more likely it becomes that it could transmit disease. The itchiness and rash can be treated with systemic or topical antihistamines or topical steroids.
- **Tick-borne diseases** : Diseases transmitted by ticks include the **human ehrlichioses**, **Lyme disease**, **tularemia**, **babesiosis**, **tick-borne relapsing fever**, **Rocky Mountain spotted fever**, other **rickettsioses,** some **arboviral diseases**,

and several **flaviviruses** causing encephalitis.

- **Tick paralysis** : Over 40 species of tick can cause a progressive paralysis that begins in the lower extremities and ascends over the course of hours. This reaction usually occurs with prolonged attachment of the tick and the tick is usually found on the body of the victim at the time of symptoms.

Prevention: To avoid being bitten by ticks, hikers should wear long trousers tucked into boots. When walking through brushy vegetation, cover as much of the body surface as possible and wear light-colored clothing, which makes it easier to spot ticks.

DEET (N,N-diethyl-meta-toluamide) should be applied to the skin when in environments where ticks are prevalent. Permethrin-containing compounds should be applied to clothing, camping gear, and screens.

Campers should avoid sites close to animal habitation and, whenever possible, sleep in screened tents. After visiting a tick-infested habitat, a thorough body search and removal of ticks as soon as possible, preferably with forceps, reduces the risk of infection.

In northern Europe, travelers should enquire whether local urban parks present a risk for Tick-borne encephalitis, for which an effective vaccine is available. While uncomplicated tick bites can be managed with simple measures, tick-borne infectious diseases and tick paralysis can be serious complications requiring medical attention.

In addition, avoid unpasteurized dairy products, especially goat milk.

Scorpions and Spiders

Scorpions are found in many areas of the world but abound in tropical and desert climates. Most scorpions possess some sort of venom, but some species are capable of inflicting fatal stings to humans. Fatal human envenomations are common only in parts of Latin America, North Africa, the Middle East, and India. Areas with a particularly high incidence of scorpion stings include Colima state in Mexico and parts of Brazil, Algeria, and India. Victims typically develop very intense local pain and inflammatory signs at the site of the sting, followed hours later by systemic symptoms that can range from mild to fatal.

Most spiders also have some sort of venom, but only about 40 out of the more than 30,000 known species are dangerous to humans. The 2 major groups of spider that cause human disease are recluse spiders (***Loxosceles***) and the black widow and hourglass spiders (***Lactrodecteus***). Recluse spiders can be found in most of the Americas, the Mediterranean, North Africa, and Israel, while the black widow and hourglass spiders' range includes Australia and Tasmania as well. Typically, recluse spiders cause a lesion that can extend to involve a whole limb, sometimes requiring extensive surgical debridement, while black widow and hourglass spiders tend to cause systemic neurologic symptoms, but either group can cause a combination of both syndromes. Other notorious species are the Brazilian banana spider and the Australian funnel-web spider, which can cause a rapidly progressive syndrome leading to coma in a matter of hours.

Prevention: While outdoor adventure travelers are much more likely to become exposed to scorpions and spiders, many species are adapted to the human environment and can be found near human habitations, particularly in rural areas. Preventive measures are similar for scorpions and spiders: wear adequate clothing and footwear during activities in risk areas, shake out clothing, shoes, and linen before use, and avoid reaching into dark, closed spaces where the interior cannot be seen. Notorious hideouts for spiders include outdoor toilet facilities and in parts of plants typically found in the tropics, such as palm and banana trees. Scorpions cannot survive long in the direct sun of the tropics, so they spend the day in cool, shaded areas, such as under rocks or pieces of furniture in human habitations. There is no relationship between the size of spiders and scorpions and their potential toxicity, and travelers should avoid manipulating or disturbing even small, seemingly harmless spiders. Since both spider bites and scorpion stings can be serious or even fatal, medical attention should be sought as soon as possible.

Treatment: In the case of a scorpion sting, first aid measures include applying ice and immobilizing the affected area; medical attention should be sought as soon as possible. In the case of a spider bite, the bitten limb should be immobilized and medical attention sought as soon as possible. Many countries manufacture antivenoms against local species of spiders, so ideally a facility with experience in handling these cases should be chosen. If the spider was killed at the scene and can be safely placed in a secure container, it should be brought to the medical facility for possible identification, but no attempts should otherwise be made to recover it or to chase it down-this could result in another person being bitten.