# Marine Hazards

## Traveler Summary

### Key Points

- Coastal waters around the world present various risks: drowning, injury from animals or plants, and envenomation from animals.
- ***Cutaneous larva migrans***, caused by hookworm larvae that penetrate the skin, is acquired on warm, moist, sandy beaches where dogs and cats roam and presents with a migratory, itchy rash. Avoid direct contact with sand and soil (e.g., by wearing appropriate footwear and using a chair or blanket).
- ***Jellyfish*** can cause stings and tissue damage that range from painful to deadly, depending on the species. If stung, douse affected skin with vinegar, and seek urgent medical care when in areas with known highly poisonous species. The bell of the jellyfish may be seen but the transparent, long tentacles may not be seen and can wrap around a limb with resulting envenomation. Do not touch jellyfish that have been washed ashore.
- ***Corals*** can cause cuts or skin irritation, even with light contact while swimming; some species contain venom. Avoid touching all corals and respect local regulations to protect them.
- ***Sea urchins*** resemble balls with a hard shell covered in long, fine, sharp spines that even wet suits may not protect against. They can be present in shallow water and rocky shorelines. Injuries after touching or stepping on an urchin can cause local infection; medical care may be needed to extract all the spines.
- ***Stingrays*** do not intentionally attack swimmers, but when disturbed or stepped on, they can react by swatting with their barbed tail, causing deep stab wounds and subsequent tissue tearing on retraction of the spine. Shuffle when wading in areas with rays and wear appropriate footwear.
- Heed posted notices or advice regarding local dangers (e.g., sharks, crocodiles, jellyfish, biting sting rays or stinging fish/eels) and regulations.

## Introduction

Coastal waters around the world are dangerous for several reasons. Tides, currents, and rip tides pose a risk for drowning. Plants and animals can harm humans through accidental contact, self-defense, or attack. Animals can cause bite or puncture wounds and potentially deliver venom or toxin with fangs, spines, or stinging cells. The most common incidents are injuries from stony coral and sea urchins and stings from jellyfish, fire coral, stonefish, and sea anemones. Most dangerous are activities that lead to drowning, envenomation by box jellyfish, and attacks by sharks. No cases of envenomation by sea snakes, cone snails, or blue-ringed octopuses have been reported in travelers.

## Risk Areas and Factors

Risk depends on the type of activity and the nature of the marine environment visited. In general, tropical seas (especially the western Pacific Ocean) are more dangerous than temperate seas for the risk of injury and envenomation, which are common among seaside vacationers, snorkelers, swimmers, and scuba divers. Jellyfish stings are most common in warm oceans during the warmer months. The reef and the sandy sea bottom conceal many creatures with poisonous spines.

## Hazards of the Beach

***Cutaneous larva migrans*** is a slowly migrating, itchy rash following penetration of soft skin by a larval stage of hookworm natural to domestic and wild animals, notably cats and dogs. Humans become infected while walking barefoot or lying down on warm, moist soil where infected animals have deposited feces. Larvae can penetrate swimming suits and towels. The tide line of tropical and subtropical beaches where dogs run free at night is a common place to acquire the infection.

### Sargassum

Sargassum is a drifting seaweed that has dramatically accumulated since 2011 and has begun washing up on shores throughout the Caribbean, in areas that stretch from Florida, along the Gulf of Mexico, and across to the lesser Antilles. Approximately 1,700 sq. km (656.37 sq. mi) of ocean coverage has occurred since late 2018. Peak Sargassum season is from January through April. The phenomenon also occurs in the Yellow Sea of China, where it is known as "Golden Tide." Decomposing Sargassum releases

hydrogen sulfide and ammonia, which cause respiratory, skin, and neurocognitive symptoms in local and traveling populations, as well as nonspecific symptoms such as headache, nausea, and fatigue. In 2018, Guadeloupe and Martinique reported 11,000 cases of Sargassum toxicity. Treatment is supportive. If Sargassum is present, travelers should avoid touching the weed or inhaling its gasses.

## Animals that Bite or Wound

### Sharks

Worldwide, about 100 shark attacks (15 fatal) on humans are reported each year, half in swimmers and half among surfers and divers. The severity of the bite depends on the species and size of the shark and the pattern of its jaw and teeth. More than 25 species of sharks have bitten humans in all types of sea; two-thirds of attacks are attributed to great white sharks, tiger sharks, and bull sharks. Hit-and-run attacks occur near the shoreline or on a reef flat. Territorial defense and feeding attacks occur further out to sea and are more serious.

### Crocodiles

Crocodiles prey on all types of animals, including humans. They are fast runners and swimmers and can strike with their tails. Three species of saltwater crocodiles inhabit coastal swamps, estuaries, and saltwater and freshwater lakes of Central America, some Caribbean islands, and Florida; the coasts of tropical Africa; and the northern coasts of Australia, Papua New Guinea, islands of the Malaysian archipelago, the Philippines, Southeast Asia as far as Bangladesh, and the eastern coast of India. They may travel out to sea.

### Seals and Sea Lions

Normally docile, males seals and sea lions may attack divers in the sea or tourists on the beach if provoked during the mating season.

### Stingrays

Stingrays can both stab and envenomate. See Stingrays and Other Venomous Fish.

### Fish

***Barracuda*** may accidently bite when attracted by speared fish, glinting jewelry, or a watch face. Their teeth are long and sharp and can sever an artery or tendon or mangle fingers. The great barracuda inhabits all tropical seas except the eastern Pacific Ocean. The less dangerous blackfin barracuda inhabits the tropical Pacific Ocean.

***Trigger fish*** attack intruders seasonally while defending their nests on the sea floor beside coral reefs. Their heavy jaws and teeth can remove chunks of flesh. They inhabit all tropical seas, but the largest and most aggressive species are found in the Indian and western Pacific Oceans.

***Moray eels*** are bottom-dwellers, hiding by day in holes and rock crevices. Some can grow to more than 2 m (6 ft) long and their wide, strong jaws and dagger-like teeth inflict severe wounds. They are common throughout tropical and warm temperate seas, including the Mediterranean, from intertidal rocky shores to depths of 300 m (1,000 ft).

***Needlefish*** swim in shoals on the surface of all temperate and tropical seas and may grow more than 1 m (3 ft) long, with spear-like jaws capable of penetrating the chest. At night they may rush toward a bright light and can impale any swimmer in their path.

***Giant*** and ***goliath groupers*** roam the tropical oceans, growing up to 3 m (10 ft) in length and weighing more than 300 kg (660 lb). Divers are in danger of being stunned by a head-on collision, especially around wrecks, or may be held in the mouth of the grouper until drowned.

## Animals that Envenomate

### Sponges

***Sponges***, animals fixed to the sea bed, are found from shallow intertidal beaches to the deep ocean. Some species have prickly spicules containing toxic chemicals that cause severe irritation to the skin. Notable are the fire sponges and touch-me-not

sponges of the Bahamas, Caribbean, Atlantic coast of the US, and Canada as far north as Nova Scotia, where they attach to rubble and rock and are found in sea grass and oyster beds.

## Hydroids, Fire Coral, Men-of-War, and Jellyfish

Hydroids, fire coral, men-of-war, and jellyfish have nematocysts (stinging cells). On contact, the nematocyst fires a barbed, hollow dart (through which venom is injected) into its prey or into human skin. In many species, the dart is too short or the venom too weak to cause significant symptoms in humans; however, envenomation by some species may be fatal.

***Hydroids*** look like ferns, feathers, fans, algae, or tufted, branching weeds that are attached to any hard structure, especially wrecks in turbid, plankton-rich coastal waters, but also on reefs and in caves. Dangerous species are found throughout tropical and warm temperate seas, including the Mediterranean. Envenomation causes a burning sensation, pain, redness, swelling, and blisters.

***Fire corals*** have a hard skeleton and look like drab mustard-yellow or pale-brown stony corals. Their harmless-looking appearance and abundance just under the surface of shallow waters result in many painful injuries to swimmers, novice snorkelers, and divers getting in and out of boats around shallow reef margins. Venomous species are found on all tropical reef systems except Hawaii. Envenomation causes transient burning pain followed by redness, swelling, and blisters that may last for weeks.

***Men-of-war*** and their tiny cousins the ***swimming bells*** can float but cannot swim. The Portuguese man-of war, with its visible 30 cm (1 ft) gas-filled, bluish-purple float, and trailing invisible nematocyst covered tentacles (averaging 10 m [33 ft] long) drift in the current and wind, primarily in the Atlantic Ocean but not in the Mediterranean Sea. Their presence locally may be seasonal, and winds may collect huge colonies that drift onto the shore. Other smaller species, such as the blue bottle, are less dangerous and found throughout the Indo-Pacific region. Envenomation causes instant severe pain, local wheals, blisters, and death of the affected skin. General symptoms include nausea, vomiting, cardiac and respiratory difficulties, and loss of consciousness leading to drowning. Deaths have occurred on the Atlantic coast of the US (including Florida) and some Caribbean islands.

***Jellyfish*** are found in all seas at varying depths; more than 250 species exist in a variety of sizes, colors, and tentacle formations, all of which are covered with nematocysts.

The ***true*** or ***bell jellyfish*** have tentacles arranged regularly around the bell. The degree of envenomation varies greatly, even within a species. Many are mild, but some species cause severe and painful stings and sometimes more generalized symptoms similar to those caused by the man-of-war, although very rarely fatal.

***Box jellyfish*** or ***sea wasps*** are box-shaped, with tentacles arising from their 4 corners. They can swim up to 1.5 m (5 ft) per second. Included in this group are the Irukandji jellyfish (***Caruki barnesi*** ; about 1.3 cm [0.5 in] across, with a single, fine, almost invisible tentacle up to 2 m [6 ft] long) and the Australian box jellyfish (***Chironex fleckeri*** ; about 25 cm [10 in] across with 3 m [10 ft] tentacles), which is the most dangerous of all marine creatures.

Irukandji jellyfish are widely dispersed, breed on the reef, and are less seasonal than the Australian box jellyfish, which are strictly tropical (northern coast of Australia as far north as Korea and west to India), breed in estuaries, and have a season that runs from October through May (although a few remain throughout the year). Less dangerous box jellyfish occur throughout all temperate seas.

Irukandji envenomation is initially mild, followed by a rash, headache, and severe muscle pain throughout the body; death rarely occurs. Australian box jellyfish envenomation causes instantaneous burning and excruciating pain, wheals, blisters, muscle pain, and unconsciousness within minutes; without prompt first aid, death is common.

## Coral

***Coral*** is a complex organism made up of tiny invertebrate animals that lay down a limestone skeleton. Coral reefs harbor a myriad of animals, plants, and microorganisms, some of which may be harmful. True corals rarely sting, but the colonizing fire coral may cause skin irritation. Stony coral is razor sharp. Coral cuts are common and may contain spicules of coral and soft tissues, including nematocysts; cuts are slow to heal and often lead to secondary bacterial infection. Soft corals contain minute spicules within their skeleton, which, with prolonged contact, can penetrate skin and cause an itchy rash.

## Sea Bather's Eruption

The larval form of thimble jellyfish can become trapped in swimming suits and discharge venom, causing skin irritation that is typically more severe in children than in adults. Thimble jellyfish are commonly found in the shallow coastal waters of the western

tropical Atlantic Ocean and the Caribbean Sea.

## Cone Snails

***Cone snails*** are highly decorated and collectable, but some of the 500 species are among the deadliest creatures in the sea and have caused many human deaths; they shoot a barbed dart through which paralyzing venom is injected. Envenomation causes pain like a bee sting (although the onset may be delayed for hours or days), followed by numbness that spreads over the limb and body and leads to muscular and respiratory paralysis.

## Starfish and Sea Urchins

***Starfish*** have short, sharp spines covered in venomous slime. Most are harmless, except the crown-of-thorns starfish (measuring about 30 cm [1 ft] across), which lives at the bottom of reefs throughout the Indo-Pacific area. Starfish wounds cause intense pain, bluing of the skin, and sometimes nausea and vomiting; spicules retained in the skin cause persistent painful cysts.

***Sea urchins*** resemble balls with a hard shell covered in long, fine, sharp spines that even wet suits may not protect against. They are found in all marine habitats of tropical and warm temperate seas, usually in shallow water and along rocky shorelines. Risk is greatest at night. Most sea urchin-induced injuries cause only local problems from broken and retained spines, but the spines of some tropical species are venomous, causing pain, swelling, redness, and numbness (which last a few hours) and discoloration from pigment in the venom. Psychotic reactions and paralysis may occur following envenomation by the flower urchin and fire urchin in the tropical Indo-Pacific region.

## Stingrays and Other Venomous Fish

***Stingrays*** usually live on the sea bed or in shallow estuaries often obscured by sand and are found in all tropical and temperate seas. In the US, about 1,500 stings from rays occur each year. The ray's flat body carries a whip-like tail that is armed with a barbed spine capable of injecting venom and is used in self-defense. Rays do not intentionally attack swimmers, but they flail about if they are stepped on, disturbed, caught, or feel trapped and their barb can penetrate anyone nearby; they may also jump into a boat. The spine, which may be up to 30 cm (1 ft) long in large rays, makes a deep stab wound and tears further when the spine is retracted; the wound turns blue and swollen and later the tissue may die. Severe pain lasts for hours. General symptoms of nausea, vomiting, diarrhea, sweating, and shock may follow envenomation. Penetration of the chest wall by the spine may be fatal.

***Venomous fish*** with spines on the fins, tail, or gill covers may cause local (severe pain, inflammation, or infection) or general symptoms (headache, heart rhythm disturbances, respiratory distress, muscles spasms), and, rarely, death. Fish with venomous spines (i.e., stonefish, scorpionfish, lionfish, or devilfish) inhabit the tropical Indo-Pacific seas, extending as far north as Japan, and some lionfish inhabit the Atlantic Ocean and Mediterranean Sea.

## Need for Medical Assistance

Antivenoms are available for Australian box jellyfish, stonefish, and sea snakes.

Follow these first aid measures as appropriate.

Spines of coral, starfish, and sea urchins:

- Leave the water at once; extract as many spines as possible; apply topical disinfectant.
- Seek medical care if secondary infection occurs.
- Encysted spines may require surgical removal later.

Jellyfish stings:

- Remove the victim from the water.
- Douse box jellyfish stings with vinegar if available; scrape off adherent tentacles.
- Use sand or a thick suspension of baking soda for men-of-war or other common Atlantic jellyfish stings.
- Do not apply alcohol, sun cream, water, or other remedies.
- Resuscitate if necessary and transport to a hospital.

Fish spine envenomations:

- Immerse the stung limb in water that is uncomfortably hot but not above 45°C (113°F) for 30 to 90 minutes to inactivate the venom.
- Resuscitate if necessary and transport to a hospital.

- Posttravel care, including surgery, may be required for persistent issues related to superinfection and tissue death.

Sea bather's eruption

- Apply a simple anti-itch lotion or 1% hydrocortisone cream.

## Prevention

To reduce the risk of marine hazards:

- Look for and heed notices about local dangers and regulations.
- Choose a beach and picnic site away from river mouths, sewage outlets, and signs of dogs.
- Avoid direct contact with sand and soil by wearing appropriate footwear and using a chair or blanket.
- Observe standard precautions for swimming. (See the water safety section of the article ***Safety and Security***.)
- Waders and swimmers should wear appropriate footwear when stepping on or among underwater rocks, and shuffle rather than stride or stamp the sandy bottom. Sandals, tennis shoes, and water shoes/diving booties may not be effective because spines can penetrate rubber soles of shoes.
- Watch for tentacles of jellyfish, especially on shores where box jellyfish may be common; do not enter the water if jellyfish are present, especially during the Australian box jellyfish season (from October through May).
- Avoid touching or treading on spiny fish and look before searching rocky crevices and holes with bare hands.
- Beware of swimming, boating, or fishing in any estuarine or river waters of northern Australia or the Indo-Pacific coasts without obtaining informed local advice on the risk of saltwater crocodiles.
- Allow plenty of space for seals, sea lions, and fish that are very large or nesting on the reef.
- Remove glinting jewelry and watches if swimming with barracuda.
- Do not handle a jellyfish, spiny fish, cone snail, tiny octopus, or sea snake, even if it appears to be dead; most likely it is not, and some species can still envenomate after death.
- Wearing stinger suits, often made from Lycra, greatly reduces the risk of jellyfish stings.
- Beware of the contents of fishing nets.

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