You Can Still Get That?

Part of the allure of dive travel is the opportunity to enjoy unique environments both above and below the water. Exotic locations entice us with vivid beauty but may also harbor unique health risks. DAN's medical department is often asked to provide information on various travel-related ailments, and this article provides an overview of some of the topics about which we are asked most frequently.

For residents of many developed countries, the diseases and plagues of history are distant memories, far removed from our current consciousness. Advances in medicine and public health have either eradicated or minimized the impact of many diseases that used to claim countless lives. But the stark reality is that such diseases are still very real in many parts of the world, and some are spreading to areas that previously enjoyed sanctuary. Fortunately, most of the more serious diseases are preventable. Do some research before your trip; travel health begins at home. There are several sources of reliable, up-to-date and readily available information for travelers, including the websites of the Centers for Disease Control and Prevention (CDC) (in Europe, please refer to the The European Centre for Disease Prevention and Control – ECDC) and the World Health Organization (WHO). DAN defers to these resources for answers to questions about disease prevention and potential health risks faced by travelers.

Vaccinations

Preventing disease transmission and infection is one of the most powerful health-preservation techniques available. In addition to staying in good shape, getting sufficient sleep and maintaining adequate nutrition and hydration, vaccines are critical for protection against many diseases that have no specific treatment. Make sure your vaccinations are current, and ask your doctor if particular boosters or vaccinations are recommended for the area you'll be visiting. Among the most commonly recommended vaccines are those for hepatitis A and B and the combination booster for diphtheria, tetanus and pertussis (DTaP). Others include polio and varicella (chickenpox).

If you can't remember when or if you received these immunizations, your doctor can test the antibody levels in your blood to confirm sufficient immunity. As some of these vaccinations may require a series of injections, it is a good idea to talk to your doctor well before you travel.

Rabies

Rabies is a viral disease affecting the central nervous system that is most often transmitted through infected saliva from a dog or wild-animal bite. Nearly all cases of infection are fatal to those without immunization. Post-exposure vaccinations are effective for preventing rabies if they are administered before symptoms develop. Initial symptoms may last for days following a bite, are similar to the flu and include generalized weakness, fever and headache. Symptoms then progress from anxiety, confusion and agitation to delirium, hallucinations, insomnia, paralysis, difficulty swallowing and hypersalivation. Death usually occurs within days of these symptoms.

The CDC recommends avoidance of wild or unknown animals such as dogs, cats, raccoons, skunks, ferrets, foxes, monkeys and bats. If contact with any of these animals is possible, consider getting vaccinated. Rabies vaccination consists of a three-shot series administered over four weeks. Even if you receive a pre-exposure vaccination, you will still need immediate medical treatment if you are bitten or scratched by an animal that is a potential carrier.

Malaria

Malaria is a potentially fatal vector-borne infectious disease transmitted to humans and other vertebrates from female Anopheles mosquitoes. These night feeders can be found in tropical and subtropical areas around the world, and they may transmit protozoa of the genus Plasmodium into the bloodstream when they take a blood meal. According to the CDC, there were an estimated 216 million cases of malaria worldwide in 2010 and approximately 655,000 deaths, 91 percent of which occurred in Africa.

The CDC and the WHO maintain listings of malaria risk by country, island and specific region on their websites. As you make your travel plans, consult these sites to determine if malaria is endemic to your destination. With frequent global travel there may be outbreaks in countries where malaria is not normally found. The recommendations for prophylactic medication are based on which medicine or medicines are most effective for the risk area. The choice of medicine is based on the strain of nonresistant malaria dominant to the particular area.

Once a person is infected, the parasite travels through the blood to the liver, where it goes through an incubation period that lasts from one week to several months. After that, the parasites enter red blood cells, where they replicate to the point of rupturing the red blood cells. This rupturing causes flu-like symptoms and may cause darkening of the urine. Resistance to commonly used medicines is a growing worldwide problem. The WHO Department of Communicable Disease Surveillance and Response defines drug resistance as “the ability of a parasite strain to survive and/or multiply despite the administration and absorption of a drug given in doses equal to or higher than those usually recommended but within tolerance of the subject.” This generally applies to the persistence of parasites after treatment. There are individual parasites that are resistant to particular medicines.

The risk of contracting malaria differs by location. For most people traveling to regions where the disease is present, prevention is much easier, safer and less expensive than the cure.

Dengue Fever

Dengue fever is also a mosquito-borne disease. Transmitted by several species from the genus Aedes, the incidence and geographic spread of this viral infection is increasing. The mosquito species that spread dengue include Aedes aegypti and Aedes albopictus. Unique features of these mosquitoes are that they live and breed in proximity to human dwellings and are low-level flyers. According to the WHO, dengue is the most prevalent, worldwide, mosquito-borne viral disease, with more than 50 million infections estimated each year.

The initial infection may go unnoticed, or it may appear as flu-like symptoms. Individuals who experience no symptoms or mild, unremarkable symptoms may become carriers who enable international spread. Clinical manifestations of the disease typically occur within four to six days of being bitten. Symptoms include a sudden onset of chills, fever, severe headaches and intense muscle and joint aches, often referred to as “breakbone fever.” Other symptoms may include abdominal pain, vomiting and, in children, a cough. The symptoms typically last about a week, and some patients experience sudden temperature drops (known as saddleback fever) during the third or fourth day.

Of particular concern is the more severe form of dengue fever, known as dengue hemorrhagic fever (DHF). As the name implies, clinical signs include bleeding, bruising, blood in the urine and stool, rash and profound shock. This form of the disease results from repeat infection when the antibodies from the initial response are still present. Therefore it is most often seen in endemic areas (areas in which the disease is known to exist) and in infants within whom maternal antibodies are still present.

Diagnosis of dengue is largely based on clinical presentation and is more likely in endemic areas where

clinicians see the condition frequently. People who present to emergency rooms or primary-care offices who neglect to talk about recent travel may go undiagnosed. As this is a viral infection, treatment is supportive (intended to relieve symptoms), consisting primarily of fluids and pain medications. Although treatment is not curative, an elevated clinical suspicion may enable a more focused evaluation and preclude a lot of unnecessary testing. Such insight may also enable more appropriate surveillance and more rapid response in the event that symptoms worsen.

Mosquito Bite Prevention

An important component of preventing dengue and malaria is reducing the risk of being bitten by mosquitoes. Use of protective clothing (long sleeves, pants and closed-toe shoes) and DEET (N,N-Diethyl-meta-toluamide, the most common active ingredient in insect repellents) can minimize exposure. There is no evidence that products containing more than 50 percent DEET are any more effective. Window screens and removal of free-standing water in areas around your home will keep living spaces safer and decrease breeding opportunities. With regard to dengue fever, Aedes mosquitoes can't fly higher than a few metres, so use of elevated beds with mosquito screens are additional strategies with demonstrated effectiveness. These precautions also reduce the risk of bites and stings by other insects that are not as worrisome as mosquitoes but can nonetheless make a vacation less enjoyable.

Food and Drink

Operators of resorts and large hotels work to ensure the well-being of their guests; it is in their best interest to maintain a safe and healthy environment. In circumstances where you are not confident in the safety of food, consider the adage "boil it, cook it, peel it or forget it." Hot and steaming is safe, as is fruit if it is freshly peeled by the consumer. Bread is safe, too, but avoid buffets, room-temperature foods, previously peeled fruit, raw produce and salads. Also avoid raw or insufficiently cooked seafood and milk products unless they are boiled or pasteurized.

Tap water at resorts is usually safe to drink, but do not hesitate to ask about the water supply and purification process before use. Venturing outside resorts increases uncertainty. The source of the water may not be known, and its potability may be suspect. Factory-sealed bottled water is safe, as are other sealed beverages. Filling water bottles or obtaining bottled water from the resort before exploring is a good idea in some areas. If you have any doubt about whether a water bottle you have bought is truly sealed, do not drink it. Ice is also suspect, especially if you are uncertain of the water source.

Ciguatera

The risk of many foodborne pathogens such as salmonella, E. coli or scombroid can be minimized by following safe handling guidelines, but there are exceptions to this rule. Ciguatera is a notable example. Ciguatoxin is originally produced by dinoflagellates, minute marine organisms eaten by herbivorous fishes, which are in turn eaten by larger predatory fish such as jacks, barracuda, snapper and grouper. What makes this toxin different is that it is heat stable, which means cooking does not break down the toxin.

Symptoms of ciguatera typically appear within six to 12 hours of ingestion and include nausea, vomiting, diarrhea and numbness or tingling of the lips and skin around the mouth. The numbness and tingling can spread to the extremities. There may even be a reversal of hot and cold sensations. This toxin is not generally life-threatening, but there have been exceptions. Symptoms of ciguatera have been mistaken for decompression sickness, but hyperbaric treatment has no effect. Care is supportive, and symptoms usually resolve within a few days or weeks.

The best resource for knowing what fish is safe to eat is local residents, so don't be afraid to

ask.

Traveler's Diarrhea

Despite our best efforts at prevention, traveler's diarrhea may strike. It can usually be managed without professional medical care, but it is important to know when to seek care and to not wait too long before doing so. The following points should be used as guidelines for when to seek assistance:

• Diarrhea with accompanying abdominal pain that lasts for more than 12 hours
• Diarrhea with a fever of 39˚C or higher
• Pain that is localized to a specific area of the abdomen
• Unusual tenderness or hardness of the abdomen
• Signs of shock (dizziness, rapid breathing, rapid pulse, sweating, anxiety)
• Blood in the urine or stool

Even if none of these serious warning signs is present, anyone who has diarrhea for 24 hours or longer should seek medical treatment. Fluid loss may surpass the individual's ability to replace the loss solely by drinking. Over-the-counter medications to minimize diarrhea are often used and may decrease discomfort. These should not be used for more than a day or two; they are better considered as temporary relief than a definitive solution. Antibiotics may also be prescribed for traveler's diarrhea and can speed resolution.

Wounds

High heat and humidity, endemic pathogens and varying levels of sanitation mean some tropical environments present a higher risk for infection of wounds. Immediate, thorough cleaning is important once any bleeding is under control. Irrigate the wound with water clean enough to drink to remove debris and help flush out pathogens. Wash around the wound with soap; the same soap you would use at home is fine. Consider application of a topical antibiotic ointment and a sterile dressing. It is important to keep the wound as clean and dry as possible. Repeat this process every day until the wound is closed. Any redness, fever, increased drainage or pain should prompt medical attention.

The best defense against disease is maintenance of good health. Routine hygiene, a healthy diet and regular exercise are essential. Knowing what diseases you are likely to encounter will provide direction for preventative measures and help guide your choices when it comes to eating and drinking, excursions and activities. With proper planning and preventive strategies, your travels can be rewarding and uncomplicated.

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Malaria Medications and Diving

Traveling divers frequently ask which malaria medicines are safe for diving. There is a particular piece of incorrect information that surfaces from time to time. It has been stated erroneously that some malaria medications increase the risk of decompression illness (DCI). There is no evidence this is true. Mefloquine (Lariam®) may produce side effects that could potentially mimic symptoms of DCI. Less-common side effects that raise concern are vivid or bizarre dreams, restlessness or anxiety, confusion, paranoia and depression. These side effects are rare but clearly problematic should any of them occur during a dive.

The DAN Medical Information department has received reports of dive operators in certain parts of the world who denied service to divers using mefloquine because of some of the drug's known side effects. Due to this possible controversy, divers should consider requesting an alternative medication that is

equally suitable for the area of travel. Some branches of the U.S. military prohibit flight crews and diving personnel from using mefloquine.

The most common alternative medications are chloroquine (Aralen®), atovaquone/proguanil (Malarone®) and doxycycline, none of which are known to be particularly problematic for divers. Verify which medication or medications are effective for your planned destination using the CDC's website (ECDC in Europe) or WHO's website and then discuss the advantages and disadvantages of each medication with your personal health-care provider.