

# Insect and tick bite avoidance



## Content Sections

- Overview
- Risk for travellers
- Before travel
- During travel
- After travel
- Resources

## Key Messages

A number of different diseases can be transmitted by insect or tick bites, these are called vector-borne diseases. Insect bites can also lead to skin irritation or skin infections.

Travellers should reduce their risk by using bite avoidance measures described in this article. For many vector-borne diseases, avoiding bites is the only means of prevention.

Destination specific information can be found on the [Country Information pages](#). Where vaccines or malaria tablets are recommended, travellers should seek a pre travel appointment with their health care provider.

Travellers should pack appropriate equipment for their destination; this may include protective clothing, repellents, mosquito nets, fine tipped tweezers and a first aid pack.

Travellers with a high fever 38C or more or other worrying symptoms should seek prompt medical advice. Malaria symptoms may occur up to a year after travel.

## Overview

---

Insect and tick bites are relatively common in travellers, they usually only cause minor irritation. However some insect or tick bites can result in skin infections [1, 2] and a number of diseases can be transmitted by these vectors.

Vaccinations or tablets are available to prevent some of these diseases, but for many, bite avoidance is the only way to prevent infection.

Examples of biting insects and the some of the diseases they transmit:

### Mosquitoes

Mosquitoes are attracted by several factors, including the presence of carbon dioxide, heat, odours and movement. The female mosquito requires a blood meal in order to reproduce. There are many mosquito species; some species bite during daylight hours (e.g. *Aedes* spp.), and some are more active from dusk to dawn (e.g. *Anopheles* spp.). Diseases mosquitoes transmit include chikungunya, dengue, Japanese encephalitis, malaria, West Nile fever and yellow fever.

### Flies

Black flies, transmit [onchocerciasis \(river blindness\)](#). They bite during daylight hours and live close to fast-flowing water.

Sand flies, transmit [leishmaniasis](#), are found in many areas of the world and are most active between dusk and dawn; however, they do bite during daylight hours if disturbed. Sandflies usually feed close to the ground.

Tsetse flies transmit [African trypanosomiasis](#) (sleeping sickness) and inhabit the dense vegetation and savannah areas in sub-Saharan Africa. They are attracted to dark, contrasting colours, particularly the colour blue, and to moving objects such as cars, canoes, animals and people.

### Reduviid bug (Triatome bugs)

Reduviid bugs, transmit [American trypanosomiasis](#) (Chagas disease). They inhabit cracks in the walls and roofs or buildings constructed from mud or thatch in Latin America. The infection is transmitted following contact with the faeces of an infected bug.

### Fleas

A number of different species of fleas can feed on humans. Fleas can transmit plague and flea-borne rickettsiosis.

### Ticks

(note these are not insects but arachnids)

Ticks typically live in long grassy areas. They usually feed on small mammals. On humans, ticks crawl on skin or clothing until they find a suitable place to attach and feed, often at a skin fold in the groin, under the arm, at the scalp line, or at the edge of underclothes. Diseases, such as Crimean Congo haemorrhagic fever, Lyme disease and tick-borne encephalitis are transmitted by ticks.

## Risk for travellers

---

According to the World Health Organization (WHO), vector-borne diseases (those transmitted by insects or ticks) account for more than 17 percent of all infectious diseases, causing more than one million deaths annually [3]. The risk of bites and contracting a vector-borne disease for travellers varies with destination and often season and rainfall patterns. Destination specific information on some of these diseases can be found on the [Country Information pages](#).

## Before travel

Travellers should research their destination ([see Country Information pages](#)). If vaccinations or malaria tablets are needed, a pre-travel appointment should be booked with a health care provider ideally at least four to six weeks before departure. For those with less time, an appointment is still worthwhile.

Travellers should consider if they need to pack protective clothing, insect repellents, insecticide treated bed/cot nets, plug in insecticides and a first aid pack with items to manage insect bites if they are causing irritation (see during travel).

## During travel

Travellers can use personal protection measures to reduce insect and tick bites. They should be aware of the risk and try to avoid areas known to be heavily infested.

### Clothing

When travelling in areas with malaria it is advisable to wear loose-fitting clothes with long trousers and long sleeves in the evenings. Travellers to areas with a risk of dengue or chikungunya infection should cover up during the daytime if possible, as the *Aedes* spp. mosquitoes that transmit these diseases bite between dawn and dusk.

Clothing can be treated with an insecticide (e.g. permethrin), which kills insects, including ticks, on contact. Permethrin is available in formulations designed to be sprayed on to clothing and this provides protection against mosquitoes, ticks, fleas, lice, sand flies, triatome bugs and tsetse flies [4]. Insect repellents such as DEET can also be applied to natural fibres such as cotton trousers and shirts. However, this repellent can destroy artificial fibres or plastic, the instructions on the pack should be followed.

In tick-infested areas, trousers should be tucked into socks to prevent ticks from crawling up the legs.

Those travelling in Africa in areas where tsetse flies exist should avoid dark blue clothing.

### Insect repellents

N, N-diethylmetatoluamide (DEET) based repellents are the most effective [4]; they have been widely tested under field conditions, and have been used for more than 50 years. DEET is available in several concentrations. Concentrations of 20 percent have been shown to offer protection for 1-3 hours, and higher concentrations provide longer-lasting protection [5]. As the duration of protection plateaus at concentrations higher than 50 percent, there is no need to use repellents with concentrations greater than this [5].

DEET-containing preparations should not be used in babies younger than two months of age. They can be used in concentrations up to 50 percent in pregnant or breast-feeding women, and in infants and children

---

older than two months [5]. Manufacturers in the UK have applied their own age restrictions; however, there is no evidence that using DEET on infants and children older than 2 months causes harm. Care should be taken to ensure that repellents are not ingested, and that they do not come into contact with the eyes or mouth.

Repellents should be reapplied at regular intervals, after swimming and in hot, humid conditions when they may be removed by perspiration. When both sunscreens and repellents are used, the repellent should be applied over sunscreen [6].

Studies show DEET repellents can decrease protection of SPF 15 sunscreen, but there is no evidence that sunscreen reduces efficacy of DEET when used at concentrations above 33%. Repellent activity will reduce more quickly than that of sunscreen if reapplying only sunscreen on top. Therefore repellent will usually need to be **reapplied** on top of a sunscreen. 30 to 50 SPF sunscreen should be applied to compensate for DEET-induced reduction in SPF. Sunscreen is not required from dusk to dawn.

Research and extensive clinical experience indicate that DEET is very safe when used according to the manufacturer's instructions [5].

### **Insect repellent: advice for travellers**

Use only on exposed areas of skin or natural fibres on clothing.

Remove with soap and water when the repellent is no longer needed.

Do not spray directly on the face; apply repellent to hands then to the face to avoid contact with lips and eyes. Wash hands after application.

Do not apply to cuts, abrasions or irritated skin.

When both sunscreen and DEET are needed, DEET should be applied **after** sunscreen.

Sunscreen that is combined with repellent should usually be avoided.

Picaridin (Autan®) and lemon eucalyptus extract or PMD (Mosiguard®) are available for those who prefer not to use DEET-based products [5, 7]. These repellents have compared favourably with DEET [4]. Picaridin should be used in concentrations of approximately 20 percent.

### **Screening and mosquito nets**

Travellers staying in accommodation without screening should sleep under a net to avoid being bitten at night.

Mesh size in mosquito bed nets should be no larger than 1.5 mm. Nets should be impregnated with permethrin (or other contact insecticides); most nets have been treated prior to purchase. Nets may need to be impregnated with permethrin again after six months of use; long-lasting insecticide nets will generally not need treating frequently [8]. Contact insecticides will kill insects landing on the net and therefore increase the effectiveness.

Travellers can carry a small sewing kit or tape so that repairs can be made if the net develops a hole. Extra equipment for hanging the net can be helpful including extra string or wire hooks.

### **Other preventative measures**

Knock down sprays that are designed to kill flying insects are not likely to provide sufficient protection from either nuisance biting or malaria prevention [4].

A systemic review demonstrated that mosquito coils can decrease bites by repelling and killing mosquitoes [9]. Coils, which contain synthetic insecticide, may be useful for some travellers but they

---

should only be used outdoors [5].

Those living or staying in areas with vector-borne diseases can reduce mosquito breeding sites around the home by removing any pools of water in ditches and rubbish collected in the area.

Air conditioning reduces the likelihood of mosquito bites as a result of substantial reduction in night time temperature [5]. Ceiling fans reduce mosquito nuisance [5].

### Measures that cannot be recommended for repelling insects

- Bath oil
- Citronella oil-based repellents (these have very short durations of action)
- Citrosa plant (geranium)
- Garlic: fresh or capsules
- Vitamin B12 complex
- Yeast extract spread
- Electronic (ultrasonic) buzzer devices
- Vitamin B1 tablets
- Tea tree oil

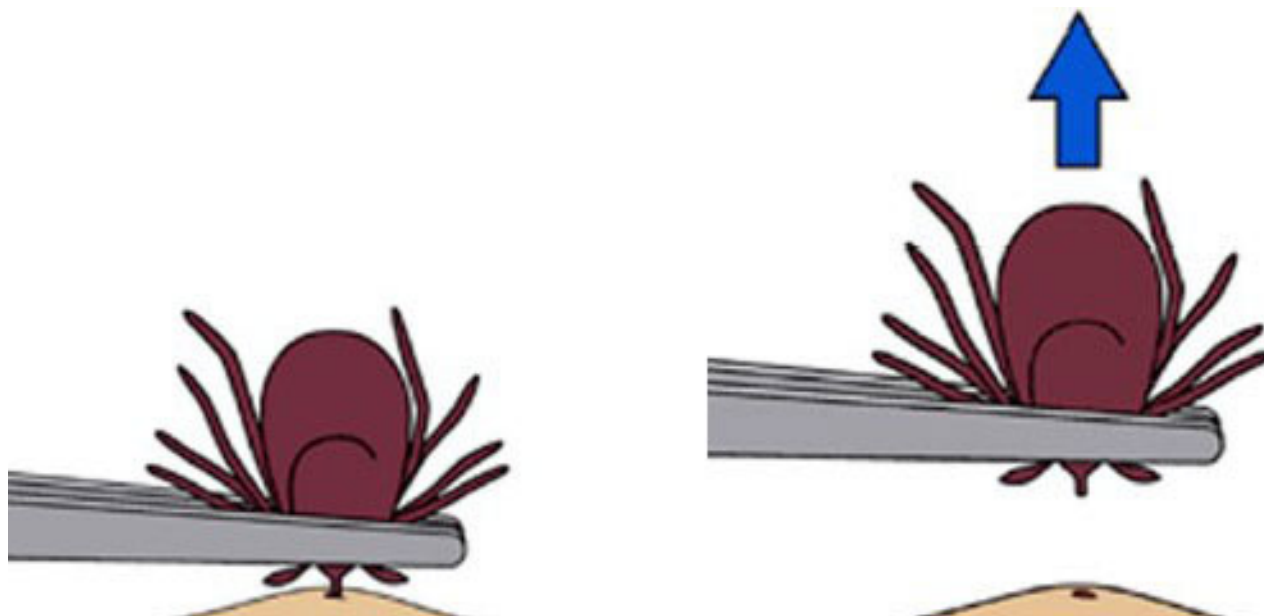
### Treatment of insect/tick bites

Mosquito bites usually appear as small, red, raised papules that itch. Application of a cold compress to the bite site may provide relief from pain or itching [10-11].

Local swelling can be reduced by the topical application of a mild steroid cream. Antihistamine tablets can be taken to relieve itching. Mosquito bites should not be scratched and should be kept clean and dry to avoid infection. Antiseptic and basic wound dressings can be helpful if the bite is causing irritation and may get infected.

Ticks need to be removed from the skin very carefully. This can be done with fine tipped tweezers or specially designed tick removers. Grasp the tick near to the skin and steadily pull out the tick being careful not to crush the tick's body or squeeze the stomach contents into the site of the bite.

Figure 1: How to remove a tick



Travellers should avoid covering the tick with solutions such as nail varnish or petroleum jelly or using heat to remove the tick.

## After travel

Those with fever (38C or more) or other worrying symptoms after travel should seek prompt medical help. Malaria symptoms can appear up to a year after travel. Insect bites can sometimes get infected; become swollen, painful and red with pus where the bite occurred. Travellers should contact their GP if they are concerned about the symptoms; antibiotics may be required.

## Resources

Goodyer LI, Croft AM, Frances SP, et al. Expert review of the evidence base for arthropod bite avoidance. *J Trav Med.* 17:182-92, 2010.

[NHS Choices: Insect bites and stings](#)

Lupi E, Hatz C, Schlagenhauf P, The efficacy of repellents against Aedes, Anopheles, Culex and Ixodes spp. – a literature review. *Travel Med. Infect. Dis.* Nov-Dec 2013;11(6):374-411.

[Public Health England, Advisory Committee on Malaria Prevention \(ACMP\): Guidelines for malaria prevention in travellers from the UK 2014.](#)

[Public Health England: Ticks and your health](#)

First Published : 10 Mar 2015

Last Updated : 22 Sep 2015