NICE National Institute for Health and Care Excellence

Public Health England

NICE guideline

Insect bites and stings: antimicrobial prescribing

NICE guideline

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Your responsibility

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

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Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

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Overview

This guideline sets out an antimicrobial prescribing strategy for insect and spider bites and stings in adults, young people and children aged 72 hours and over, including those that occurred while travelling outside the UK. It aims to limit antibiotic use and reduce antibiotic resistance.

See a 1-page visual summary of the recommendations.

The recommendations in this guideline were developed before the COVID-19 pandemic.

For treating infections associated with other bites and stings, see our webpage on bites and stings. We have also produced NICE guidelines on cellulitis and erysipelas, and antimicrobial stewardship: systems and processes for effective antimicrobial medicine use.

Who is it for?

- Healthcare professionals
- People with insect bites and stings, their families and carers

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Recommendations

1.1 Managing insect bites and stings

Assessment and advice

1.1.1 Be aware that:

- a rapid-onset skin reaction from an insect bite or sting is likely to be an inflammatory or allergic reaction, rather than an infection
- most insect bites or stings will not need antibiotics.

1.1.2 Assess the type and severity of the insect bite or stings to identify:

- a local inflammatory or allergic skin reaction
- erythema migrans (bullseye rash), a sign of Lyme disease (see the NICE guideline on Lyme disease)
- symptoms or signs of an infection
- a systemic reaction (see the recommendations on referral and seeking specialist advice).

1.1.3 Advise people with an insect bite or sting that:

- a community pharmacist can advise about self-care treatments
- skin redness and itching are common and may last for up to 10 days
- it is unlikely that the skin will become infected
- avoiding scratching may reduce inflammation and the risk of infection
- they should seek medical help if symptoms worsen rapidly or significantly at any time, or they become systemically unwell.

1.1.4 For people with a known or suspected tick bite, follow the NICE guideline on Lyme disease.

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For a short explanation of why the committee made these recommendations, see the rationale section on assessment and advice.

For more details, see the evidence review.

Treating a local inflammatory or allergic skin reaction

1.1.5 Do not offer an antibiotic for an insect bite or sting in people who do not have symptoms or signs of an infection.

1.1.6 Be aware that people may wish to consider oral antihistamines (in people aged over 1 year) to help relieve itching, even though there is uncertainty about their effectiveness in managing insect bites or stings. Some antihistamines cause sedation, which may help at night.

Treating an infected insect bite or sting

1.1.7 For people with an insect bite or sting who have symptoms or signs of an infection, see the recommendations on choice of antibiotic in the NICE guideline on cellulitis and erysipelas.

For a short explanation of why the committee made these recommendations, see the rationale section on treatment.

For more details, see the summary of the evidence.

Reassessment

1.1.8 Reassess people with an insect bite or sting if:

- symptoms or signs of an infection develop (see the NICE guideline on cellulitis and erysipelas)
- their condition worsens rapidly or significantly, or they become systemically unwell
- they have severe pain out of proportion to the wound, which may indicate the presence of toxin-producing bacteria.

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1.1.9 When reassessing people with an insect bite or sting, take account of other possible diagnoses such as Lyme disease (see the NICE guideline on Lyme disease).

Referral and seeking specialist advice

1.1.10 Refer people with an insect bite or sting to hospital if they have symptoms or signs suggesting a more serious illness or condition, such as a systemic allergic reaction (see the NICE guideline on anaphylaxis).

1.1.11 Consider referral or seeking specialist advice for people with an insect bite or sting if:

- they are systemically unwell
- they are severely immunocompromised, and have symptoms or signs of an infection
- they have had a previous systemic allergic reaction to the same type of bite or sting
- it is in the mouth or throat, or around the eyes
- it has been caused by an unusual or exotic insect
- they have fever or persisting lesions associated with a bite or sting that occurred while travelling outside the UK.

For a short explanation of why the committee made these recommendations, see the rationale section on referral and seeking specialist advice.

For more details, see the evidence review.

Terms used in the guideline

Cellulitis and erysipelas

Infections of the tissues under the skin (subcutaneous), which usually result from a contaminated break in the skin. Both conditions are characterised by acute localised inflammation and oedema. The lesions are more superficial in erysipelas and have a well-defined, raised margin.

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Erythema migrans

Erythema migrans is an expanding rash often seen in the early stage of Lyme disease, and can also (but less commonly) be caused by southern tick-associated rash illness. It usually becomes visible from 1 to 4 weeks (but can appear from 3 days to 3 months) after a tick bite and lasts for several weeks.

Insect bite or sting

For the purpose of this guideline, 'insect bites' also includes bites from spiders and ticks. Insects may bite with their mouthparts when feeding or defending themselves. Stings come from bees, wasps and hornets and are used only for defence.

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Rationales

The recommendations in this guideline are based on the evidence identified and the experience of the committee.

Assessment and advice

Why the committee made the recommendations

Recommendations 1.1.1 to 1.1.4

Most insect bites and stings can be treated at home with simple first aid, with advice from a community pharmacist. Prescribers are unlikely to be involved even when, rarely, symptoms may last for up to 10 days. This is because secondary bacterial infection is rare. The committee agreed that, usually, knowing what caused the bite or sting is unlikely to change how it is treated.

The committee also noted that redness, itchiness, or pain and swelling after an insect bite or sting is much more likely to be an inflammatory or allergic reaction rather than an infection, especially when there is a rapid onset. They recognised that inflammation after an insect bite or sting may appear like an infection but does not mean that antibiotics are needed. The committee noted that the extent of redness from an insect bite or sting may be less visible on darker skin tones, and healthcare professionals should take this into account when assessing insect bites.

The committee agreed that it was important to prompt people to think about whether the bite may be a tick bite, and to check whether erythema migrans is present. This is so that a known or suspected tick bite can be managed appropriately in line with the NICE guideline on Lyme disease.

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Treatment

Why the committee made the recommendations

Recommendations 1.1.5 to 1.1.7

Although biting insects can carry bacteria on their mouthparts, most infected bites are likely to be secondary bacterial infections that arise from scratching the bite lesion. Symptoms and signs of

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infection most likely indicate cellulitis and should be treated with antibiotics in line with the NICE guideline on cellulitis and erysipelas.

There is limited evidence with high uncertainty for the use of oral antihistamines in reducing lesion size and itchiness from mosquito bites. However, based on their experience, the committee agreed that oral antihistamines may help to relieve itching. Although the included study of oral antihistamines compared with placebo included only children who were aged 2 years and over, the committee acknowledged that oral antihistamines are also an option for adults and children under 2 years. Not all antihistamines are licensed for treating insect bites and stings, and not all antihistamines are licensed in young children. The committee also discussed the use of sedating antihistamines in children, noting that the BNF for children states: 'sedating antihistamines are occasionally useful when insomnia is associated with urticaria and pruritus'.

No evidence was found for other self-care treatments that are often used in practice (such as topical corticosteroids, topical antihistamines and analgesics). However, studies published before the year 2000 that compared these treatments were not included in the literature search. Given the range of potential self-care treatments and differences in licensed indications, the committee concluded that a community pharmacist is ideally placed to advise people about managing an insect bite or sting at home.

For more detail, see the summary of the evidence on oral antihistamines for uninfected mosquito bites in adults and antihistamines for uninfected mosquito bites in children.

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Referral and seeking specialist advice

Why the committee made the recommendations

Recommendations 1.1.10 to 1.1.11

Insect bites and stings are the second most common cause of serious allergic reactions, so the committee agreed that people with symptoms or signs of a serious allergic reaction should be referred for urgent care.

It is also important to consider referral or seeking specialist advice in the following situations:

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- people who have had a previous systemic allergic reaction to the same type of bite or sting because a serious allergic reaction is more likely
- people with a bite or sting in the mouth or throat, or around the eyes
- people with a bite or sting from an unusual or exotic insect or spider, because management may be different (for example, certain spider bites can lead to tissue necrosis)
- people with fever or persistent lesions after an insect bite or sting from outside the UK because this may indicate a more serious illness such as rickettsia or malaria.

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Context

An insect bite or sting often causes a small, red lump on the skin, which may be painful and itchy. Secondary bacterial infection is unlikely; it is unclear which causative organisms are most common.

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Summary of the evidence

This is a summary of the evidence. For full details, see the evidence review.

The evidence included:

- 1 randomised controlled trial in adults with extensive cellulitis caused by an arthropod bite (Friedland et al. 2012)
- 1 systematic review of double-blind crossover randomised controlled trials of oral antihistamines in people with uninfected mosquito bites (Foex et al. 2006)
- 2 double-blind crossover randomised controlled trials of oral antihistamines in people with uninfected mosquito bites (Karpinnen et al. 2006 and Karpinnen et al. 2012)
- 1 retrospective study (Dyachenko and Rozenman 2006) of treatments in people with an uninfected bite (confirmed or presumed to be caused by a brown recluse spider).

Randomised controlled trial evidence was only identified for the effectiveness of oral antihistamines in adults and children with mosquito bites and for intravenous antibiotics in adults with an infected arthropod (of undefined species) bite. Only 1 of the randomised controlled trials included people with a secondary infection of their bite and this was a subgroup of people with an infected arthropod bite from a larger trial.

No evidence was identified for antibiotics in children and young people.

Antibiotics for infected arthropod bites in adults

Based on clinical response at day 3, there was no statistically significant difference in the clinical effectiveness of intravenous ceftaroline compared with intravenous vancomycin plus intravenous aztreonam (Friedland et al. 2012) in adults with extensive cellulitis caused by an arthropod bite. No adverse effect data were reported.

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Oral antihistamines for uninfected mosquito bites in adults

Cetirizine 10 mg once or twice daily compared with placebo

There was no statistically significant difference in median mosquito bite lesion size at 10 minutes, 60 minutes, 12 hours or 24 hours with cetirizine compared with placebo. In 2 studies, there was a statistically significant difference in median mosquito bite lesion size at 15 minutes compared with placebo (but no statistically significant difference was seen in a third study).

There was no statistically significant difference in pruritus after mosquito bite exposure at 10 minutes, 30 minutes, 90 minutes, 24 hours, 48 hours, 5 days or 7 to 10 days with cetirizine compared with placebo. However, there was a statistically significant reduction in mean or median pruritus scores at other time points: 15 minutes, 60 minutes, 12 hours, and at days 3, 4 and 6.

There was no statistically significant difference in adverse effects (mild to severe sedation, headache, emesis or arthralgia) at follow up.

In 1 study, 7 of 9 people preferred cetirizine 10 mg twice daily (1 preferred placebo and the other had no preference).

Levocetirizine 5 mg once daily compared with placebo

There was a statistically significant reduction in both median mosquito bite lesion size and median pruritus scores at 15 minutes, and in delayed bite lesions at 24 hours.

There was no statistically significant difference in adverse effects (mild to moderate somnolence) at follow up.

Loratadine 10 mg once daily compared with placebo

There was no statistically significant difference in median mosquito bite lesion size or median pruritus scores at 15 minutes.

There was no statistically significant difference in adverse effects (mild to moderate sedation) at follow up.

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Rupatadine 10 mg once daily compared with placebo

There was a statistically significant difference in median mosquito bite lesion size at 15 minutes, but no statistically significant difference in delayed bite lesion size at 24 hours. There was also a statistically significant reduction in median pruritus scores at 15 minutes but no statistically significant difference for delayed bite reaction pruritis at 24 hours.

Adverse effects (sedation) were statistically significantly increased at follow up.

Antihistamines for uninfected mosquito bites in children

Loratadine 0.3 mg/kg once daily compared with placebo

There was a statistically significant reduction in median bite lesion size at 15 minutes and 24 hours but no statistically significant difference at 2 hours and 6 hours. There was also a statistically significant reduction in median pruritus score at 15 minutes.

There was no statistically significant difference in adverse effects (mild gastrointestinal pain and diarrhoea) at follow up.

Treatments for uninfected brown recluse spider bites

A single-centre retrospective study (Dyachenko and Rozenman 2006) reported data for 52 people with an uninfected bite that was confirmed or presumed to be caused by a brown recluse spider. The study included people aged 9 to 66 years; results were not broken down by age.

All patients had prophylactic antibiotics (92.3% had cefalexin; no further details given), rest, cold compression and elevation. Most patients (92.3%) had prednisolone and an antihistamine (no further details given), and 21 patients (40.4%) had a non-steroidal anti-inflammatory drug. All the outcomes were assessed as being of very low quality.

The authors concluded that none of the treatments prevented necrotic lesions, and their role in time to healing and length of hospital stay was unclear.

See the evidence review for more information.

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