

# Insect Allergy



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## KEYWORDS

- Insect bites • Insect stings • Diagnosis • Treatment • Allergic reaction
- Anaphylaxis • Venom immunotherapy

## KEY POINTS

- Insect bites and stings are common and mostly clinically mild, but providers should be aware of potential systemic reactions, including anaphylaxis.
- Common insects that bite or sting include mosquitoes, ticks, flies, fleas, biting midges, bees, and wasps; immunocompromised patients or patients with hypersensitivity reactions may experience large local reactions or papular urticaria.
- The key to diagnosis is a thorough clinical history and identification of the insect when possible; skin testing and serum immunoglobulin E levels are indicated for certain high risk patients.
- Management of insect bites or stings is usually supportive care with antihistamines, pain medications, and cold compresses; patient with anaphylaxis should be given epinephrine and transported to the emergency department.
- Venom immunotherapy (VIT) can be helpful for patients with anaphylaxis or risk for severe reactions; VIT is highly effective in reducing the risk of future reactions.

## INTRODUCTION

The purpose of this article is to review the current available material pertaining to insect bites and stings. It will review the development, presentation, and treatment of both common insect bites and insect stings. Although the clinical presentation may be similar between insect bites and insect stings, the evaluation and treatment can differ considerably. The proper diagnosis and treatment can decrease the risk of complications, which can include life-threatening anaphylaxis.

## BACKGROUND

Insects are arthropod invertebrates characterized by an exoskeleton and a 3-part body with 3 pairs of jointed legs. There are an estimated 4 to 6 million species of insects,<sup>1</sup> which represent over 50% of all living organisms on earth.<sup>2</sup> Insect bites and

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stings are common and generally clinically mild, but can lead to serious medical conditions, including life-threatening complications. Common insects that bite include: bedbugs, chiggers, fleas, flies, mosquitoes, and ticks. Common insect stings, involving in the introduction of venom into people, include ants, bees, and centipedes.

## EPIDEMIOLOGY

Exact incidence statistics on insect bites or stings is unknown, as most people bitten or stung have mild local reactions that are not reported or tracked. In Europe, between 56% and 94% of people report being stung by a Hymenoptera insect.<sup>3</sup> The prevalence of systemic reactions to Hymenoptera stings is reported to be 0.5% to 3.3% in adults and 0.15% to .8% in children.<sup>4</sup> In Florida, review of emergency department billing codes suggests that 42% of pediatric patients experienced systemic reactions to Hymenoptera stings.<sup>5</sup>

Among stinging ant endemic areas of the United States, 55% of people reported being stung within a 3-week period.<sup>3</sup> The prevalence, however, of systemic anaphylaxis to ant stings is reported to be less than 1%.<sup>6</sup>

Approximately 40 to 100 Americans die annually from insect bites or stings, although many experts believe the true mortality is higher.<sup>7</sup>

## RISK FACTORS

Risk factors for insect bites and stings are related strongly to environmental exposure. People who live next to bodies of water or wetlands are at risk for mosquitoes, biting midges, or other insects that require nearby water to reproduce. Living near wooded or grassy areas is a risk factor for tick bites. People who work with or live with animals, particularly horses, dogs, or cats are at risk for fly or flea bites. Finally, occupational hazards like gardening or beekeeping increase the risk for insect-specific bites or stings. Seasonal exacerbation of papular urticaria may occur, related to the re-exposure of the insect.<sup>8</sup>

## CLINICAL PRESENTATION

Insect bites and stings typically result in mild, local, allergic reactions. Delayed hypersensitivity and systemic reactions including anaphylaxis are rare but may occur. Most insect bites and stings result in a local inflammatory response at the specific site. Large areas of redness, itching, and swelling mimicking cellulitis may occur.<sup>9</sup> Vesicular or bullous lesions may also arise (**Fig. 1**).<sup>10</sup>

One common response to insect bite or stings is papular urticaria (**Table 1**). This insect bite-induced hypersensitivity reaction is common in children ages 2 to 10, but can occur in adolescents and adults. Common insect culprits include mites, ticks, fleas, mosquitoes, and flies. Typically, papular urticaria presents as recurrent erythematous, pruritic papules from 3 to 10 mm in size, with possible vesicles and wheals. Papular urticaria often occurs in a line or grouped in clusters. Extremities and clothing-constricted areas like ankles and waistbands are common presenting areas for papular urticaria. Genital, perianal, and axillary regions are not usually involved.<sup>8,11</sup>

Immunocompromised patients, including those with human immunodeficiency virus (HIV) or cancer, may develop more severe local allergic reactions and systemic signs, including fever, malaise, headache, and lymphadenopathy (**Fig. 2**).<sup>12,13</sup> Some patients may develop these systematic symptoms and signs without being immunocompromised. In severe cases, insect bites and stings may cause anaphylaxis, “a severe, potentially fatal, systemic allergic reaction that occurs suddenly after contact with

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