

# What's Eating You? Bedbugs

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## PRACTICE POINTS

- Bedbug exposures in the workplace are on the rise.
- High clinical suspicion is required when atypical dermatoses are not responding to therapy and histology suggests arthropod exposure.
- Once detected, partnership with occupational health and pest management experts is critical to eradicate bedbugs.

Bedbugs are a known household scourge that also have become an increasing problem in the corporate space. These pests have adapted to the office environment, finding new harborages in which to thrive and devising new ways to obtain blood meals during the day. Bedbugs pose a considerable public health problem, and managing the epidemic will require vigilance by health care professionals as well as patient education on prevention. We present the case of a 42-year-old man with treatment-refractory pruritic papules over the bilateral posterior arms that were attributed to a bedbug infestation at his workplace.

*Cutis*. 2019;103:31-33.

Bedbugs are common pests causing several health and economic consequences. With increased travel, pesticide resistance, and a lack of awareness about prevention, bedbugs have become even more difficult to control, especially within large population centers.<sup>1</sup> The US Environmental Protection Agency considers bedbugs to be a considerable public health issue.<sup>2</sup> Typically, they are found in private residences; however, there have been more reports of bedbugs discovered in the workplace within the last 20 years.<sup>3-5</sup> Herein, we present a case of bedbugs presenting in this unusual environment.

## Case Report

A 42-year-old man presented to our dermatology clinic with intensely itchy bumps over the bilateral posterior arms of 3 months' duration. He had no other skin, hair, or nail concerns. Over the last 3 months prior to dermatologic evaluation, he was treated by an outside physician with topical steroids, systemic antibiotics, topical antifungals, and even systemic steroids with no improvement of the lesions or symptoms. On clinical examination at the current presentation, 8 to 10 pink dermal papules coalescing into 10-cm round patches were noted on the bilateral posterior arms (Figure 1). A punch biopsy of the posterior right arm was performed, and histologic analysis showed a dense superficial and deep infiltrate and a perivascular infiltrate of lymphocytes and eosinophils (Figure 2). No notable epidermal changes were observed.

At this time, the patient was counseled that the most likely cause was some unknown arthropod exposure. Given the chronicity of the patient's disease course, bedbugs were favored; however, an extensive search of the patient's home failed to uncover any arthropods, let alone bedbugs. A few weeks later, the patient discovered insects emanating from the mesh backing of his office chair while at work (Figure 3). The location of the intruders corresponded exactly with the lesions on the posterior arms.

## NEW PODCAST

Dr. Bart D. Wilkison and Dr. Brandon W. McNally discuss bedbugs in the workplace with *Cutis* Editor-in-Chief Vincent A. DeLeo, MD, in a new episode of the "Peer to Peer" podcast

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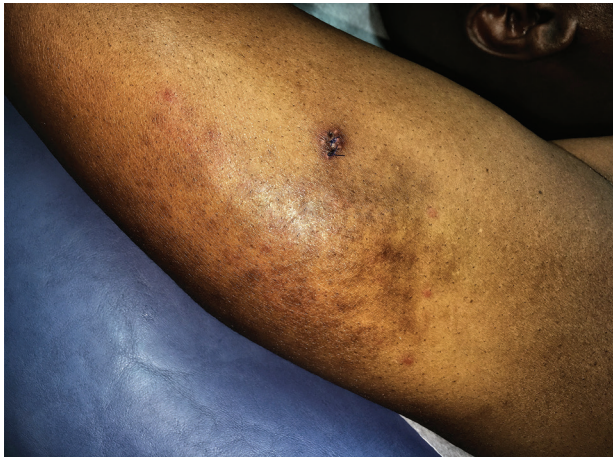


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The authors report no conflicts of interest.

The opinions and assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the Department of the Army or the Department of Defense.

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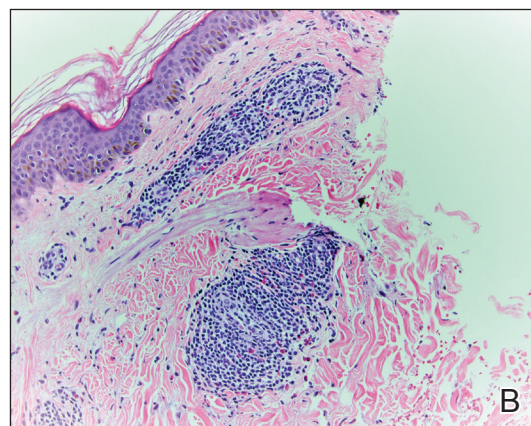
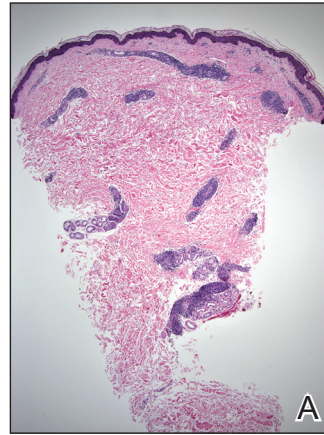
**FIGURE 1.** Several pink, ill-defined papules coalescing into a 10-cm patch on the posterior right arm. Sutures show the punch biopsy location.

The occupational health office at his workplace collected samples of the arthropods and confirmed they were bedbugs. The patient's lesions resolved with topical clotetasol once eradication of the workplace was complete.

## Discussion

**Morphology and Epidemiology**—Bedbugs are wingless arthropods that have flat, oval-shaped, reddish brown bodies. They are approximately 4.5-mm long and 2.5-mm wide (Figure 4). The 2 most common species of bedbugs that infect humans are *Cimex lectularius* and *Cimex hemipterus*. Bedbugs are most commonly found in hotels, apartments, and residential households near sleep locations. They reside in crevices, cracks, mattresses, cushions, dressers, and other structures proximal to the bed. During the day they remain hidden, but at night they emerge for a blood meal. The average lifespan of a bedbug is 6 to 12 months.<sup>6</sup> Females lay more than 200 eggs that hatch in approximately 6 to 10 days.<sup>7</sup> Bedbugs progress through 5 nymph stages before becoming adults; several blood meals are required to advance each stage.<sup>6</sup>

Although commonly attributed to the home, bedbugs are being increasingly seen in the office setting.<sup>3-5</sup> In a survey given to pest management professionals in 2015, more than 45% reported that they were contracted by corporations for bedbug infestations in office settings, an increase from 18% in 2010 and 36% in 2013.<sup>3</sup> Bedbugs are brought into offices through clothing, luggage, books, and other personal items. Unable to find hosts at night, bedbugs adapt to daytime hours and spread to more unpredictable locations, including chairs, office equipment, desks, and computers.<sup>4</sup> Additionally, they frequently move around to find a suitable host.<sup>5</sup> As a result, the growth rate of bedbugs in an office setting is much slower than in the home, with fewer insects. Our patient did not have bedbugs at home, but it is possible that other employees transported them to the office over time.



**FIGURE 2.** A, A 4-mm punch biopsy showed a dense superficial and deep infiltrate (H&E, original magnification  $\times 2$ ). B, A perivascular infiltrate of lymphocytes and sporadic eosinophils without epidermal change also was noted (H&E, original magnification  $\times 20$ ).

**Clinical Manifestations**—Bedbugs cause pruritic and non-pruritic skin rashes, often of the arms, legs, neck, and face. A common reaction is an erythematous papule with a hemorrhagic punctum caused by one bite.<sup>8</sup> Other presentations include purpuric macules, bullae, and papular urticaria.<sup>8-10</sup> Although bedbugs are suspected to transmit infectious diseases, no reports have substantiated that claim.<sup>11</sup>

Our patient had several coalescing dermal papules on the arms indicating multiple bites around the same area. Due to the stationary aspect of his job—with the arms resting on his chair while typing at his desk—our patient was an easy target for consistent blood meals.

**Detection**—Due to an overall smaller population of insects in an office setting, detection of bedbugs in the workplace can be difficult. Infestations can be primarily identified on visual inspection by pest control.<sup>12</sup> The mesh backing on our patient's chair was one site where bedbugs resided. It is important to check areas where employees congregate, such as lounges, lunch areas, conference rooms, and printers.<sup>4</sup> It also is essential to examine coatracks and locker rooms, as employees may leave personal items that can serve as a source of transmission



**FIGURE 3.** The patient's office chair showed bedbugs protruding through the mesh backing.



**FIGURE 4.** *Cimex lectularius* (bedbug) taking a blood meal. Photograph by Harold J. Harlan, PhD (Crownsville, Maryland).

of the bugs from home. Additional detection tools provided by pest management professionals include canines, as well as devices that emit pheromones, carbon dioxide, or heat to ensnare the insects.<sup>12</sup>

**Treatment**—Treatment of bedbug bites is quite variable. For some patients, lesions may resolve on their own. Pruritic maculopapular eruptions can be treated with topical pramoxine or doxepin.<sup>8</sup> Patients who develop allergic urticaria can use oral antihistamines. Systemic reactions such as anaphylaxis can be treated with a combination of intramuscular epinephrine, antihistamines, and corticosteroids.<sup>8</sup> The etiology of our patient's condition initially was unknown, and thus he was given unnecessary systemic steroids and antifungals until the source of the rash was identified and eradicated. Topical clobetasol was subsequently administered and was sufficient to resolve his symptoms.

## Final Thoughts

Bedbugs continue to remain a nuisance in the home. This case provides an example of bedbugs in the office, a location that is not commonly associated with bedbug infestations. Bedbugs pose numerous psychological, economic, and health consequences.<sup>2</sup> Productivity can be reduced, as patients with symptomatic lesions will be unable to work effectively, and those who are unaffected may be unwilling to work knowing their office environment poses a health risk. In addition, employees may worry about bringing the bedbugs home. It is important that employees be educated on the signs of a bedbug infestation and take preventive measures to stop spreading or introducing them to the office space. Due to the scattered habitation of bedbugs in offices, pest control managers need to be vigilant to identify sources of infestation and eradicate accordingly. Clinical manifestations can be nonspecific, resembling autoimmune disorders, fungal infections, or bites from other various arthropods; thus, treatment is highly dependent on the patient's history and occupational exposure.

Bedbugs have successfully adapted to a new environment in the office space. Dermatologists and other health care professionals can no longer exclusively associate bedbugs with the home. When the clinical and histological presentation suggests an arthropod assault, we must counsel our patients to surveil their homes and work settings alike. If necessary, they should seek the assistance of occupational health professionals.

## REFERENCES

1. Ralph N, Jones HE, Thorpe LE. Self-reported bed bug infestation among New York City residents: prevalence and risk factors. *J Environ Health*. 2013;76:38-45.
2. US Environmental Protection Agency. Bed Bugs are public health pests. EPA website. <https://www.epa.gov/bedbugs/bed-bugs-are-public-health-pests>. Accessed December 6, 2018.
3. Potter MF, Haynes KF, Fredericks J. Bed bugs across America: 2015 Bugs Without Borders survey. *Pestworld*. 2015:4-14. [https://www.npmapestworld.org/default/assets/File/newsroom/magazine/2015/nov-dec\\_2015.pdf](https://www.npmapestworld.org/default/assets/File/newsroom/magazine/2015/nov-dec_2015.pdf). Accessed December 6, 2018.
4. Pinto LJ, Cooper R, Kraft SK. Bed bugs in office buildings: the ultimate challenge? MGK website. <http://giecdn.blob.core.windows.net/fileuploads/file/bedbugs-office-buildings.pdf>. Accessed December 6, 2018.
5. Baumblatt JA, Dunn JR, Schaffner W, et al. An outbreak of bed bug infestation in an office building. *J Environ Health*. 2014;76:16-19.
6. Parasites: bed bugs. Centers for Disease Control and Prevention website. [www.cdc.gov/parasites/bedbugs/biology.html](http://www.cdc.gov/parasites/bedbugs/biology.html). Updated March 17, 2015. Accessed September 21, 2018.
7. Bed bugs. University of Minnesota Extension website. <https://www.extension.umn.edu/garden/insects/find/bed-bugs-in-residences>. Accessed September 21, 2018.
8. Goddard J, deShazo R. Bed bugs (*Cimex lectularius*) and clinical consequences of their bites. *JAMA*. 2009;301:1358-1366.
9. Scarupa MD, Economides A. Bedbug bites masquerading as urticaria. *J Allergy Clin Immunol*. 2006;117:1508-1509.
10. Abdel-Naser MB, Lofly RA, Al-Sherbiny MM, et al. Patients with papular urticaria have IgG antibodies to bedbug (*Cimex lectularius*) antigens. *Parasitol Res*. 2006;98:550-556.
11. Lai O, Ho D, Glick S, et al. Bed bugs and possible transmission of human pathogens: a systematic review. *Arch Dermatol Res*. 2016;308:531-538.
12. Vaidyanathan R, Feldlaufer MF. Bed bug detection: current technologies and future directions. *Am J Trop Med Hyg*. 2013;88:619-625.