



## Lice Found on Humans

Psocodea: Phthiraptera

human head louse, *Pediculus humanus capitus* *Pediculus humanus humanus* De Geer

human body louse, *Pediculus humanus humanus* L. De Geer

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**Description** Human head and body lice are wingless, flattened insects with mouthparts for sucking blood. The head is somewhat narrower than the rest of the elongated body. Adults are small, about the size of a sesame seed (2.5–3.5 mm; 0.1 inch). Head and body lice are gray to tan in color. If they have fed recently, the blood meal will be visible through the body and make them appear darker. Blood-sucking lice have a large claw at the end of each leg that fits snugly around a hair shaft, allowing them to cling securely to their host or the fibers of their clothing. Lice cannot fly or jump; they can only crawl.



Human head lice, *Pediculus humanus capitus*. (Jim Occi, BugPics, Bugwood.org)



Human head louse, *Pediculus humanus capitus*. (Dani Barchana, Bugwood.org)

**Life Cycle** Lice have an incomplete life cycle consisting of egg, nymphal, and adult stages. The oval, whitish eggs (also called nits) of head lice are firmly glued at an angle to hair shafts close to the skin's surface. They will only hatch if kept at body temperature. In contrast, body lice typically lay their eggs in heavily used clothing and bedding. The eggs of body lice will hatch at lower temperatures than head lice nits. Head and body lice nits hatch in 6–9 days. Nymphs look much like adult lice, but they must feed and grow through three molts before reaching the adult stage in approximately 1 week. Both nymphs and adults require blood meals for survival. They feed frequently but for only a few minutes at each feeding. Adult female head and body lice typically lay several eggs each day. Adults live for about 30 days.



Comparative sizes of human lice nit (egg glued to hair shaft), nymph, and adult. (Photo from Centers for Disease Control)

**Damage** Head and body lice are blood feeders and require multiple blood meals throughout their lives for survival. Only a small amount of blood is ingested by a single louse each time it feeds, but each act of feeding is a source of discomfort and intense irritation due to an allergic reaction to the bites. Scratching the bites may break the skin and lead to secondary infection of the skin by bacteria, requiring additional medical attention. Head lice are generally not thought to transmit disease, but some evidence suggests that they may be implicated with some bacterial diseases. Historically body lice have transmitted several infectious diseases, including typhus and relapsing fevers. Typhus and relapsing fever are introduced into the human host by scratching and rubbing the louse feces or the louse body into the skin; these diseases are not transmitted through the act of the louse biting the host. Disease transmission by lice is not regularly seen in the United States, probably because fewer people carry the disease agents

and are less likely to live in the conditions conducive to spread of the disease (poor hygiene, overcrowding, no laundry facilities, etc.). In modern times, human lice are largely just a contagious nuisance. Pediculosis is the term used to describe an infestation of lice on humans.

**Habitat** Head lice are found on the head, frequently around the ears and around the hairline above the back of the neck. Head lice always lay their eggs on the hairs of their host. Body lice are found in clothing and bedding that has been heavily worn or used for long periods of time without laundering. Head lice will die after 1–2 days if they fall off the host and don't find a new one. Body lice will soon die if the infested clothing or bedding is discarded and another person doesn't begin wearing it or return to sleep in it because lice need to feed on human blood several times daily. Body lice are thought to have diverged from head lice about 100,000 years ago, or about the time humans began wearing clothing (Kittler et al. 2004, 2004).

Head lice nits are laid at the base of the hair shaft. The shell will remain firmly glued on the shaft even after the nymph has hatched out and as the hair grows in length. Finding nits on the hair shaft only a half inch or more from the scalp suggests an old infestation with the empty or dead nits still present. Finding nits attached close to the scalp suggests an active infestation, but the presence of crawling nymphs or adult head lice is a sure sign of an active louse infestation. In contrast, body lice are usually found on clothing and bedding rather than the body. Head and body lice may be hard to see without strong light and a magnifying glass because they move fast, avoid light, and are very small.

Head lice are spread through direct human contact and the sharing of infested personal items. Infested hats, brushes, hair ornaments, headgear, coats, pillowcases, stuffed animals, blankets, or towels can all serve as a means of spreading head lice, but this is much less common than head-to-head contact with someone who has lice. Head lice move easily from person to person in group settings such as schools, day care centers, camps, etc., where people and their personal items are in close contact. Infested items can continue to spread lice as long as the nits or lice are alive on the item. Body lice are spread through close human contact and the sharing of infested clothing and bedding.

Human head and body lice do not feed on other animals and people cannot catch them from dogs, cats, or other pets. Conversely, human lice cannot infest pets either. Pets do not need to be treated if human lice are found in the household.

### **Treatment**

Treatment for human head and body lice requires several steps that must be followed regularly and thoroughly. The most effective strategy for eliminating head lice includes the manual removal of nits and crawling lice from the hair, the use of medicated shampoos, and washing all possibly infested clothing and bedding items in hot water and drying with high heat. Body lice are rarely seen these days outside of the homeless population, but an infestation can be treated by destroying any infested clothing and bedding and resuming good hygiene with regular bathing and laundering.

Shaving the head would likely remove all head lice quickly and effectively from a person, but this is not a requirement. While the use of a medicated shampoo for head lice is probably not necessary if the head is completely shaved, all possibly infested items should still be washed and dried.

Cutting the hair short is also not necessary, but the detection and removal of head lice is much easier when the hair is short. Regardless of hair length, use a fine-toothed comb or a special lice comb designed to detect and remove nits and crawling lice from the hair. Mechanically removing as many nits and crawling lice as possible will help eliminate the infestation faster. Kill any nits or crawling lice found by dropping them in very hot water, rubbing alcohol, Lysol, or medicated lice shampoo. Be sure to disinfect the comb as well when you are done. Check the hair daily until no nits or crawling lice are found for one week, then check weekly to monitor for reoccurrence for at least the next 2–3 weeks. Using a magnifying glass and a strong light may help with the detection of nits and crawling lice, which may be harder to see on lighter colored hair.

In addition to the daily checking and removal of nits and crawling lice from the hair with a comb, use an effective head and scalp treatment. For best results, use a medicated shampoo or lotion specifically labeled for louse treatment. Usually these contain the insecticides pyrethrin or permethrin and are available over the counter in a pharmacy. **Follow the label exactly for best results.** Pay particular attention to how the medication should be applied, the length of time it should remain on the head, and if a second treatment is required a certain time after the first treatment. Medicated shampoos may not kill all the nits and a second treatment may be required after the surviving nits have hatched, but before they reach the adult stage and lay eggs themselves. Very long hair may require more than one bottle or tube of medication; check with your pharmacist or healthcare provider for recommendations. Do not use more than one kind of medicated treatment at a time. If crawling lice are found in the hair one day after properly applying the medicated treatment, consult with a medical doctor or healthcare provider. Stronger treatments may be available with a prescription from a medical doctor. Pregnant women and children under two should not use medicated shampoos without the advice of a medical doctor. In these cases, check the hair and scalp daily for nits and crawling lice; remove and kill any found.

If lice are found on one family member, everyone living in the same household should also be checked for lice the same day. All family members with lice should be treated the same day as well. Consider a prophylactic louse treatment for anyone who does not have nits or crawling lice, but shares a bed or a room with someone who does, or at the very least should be rigorously checked every day for signs of lice infestation.

In addition to the scalp treatments, all possibly infested bedding, clothing, coats, hats, etc. should be washed in hot water and dried with high heat. Items that cannot be washed and dried should be dry cleaned immediately or bagged securely for a week. Lice cannot survive more than a few days without feeding. Items such as brushes, hair ornaments, helmets, etc. can be securely bagged and placed in a freezer for a day or two. Alternatively, items can be placed in a plastic storage bin with a tightly closing lid or in a heavy plastic bag that can be securely closed and left unopened for a week. Vacuum carpets and upholstered furniture to remove any hair that may have fallen out with nits attached. The use of insecticide sprays and foggers inside the home is not necessary and not recommended for the control of human lice.

### Checklist for Lice Control

For best results, do all 3 steps on the same day.

1. Treat scalp or body with a medicated shampoo that is labeled for the control of lice on humans.
2. Launder bedding and clothes in hot soapy water using normal amounts of regular laundry detergent.
3. Use lice combs to check for live lice. Remove and kill any lice and nits that are found.

Repeat if needed, but consult a medical practitioner if live lice are still found after applying a medicated shampoo properly.

If live head lice are still found several days after following the above suggestions, including the use of medicated shampoos or lotions, it may appear that the treatments have failed. While it is possible that the lice have developed resistance to the insecticide in the medicated shampoo, it is more likely that a reinfestation has occurred from another infested person or from infested items, or that the control steps were not followed rigorously and thoroughly (i.e., not using a louse comb each day, not using a medicated shampoo, applying the shampoo incorrectly, etc.). Schools, camps, and daycares should be notified if your child has head lice; chances are that the child acquired the infestation there and could be reinfested even after successful treatment if other children still have lice.

### Alternative Treatments

Home remedies or treatments described as “natural” or “pesticide free” are not recommended because there is no research data to show they are effective in killing all life stages of the lice, how long the application should remain in place to be effective, or in the case of some recommended materials, if the remedy is non-harmful. Coating the head and hair in petroleum jelly or mayonnaise in an attempt to suffocate the lice would require the treatment to be left on the head for hours on end to be effective. This may at best kill only the crawling lice but leave the nits unharmed, in which case multiple treatments would be necessary to eliminate the lice as they hatch out. Hair relaxers may kill lice if left on for a sufficient time, but these materials are caustic and may also burn the hair and scalp. Kerosene, medicated pet shampoos, or any substance not registered for use on the skin should never be used to control lice on the body and may be far more harmful than a medicated shampoo. Hair dryers and hot curling irons may kill lice and nits through heat and/or crushing the lice, but there is danger in burning the scalp while trying to kill the nits closest to the head. **Ultimately, combing the hair with a louse comb and using a medicated shampoo or cream is an effective combination that requires some**

**effort and time, but will eliminate the infestation within several days when combined with cleaning infested items and vacuuming the home.** Home remedies may require much longer periods of time than that, and if they are not very effective, may not actually control the lice at all.

For more information, including detailed steps on how to apply medicated shampoos, see the fact sheet “Pediculosis (Head Lice) – Management” written by the Virginia Department of Health, available at: [http://www.virginia.edu/studenthealth/documents/Pediculosis\\_Treatment\\_Fact\\_Sheet.pdf](http://www.virginia.edu/studenthealth/documents/Pediculosis_Treatment_Fact_Sheet.pdf)

## References

Kittler R.I., Kayser M., and M. Stoneking. 2003. Molecular evolution of *Pediculus humanus* and the origin of clothing. *Current Biology* 13(16): 1414-1417.

Kittler R.I., Kayser M., and M. Stoneking. 2004. Erratum: Molecular evolution of *Pediculus humanus* and the origin of clothing. *Current Biology* 14(24): 2309.