

Tennessee Head Lice Manual - 2022 -



Table of Contents

Biology of Head Lice 5 Inspection and Diagnosis of Head Lice 7 Steps to Inspect and Diagnose a Head Lice Infestation 8 Other Considerations 8 Risk Factors for a Head Lice Infestation 9 Common Symptoms 10 Head Lice Treatment 11 Head Lice Treatment Products 11 Manual Removal of Head Lice 13 Steps to Manually Comb Lice 13 After Head Lice Treatment 13 Reasons for Head Lice Treatment Failures 14 Pediculicide Resistance 15 Environmental Care and Decontamination 16 Pesticides 16 School Policies 18 School Head Lice Protocol 19 Other Biting Arthropods 20 Bed Bugs 20 Human Itch Mite (Scabies) 20 Body Lice 21 Pubic "Crab" Lice 21 Glossary 22 References 23 Appendices 24 Appendix A: Quick Facts about Head Lice 24 Appendix B: Decision Tree for t	Preface	2
Human Health and Head Lice	Acknowledgements	2
Biology of Head Lice 5 Inspection and Diagnosis of Head Lice 7 Steps to Inspect and Diagnose a Head Lice Infestation 8 Other Considerations 8 Risk Factors for a Head Lice Infestation 9 Common Symptoms 10 Head Lice Treatment 11 Head Lice Treatment Products 11 Manual Removal of Head Lice 13 Steps to Manually Comb Lice 13 After Head Lice Treatment 13 Reasons for Head Lice Treatment Failures 14 Pediculicide Resistance 15 Environmental Care and Decontamination 16 Pesticides 16 School Policies 18 School Head Lice Protocol 19 Other Biting Arthropods 20 Bed Bugs 20 Human Itch Mite (Scabies) 20 Body Lice 21 Pubic "Crab" Lice 21 References 23 Appendices 24 Appendix A: Quick Facts about Head Lice 24	Overview	3
Inspection and Diagnosis of Head Lice 7 Steps to Inspect and Diagnose a Head Lice Infestation 8 Other Considerations 8 Risk Factors for a Head Lice Infestation 9 Common Symptoms 10 Head Lice Treatment 11 Head Lice Treatment Products 11 Manual Removal of Head Lice 13 Steps to Manually Comb Lice 13 After Head Lice Treatment 13 Reasons for Head Lice Treatment Failures 14 Pediculicide Resistance 15 Environmental Care and Decontamination 16 Pesticides 16 School Policies 18 School Head Lice Protocol 19 Other Biting Arthropods 20 Bed Bugs 20 Human Itch Mite (Scabies) 20 Body Lice 21 Pubic "Crab" Lice 21 References 22 Appendices 24 Appendix A: Quick Facts about Head Lice 24 Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice <th>Human Health and Head Lice</th> <th>4</th>	Human Health and Head Lice	4
Steps to Inspect and Diagnose a Head Lice Infestation 8 Other Considerations 8 Risk Factors for a Head Lice Infestation 9 Common Symptoms 10 Head Lice Treatment 11 Head Lice Treatment Products 11 Manual Removal of Head Lice 13 Steps to Manually Comb Lice 13 After Head Lice Treatment 13 Reasons for Head Lice Treatment Failures 14 Pediculicide Resistance 15 Environmental Care and Decontamination 16 Pesticides 16 School Policies 18 School Head Lice Protocol 19 Other Biting Arthropods 20 Bed Bugs 20 Human Itch Mite (Scabies) 20 Body Lice 21 Pubic "Crab" Lice 21 Glossary 22 References 23 Appendices 24 Appendix A: Quick Facts about Head Lice 24 Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice	Biology of Head Lice	5
Other Considerations 8 Risk Factors for a Head Lice Infestation 9 Common Symptoms 10 Head Lice Treatment 11 Head Lice Treatment Products 11 Manual Removal of Head Lice 13 Steps to Manually Comb Lice 13 After Head Lice Treatment 13 Reasons for Head Lice Treatment Failures 14 Pediculicide Resistance 15 Environmental Care and Decontamination 16 Pesticides 16 School Policies 18 School Head Lice Protocol 19 Other Biting Arthropods 20 Bed Bugs 20 Human Itch Mite (Scabies) 20 Body Lice 21 Pubic "Crab" Lice 21 Glossary 22 References 23 Appendices 24 Appendix A: Quick Facts about Head Lice 24 Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice	Inspection and Diagnosis of Head Lice	7
Risk Factors for a Head Lice Infestation 9 Common Symptoms 10 Head Lice Treatment 11 Head Lice Treatment Products 11 Manual Removal of Head Lice 13 Steps to Manually Comb Lice 13 After Head Lice Treatment 13 Reasons for Head Lice Treatment Failures 14 Pediculicide Resistance 15 Environmental Care and Decontamination 16 Pesticides 16 School Policies 18 School Head Lice Protocol 19 Other Biting Arthropods 20 Bed Bugs 20 Human Itch Mite (Scabies) 20 Body Lice 21 Pubic "Crab" Lice 21 References 23 Appendices 24 Appendices 24 Appendix A: Quick Facts about Head Lice 24 Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice	Steps to Inspect and Diagnose a Head Lice Infestation	8
Common Symptoms 10 Head Lice Treatment 11 Head Lice Treatment Products 11 Manual Removal of Head Lice 13 Steps to Manually Comb Lice 13 After Head Lice Treatment 13 Reasons for Head Lice Treatment Failures 14 Pediculicide Resistance 15 Environmental Care and Decontamination 16 Pesticides 16 School Policies 18 School Head Lice Protocol 19 Other Biting Arthropods 20 Bed Bugs 20 Human Itch Mite (Scabies) 20 Body Lice 21 Pubic "Crab" Lice 21 Glossary 22 References 23 Appendices 24 Appendices 24 Appendix A: Quick Facts about Head Lice 24 Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice Personance 24 Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice	Other Considerations	8
Head Lice Treatment 11 Head Lice Treatment Products 11 Manual Removal of Head Lice 13 Steps to Manually Comb Lice 13 After Head Lice Treatment 13 Reasons for Head Lice Treatment Failures 14 Pediculicide Resistance 15 Environmental Care and Decontamination 16 Pesticides 16 School Policies 18 School Head Lice Protocol 19 Other Biting Arthropods 20 Bed Bugs 20 Human Itch Mite (Scabies) 20 Body Lice 21 Pubic "Crab" Lice 21 Glossary 22 References 23 Appendices 24 Appendix A: Quick Facts about Head Lice 24 Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice	Risk Factors for a Head Lice Infestation	9
Head Lice Treatment Products	Common Symptoms	10
Manual Removal of Head Lice 13 Steps to Manually Comb Lice 13 After Head Lice Treatment 13 Reasons for Head Lice Treatment Failures 14 Pediculicide Resistance 15 Environmental Care and Decontamination 16 Pesticides 16 School Policies 18 School Head Lice Protocol 19 Other Biting Arthropods 20 Bed Bugs 20 Human Itch Mite (Scabies) 20 Body Lice 21 Pubic "Crab" Lice 21 Glossary 22 References 23 Appendices 24 Appendix A: Quick Facts about Head Lice 24 Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice	Head Lice Treatment	11
Steps to Manually Comb Lice 13 After Head Lice Treatment 13 Reasons for Head Lice Treatment Failures 14 Pediculicide Resistance 15 Environmental Care and Decontamination 16 Pesticides 16 School Policies 18 School Head Lice Protocol 19 Other Biting Arthropods 20 Bed Bugs 20 Human Itch Mite (Scabies) 20 Body Lice 21 Pubic "Crab" Lice 21 Glossary 22 References 23 Appendices 24 Appendix A: Quick Facts about Head Lice 24 Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice	Head Lice Treatment Products	11
After Head Lice Treatment	Manual Removal of Head Lice	13
Reasons for Head Lice Treatment Failures		
Pediculicide Resistance	After Head Lice Treatment	13
Environmental Care and Decontamination 16 Pesticides 16 School Policies 18 School Head Lice Protocol 19 Other Biting Arthropods 20 Bed Bugs 20 Human Itch Mite (Scabies) 20 Body Lice 21 Pubic "Crab" Lice 21 Glossary 22 References 23 Appendices 24 Appendix A: Quick Facts about Head Lice 24 Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice	Reasons for Head Lice Treatment Failures	14
Pesticides 16 School Policies 18 School Head Lice Protocol 19 Other Biting Arthropods 20 Bed Bugs 20 Human Itch Mite (Scabies) 20 Body Lice 21 Pubic "Crab" Lice 21 Glossary 22 References 23 Appendices 24 Appendix A: Quick Facts about Head Lice 24 Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice	Pediculicide Resistance	15
School Policies 18 School Head Lice Protocol 19 Other Biting Arthropods 20 Bed Bugs 20 Human Itch Mite (Scabies) 20 Body Lice 21 Pubic "Crab" Lice 21 Glossary 22 References 23 Appendices 24 Appendix A: Quick Facts about Head Lice 24 Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice	Environmental Care and Decontamination	16
School Head Lice Protocol	Pesticides	16
Other Biting Arthropods 20 Bed Bugs 20 Human Itch Mite (Scabies) 20 Body Lice 21 Pubic "Crab" Lice 21 Glossary 22 References 23 Appendices 24 Appendix A: Quick Facts about Head Lice 24 Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice	School Policies	18
Bed Bugs 20 Human Itch Mite (Scabies) 20 Body Lice 21 Pubic "Crab" Lice 21 Glossary 22 References 23 Appendices 24 Appendix A: Quick Facts about Head Lice 24 Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice	School Head Lice Protocol	19
Human Itch Mite (Scabies)	9 1	
Body Lice	Bed Bugs	20
Pubic "Crab" Lice	Human ltch Mite (Scabies)	20
Glossary22References23Appendices24Appendix A: Quick Facts about Head Lice24Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice	Body Lice	21
References	Pubic "Crab" Lice	21
Appendices	Glossary	22
Appendix A: Quick Facts about Head Lice24 Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice	References	23
Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice	••	
• • • • • • • • • • • • • • • • • • • •	, ,	24
INTESTATION 75	Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice Infestation	25
Appendix C: Quick Guide to Treat Head Lice26		

Preface

The purpose of this manual is to provide information on head lice infestations in the state of Tennessee. It is intended for use by health departments, healthcare providers, childcare and school facilities, and parents. This manual is a comprehensive guide to identify, treat, and prevent head lice infestations.

Acknowledgements

TENNESSEE DEPARTMENT OF HEALTH

Abelardo Moncayo, PhD Joseph George, MS, PG David Borowski, MS Athena Lemon, MS Rachel Wofford, MPH Calla Reed, BA

TENNESSEE DEPARTMENT OF CHILDREN'S SERVICES

Patricia Slade, MSN, MBA, RN

TENNESSEE DEPARTMENT OF EDUCATION

Amanda Johnson, MPH, RN, CHES

University of Tennessee Extension

Karen Vail, PhD



Department of Health Authorization No. 355744.
This Electronic publication was promulgated at zero cost.
January 2022

Overview

The head louse (*Pediculus humanus capitis*) (**Figure A**) is most likely to be found on the scalps of pre-school and elementary school aged children, and their immediate family members. An estimated 6-12 million cases occur annually in the United States among children 3-11 years of age. The most common way of contracting a head lice infestation is close head-to-head contact, such as children playing together with their heads frequently touching, or people living in overcrowded facilities. The criteria for diagnosis of a head lice infestation (pediculosis) is the presence of live head lice found on an individual's scalp. A head lice infestation is not considered a health hazard, as head lice do not spread disease. During the initial stages of a head lice infestation, individuals may not experience any symptoms. As the infestation progresses, individuals may experience intense itching of the scalp, which could result in sleeplessness and irritability. There are available treatments to successfully eliminate a head lice infestation, and excluding children from school is not a recommended form of prevention.



Figure A: Male human head louse. Photo credit to Gilles San Martin, CC-BY-SA.

Human Health and Head Lice

Head lice infestations are not considered a health hazard, as head lice do not spread disease.

Head lice infestations are not considered a health hazard, as head lice do not spread disease. However, social stigma can result from a head lice infestation. A head lice infestation can cause restlessness, embarrassment, assumptions about an individual's personal hygiene, and shame for an individual. Head lice are not necessarily a product of poverty or living conditions; anyone can have a head lice infestation.

Head lice pose a substantial economic burden. The annual combined direct cost (medicines, products, and treatments) of head lice infestations in the United States (U.S.) is at a minimum \$240 million. Once indirect costs (missed work and school days, misuse of treatments, misdiagnosis) are considered, the U.S. economic burden of head lice surpasses \$1 billion.³ In many areas of the world, head lice are a serious public health problem, and the prevalence of head lice infestations has been increasing.²

The head lice policies in many childcare and educational facilities, known as "no-nit" policies, cause a child with head lice to miss an unnecessary amount of school days and fail to reduce prevalence of head lice in the community. There are little-known facts about head lice, ranging from their biology (head lice cannot jump or fly) to policies implemented at schools and other care facilities ("no-nit" policies are not effective) (see **Appendix A**). By increasing awareness of head lice and decreasing the stigma associated with head lice infestations, communities can better prevent and eliminate head lice infestations.

Biology of Head Lice

Head lice can only crawl from one head to another through direct head-to-head contact. Lice cannot jump or fly.

The head louse has three life stages: egg (nit), nymph, and adult. **Figure B** provides a reference for the size of each life stage.



Figure B: The size of a head louse egg, nymph, and adult in reference to a penny.

Eggs: Eggs, roughly the size of a poppy seed, are glued to the base of an individual hair shaft within ¼ inch of the scalp, as this environment provides the optimal humidity and temperature for growth. An egg hatches after 7-10 days, but its casing remains on the hair shaft.⁴

Nymphs: Nymphs can begin taking a blood meal shortly after hatching. The nymphal stage lasts 8-9 days and progresses through three substages (N1, N2, and N3 seen in **Figure C**).

Adults: Adult lice continue to take blood meals for nutrition and reproduction. They are 2-3 mm in size, about the size of a sesame seed, and live an average of 30 days. Females lay new eggs at a rate of 8-9 eggs per day near the base of a hair shaft.⁴ Most individuals will have an average infestation of 10-20 crawling lice.²

Figure C provides a timeline and visual representation of the three head louse stages. At any life stage, head lice can only crawl from one head to another through direct head-to-head contact. Lice cannot jump or fly.

Developmental Timeline of Head Lice

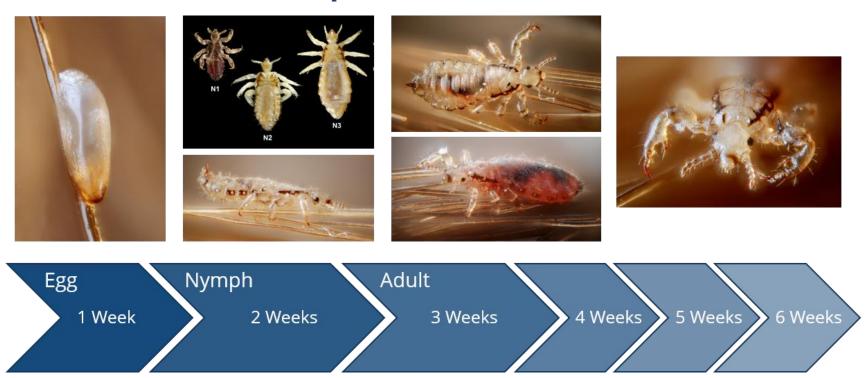


Figure C: The developmental timeline of head lice. An egg hatches between 7-10 days, the nymph matures for 8-9 days, and adults live an average of 30 days. Photos credit to Gilles San Martin, CC-BY-SA.

Inspection and Diagnosis of Head Lice

Mass screenings are not recommended because they decrease accuracy of diagnosis and lead to social stigma.

To inspect a possible lice infestation, manually detect any crawling lice by using a bright light source, a magnifying tool, disposable gloves, and a disposable hair parting tool (such as a lice comb). Allot sufficient time for this process, as it may be tedious. Lice screening kits can be assembled ahead of time, as shown in **Figure D**. In group settings, such as schools and other childcare facilities, individuals suspected of having head lice should be examined by a trained professional. If more than one individual is being inspected for a head lice infestation, then a new, disposable hair parting tool and new, disposable gloves are encouraged. Mass screenings are not recommended because they decrease accuracy of diagnosis and lead to social stigma.

Bright light source Combing tool Gloves (optional) Magnifying tool (optional)

Figure D: Tools for detecting a head lice infestation.

Steps to Inspect and Diagnose a Head Lice Infestation

- 1. Use a lice comb, or hair parting tool, to examine the scalp by parting hair near the nape of the neck and behind the ears (**Figure E**).
- 2. Use a bright light source to look for crawling lice (about the size of a sesame seed) or lice eggs (about the size of a poppy seed, white to yellowish in color, and difficult to dislodge with a finetoothed comb). If needed, use a magnifying instrument to get a closer look.



Figure E: A close-up of head lice eggs near the nape of the neck and behind the ears.

- 3. Proceed with the search throughout the hair line and rest of the scalp.
- 4. If crawling lice are identified, this indicates a head lice infestation; seek treatment (see section on Lice Treatment for more information).
- 5. If crawling lice are not identified, but eggs are present:
 - a. less than a ¼ inch of the scalp, consider a second inspection or asking for a second opinion.
 - b. more than a ¼ inch from the scalp, this may indicate an older infestation. Discuss with a healthcare provider to ensure there is not an ongoing infestation.

For more information on whether to seek treatment refer to **Appendix B**.

Other Considerations

Head lice eggs are about the size of a poppy seed, and they are often mistaken for dandruff, eczema, hair product buildup, or other scalp conditions. A louse egg is attached to an individual hair with a cement-like glue; it takes significantly more effort to remove than dandruff or hair product buildup. Unhatched eggs are found closer to the base of the hair shaft, often within a ¼ inch of the scalp, and are especially common behind and above the ears as well as at the nape of the neck.²

Risk Factors for a Head Lice Infestation

Head lice infestations are less common than the cold, flu, strep throat, ear infections, or pink eye.

Head lice are most commonly spread through prolonged, direct head-to-head contact with someone who has head lice. Contact is often unintentional; for example, occurring at sleepovers or wrestling between children. There is a small chance that head lice can be indirectly shared through objects such as: hats, scarves, coats, hairbrushes, headphones, sports helmets, pillows, towels, furniture, or stuffed toy animals.

The claws of head lice are specially adapted to hold onto human hair. They have difficulty attaching to plastics, synthetic leathers, and other hard, smooth, polished surfaces. Therefore, these types of items do not play a role in the spread of head lice.⁵ Additionally, pets cannot carry head lice, nor can head lice be spread to pets.

The best way to prevent a head lice infestation is to avoid direct head-to-head contact. Head lice infestations are less common than the cold, flu, strep throat, ear infections, or pink eye.

Common Symptoms

During the initial stages of a louse infestation, individuals may not experience any symptoms. Symptoms may take between 4-6 weeks to manifest as the lice population increases. As individuals may not complain about symptoms during early infestation, it is important to check for lice during this time if there was a potential exposure. The earlier lice are detected, the easier the infestation is to treat.

As the infestation progresses, symptoms may include:

- intense itching of the scalp;
- irritability and/or drowsiness, due to the activity of the lice preventing rest; and
- sores on the scalp due to constant itching.

Head Lice Treatment

Never initiate treatment unless there is a clear diagnosis of a head lice infestation.

Never initiate treatment unless there is a clear diagnosis of a head lice infestation. To treat a head lice infestation, use an over-the-counter or prescription topical product to eliminate the infestation. There are many common, effective, and inexpensive treatments for head lice infestations. Shaving off hair or using alternative remedies such as tea tree oil, mayonnaise, olive oil, butter, or margarine is not recommended.

Head Lice Treatment Products

Products used to eliminate lice infestations are called pediculicides. Refer to the Comparison of Head Lice Treatment Products table for a brief overview of some available topical products. For a more comprehensive comparison and personalized recommendation, talk to your healthcare provider. Head lice treatment products should only be used for an active infestation, not as a preventative or routine product. The following actions are **NOT** recommended:

- combining treatment products;
- deviating from the product instructions;
 - using more product than directed
 - \circ exceeding the recommended treatment duration
- using products not designed to treat head lice infestations; and
- re-treating excessively with the same product or re-treating sooner than directed.

Comparison of Head Lice Treatment Products

Product	Common Brand(s)	Age Minimum	Kills Lice Eggs (Ovicidal)	Re-Treatment Approved*
Over-the-Counter				
Permethrin lotion (1%)	Nix	2 months	No	Yes
Pyrethrin-based product	A-200, Pronto, Rid, R&C, Triple X	2 years	No	Yes
Prescription Required				
Benzyl alcohol lotion (5%)	Ulesfia	6 months	No	Yes
Ivermectin lotion (0.5%)	Sklice	6 months	No	Speak with physician first [†]
Malathion lotion (0.5%)	Ovide	6 years	Partial	Yes
Spinosad topical suspension (0.9%)	Natroba	6 months	Yes	Yes

Always read and follow product instructions to their fullest. If you have questions or concerns about a product, consult a medical professional. Always rinse product out in the sink rather than a shower/bath and use warm, not hot water. If you are pregnant or breastfeeding, please consult the product label or a healthcare professional before handling and using products.

Once a head lice infestation is diagnosed and the appropriate treatment options identified, consider the following:

- follow label instructions and physician guidance;
- screen family members and close contacts for head lice over the next few weeks;
- use topical head lice treatment options in conjunction with manual removal for maximum effectiveness;
- rinse out topical head lice treatments over a sink rather than a shower/bath to limit skin exposure;
 - when rinsing out product, use warm water rather than hot water.

^{*} Re-treatment is only necessary if crawling lice are visible after the initial treatment is complete (refer to product instructions).

[†] If live lice are identified after initial treatment of ivermectin location (Sklice), consult the prescribing physician prior to re-treatment.

Manual Removal of Head Lice

Combing with a lice comb (**Figure F**) is an effective method for removing head lice in conjunction with a topical treatment. An effective lice comb should:

- be disposable or able to be submerged in hot water (at least 130°F) for 5-10 minutes;
- have small comb teeth to effectively remove eggs and adults; and
- only have narrow gaps between the comb teeth.



Figure F: Head lice comb

Steps to Manually Comb Lice

- 1. Follow product directions before manual combing.
- 2. Using a lice comb, comb through the hair in small sections.
- 3. After each comb-through, wipe the comb on a wet paper towel. Examine the scalp, comb, and paper towel carefully, making sure to dispose of any eggs or living lice on the comb and paper towel.
- 4. Repeat steps 2 and 3 until all hair has been combed.
- 5. Treatment and manual combing may need to be repeated in 8-10 days. Follow product directions.

After Head Lice Treatment

After a head lice treatment is successfully applied and hair combed with a lice comb, there should be no crawling head lice adults or nymphs in the affected individual's hair (see the Diagnosis of Head Lice section for a reminder on how to effectively check for head lice). Empty egg casings may still be seen days or weeks after a successful treatment. These egg casings usually appear yellow, are farther from the scalp (over ¼ inch) and are not a cause for concern.

If crawling lice are seen after 8-10 days, re-treat as needed with the appropriate product. Do not re-retreat more than twice, as this may be an indication of pediculicide resistance (see the subsection Pediculicide Resistance); see healthcare provider if this occurs.

Reasons for Head Lice Treatment Failures

Misdiagnosis of a head lice infestation

An active head lice infestation is diagnosed by detecting a crawling louse. The presence of eggs alone is not enough to diagnose a lice infestation, as empty egg casings may be found days or weeks after an infestation has cleared. Eggs can be mistaken for dandruff, eczema, residue from hair products, knots, or tiny clumps of dead skin that encircle a hair shaft. The symptoms of a head lice infestation may be due to other dermal conditions.

Not following treatment instructions

Following product instructions is essential to eliminating a head lice infestation. Most products do not kill lice eggs, and manufacturers generally recommend re-treatment if crawling lice are still present after 8-10 days. The second treatment is to eliminate lice that emerged from eggs after the first treatment and therefore, may be necessary to resolve a head lice infestation. Overuse of a product, whether it is through increased treatment time or concentration of pediculicide, is not more effective in eliminating head lice.

Lice resistant to treatment

If product instructions were followed for two treatments, but crawling lice are still present, it is possible the lice are resistant to that treatment. Confer with a healthcare provider about prescription pediculicides to treat a resistant head lice infestation. For more information on resistance, see the subsection Pediculicide Resistance.

Re-infestation

It is possible to be re-infested with head lice. Reduce the chance of re-infestation by monitoring family members and close contacts for head lice in the weeks following an infestation. Make sure to treat all infested individuals concurrently and continue to take precautions to reduce head-to-head contact. To further reduce the chance of re-infestation, refer to the section on Environmental Care and Decontamination.

Pediculicide Resistance

Only use the recommended dosage for any lice treatment, as increased contact time or concentration of product will not eliminate pediculicide resistant head lice.

There are head lice resistant to the pediculicides used in topical treatments (sometimes referred to as "super lice" on product labels). If crawling lice remain after re-treatment, there is a chance the lice are resistant to pediculicides such as pyrethrin and permethrin; ask a healthcare provider about prescription lice treatments. Only use the recommended dosage for any lice treatment, as increased contact time or concentration of product will not eliminate pediculicide resistant head lice.⁷

Environmental Care and Decontamination

Extensive environmental decontamination is not necessary after head lice are diagnosed.

Crawling head lice cannot survive off the scalp for over 48 hours. However, certain environmental cleaning activities will help reduce the chance of becoming re-infested with head lice.

- Soak combs and brushes in hot water (at least 130°F) for 5-10 minutes.
- Wash clothes, hats, bed linens, and towels in hot water (at least 130 °F)
 and dry on high heat for 30-40 minutes. Items that cannot be washed
 may be dry cleaned or sealed in a plastic bag for two weeks to ensure
 all eggs are dead.
- Other cloth surfaces (like cloth furniture, carpets, rugs, large pillows, and car seats) that may have been in direct head contact with someone with head lice should be vacuumed to remove any living or dead head lice and hair(s) that might have eggs attached.

Extensive environmental decontamination is not necessary after a head lice infestation is diagnosed.

Pesticides

Pesticides are potentially hazardous to children. Pesticides should not be applied to the indoor environment for management of head lice. Do not spray pesticides in homes, schools, or other inhabited areas; pesticides can be toxic if inhaled or absorbed through the skin. Using pesticides incorrectly can result in health and safety risks. In addition to not being effective, use of environmental pesticides to treat head lice should not be used pursuant to Tennessee Law (see **Figure G**).

TCA 62-21-124. (a) Whether or not engaged in the business of applying pesticides, a person may not apply a pesticide within any of the following buildings, except under the direct supervision of a person licensed to apply pesticides in accordance with this chapter:

- (1) Any building used for the preparation or serving of food;
- (2) Any building used for the temporary or permanent lodging of others;
- (3) Any building used primarily for educational purposes, except those buildings used primarily for religious instruction or for providing education to no more than ten (10) persons; or
- (4) Any commercial food processing facility.

Figure G: Tennessee law concerning the application of pesticides.8

School Policies

Students' emotional, social, and academic wellbeing can be adversely affected when excluded from school due to a head lice infestation.

Head lice policies in some childcare and educational facilities, known as "no-nit" policies, often cause a child with a head lice infestation to miss an unnecessary amount of school days and fail to reduce prevalence in the community. Providing parents/guardians and school staff with education about head lice is recommended to eliminate common myths and stigma.

Students' emotional, social, and academic well-being can be adversely affected when excluded from school due to a head lice infestation. The Centers for Disease Control and Prevention and the National Association of School Nurses do **NOT** recommend the following practices:

- exclusion of children from the classroom for head lice eggs (nits) or crawling lice;
- whole classroom/mass screenings; and
- notification to others except for parents/guardians of students with head lice infestations.

Schools should not exclude students due to fear of active infestation or eggs remaining after appropriate lice treatment. The affected student poses little risk of spread to others and should remain in class. School nurses should collaborate with healthcare providers to provide safe, evidence-based treatment recommendations to ensure promotion of regular school attendance and effective management of head lice infestations.

School Head Lice Protocol

If creating a protocol, consider the following:

- Maintain the confidentiality of the person to avoid negative stigma and embarrassment.
- Create clear guidelines on when, how, and who to notify if a person is diagnosed with a head lice infestation. This may include identifying others who had head-to-head contact with the diagnosed individual in the previous few weeks.
- There is no need to exclude a person from school who has a head lice infestation.
- Mass screenings are no longer recommended because they lead to social stigma and decrease accuracy of diagnosis.
- Create a detailed protocol for parents and staff regarding head lice if an infestation is detected.
- Create specific plans in case a parent or guardian is unable to successfully treat the head lice infestation.
- Determine how to discourage head-to-head contact to prevent the spread of a head lice infestation.

Be prepared to answer questions from parents and guardians; communication is key to understanding a head lice infestation and how to properly treat one. Clear guidelines for both staff and parents/guardians on how the school will proceed with an identified head lice infestation is essential for a successful protocol.

Other Biting Arthropods

There are a few other biting arthropods that can be mistaken for head lice; specifically, bed bugs, burrowing mites that cause scabies, body lice, and pubic lice. However, it is important to note that none of these other biting arthropods frequent the scalp. Body lice and pubic lice can be treated with lifestyle changes or over-the-counter products; the burrowing mite that causes scabies should be treated by a medical professional; and bed bugs should be treated by a pest management professional.

Bed Bugs

Like head lice, bed bugs are small, crawling parasitic insects that rely on blood meals. Adult bed bugs are 5-7mm long, much larger than an adult head louse, and about the size of an apple seed. They are wingless (cannot fly) and can live several months without a blood meal. They are found globally and can infest homes and areas quickly, but they do not spread disease. The most common indications of a bed bug infestation are dark fecal spots on furniture/bedding and characteristic bites on exposed body parts that contact the bed when the person is sleeping.

Human Itch Mite (Scabies)

Human scabies is caused by a skin infestation of the human itch mite, which burrows into the surface layers of the skin to live and lay eggs. Similar to head lice, scabies spreads by prolonged direct contact with an individual who has scabies. However, the human itch mite is not usually found on the scalp and can barely be seen by the human eye.

The human itch mite can be found globally and is most prevalent in crowded conditions, such as nursing homes, child-care facilities, and prisons. Common signs and symptoms of scabies are a characteristic pimple-like skin rash, small burrow tunnels under the skin, and intense itching, typically found in between the fingers, in the armpits, and along the belt line. The human itch mite does not transmit disease.¹⁰

Body Lice

Body lice are parasitic insects that live on clothing or bedding used by persons with a body lice infestation. They are roughly the same size as head lice and can be compared to the size of a sesame seed. They spread both through direct skin-to-skin contact with an infested person and through indirect contact with that individual's personal bedding and other items. Body lice infestations are mainly found in homeless populations and refugee camps and are rare for individuals who bathe regularly or have access to fresh laundry and bedding.

Body lice transmit pathogens that cause diseases, such as epidemic typhus, trench fever and louse-borne relapsing fever. The most common signs and symptoms of a body lice infestation are intense itching, swelling and discoloration of heavily bitten areas of skin, and symptoms related to the transmitted diseases. Body lice are not typically found on the scalp. A body lice infestation can be treated with environmental and behavioral modifications: improving personal hygiene, machine washing and drying infested clothes, bedding, and towels at least once a week.

Pubic "Crab" Lice

Pubic, or crab, lice are blood-feeding parasitic insects found mainly in the genital area. They also can be found in other areas of coarse hair, such as eyebrows, eyelashes, armpits, beards, or mustaches. Adult pubic lice are 1-2 mm in length, smaller than adult head lice, and can usually be seen by the human eye. The most common signs and symptoms of pubic lice are itching in the genital area and visible crawling lice. Pubic lice are most common in sexually active adults and should be diagnosed and treated by a medical professional. Pubic lice are found globally and do not transmit disease, although their presence is often correlated with sexually transmitted infections.

Glossary

Head Lice: Blood feeding parasitic insect that can be found on the scalp and hair of a human head.

Infestation: The presence of an unusually large number of insects. There are usually 10-20 living head lice during a head lice infestation.

Louse: Singular form of lice.

Nit(s)/Egg(s): Nits are head lice eggs laid by the adult female and are cemented at the base of the hair shaft nearest the scalp.

Nymph(s): Immature head louse that hatch from an egg and require three substages of development to become an adult.

Ovicide: An insecticide that kills the egg stage.

Pesticide(s): Any substance intended for preventing, destroying, repelling, or mitigating pests in the environment.

Pediculicide(s): An insecticide that kills lice.

Topical: A medication applied to the skin.

References

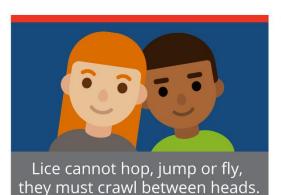
- 1. CDC. CDC Lice Head Lice Epidemiology & Risk Factors. Published October 15, 2019. Accessed December 17, 2021. https://www.cdc.gov/parasites/lice/head/epi.html
- 2. Service MW. *Medical Entomology for Students*. Cambridge University Press; 2018.
- 3. Hansen RC, O'Haver J. Economic considerations associated with Pediculus humanus capitis infestation. *Clin Pediatr (Phila)*. 2004; 43(6):523-527. doi:10.1177/000992280404300603
- 4. Kettle D. *Medical and Veterinary Entomology 2nd Edition*. CAB International; 1995.
- 5. CDC. CDC Lice Head Lice General Information Frequently Asked Questions (FAQs). Published September 17, 2020. Accessed December 9, 2021. https://www.cdc.gov/parasites/lice/head/gen_info/faqs.html
- 6. Devore CD, Schutze GE, Council on School Health and Committee on Infectious Diseases, American Academy of Pediatrics. Head lice. *Pediatrics*. 2015; 135(5):e1355-1365. doi:10.1542/peds.2015-0746
- 7. CDC. CDC Parasites. Published April 14, 2021. Accessed December 14, 2021. https://www.cdc.gov/parasites/index.html
- 8. Vail K. Head Lice Spray Cans and Cleaners Found in Unlocked, Floor Cabinets in Classrooms for Young Children, Again! It's Time to Remove Stored Insecticides from Classrooms! Pests and Pesticides in Child-serving Facilities. *IPM Newsl.* 2018; 11(4):1-2.
- 9. CDC. CDC Bed Bugs Frequently Asked Questions. Published September 16, 2020. Accessed March 31, 2021. https://www.cdc.gov/parasites/bedbugs/faqs.html
- CDC. CDC Scabies General Information Frequently Asked Questions (FAQs).
 Published September 18, 2020. Accessed March 31, 2021.
 https://www.cdc.gov/parasites/scabies/gen_info/faqs.html
- 11. CDC. CDC Lice Body Lice Frequently Asked Questions (FAQs). Published September 24, 2013. Accessed March 1, 2021. https://www.cdc.gov/parasites/lice/body/gen_info/faqs.html

Appendices

Appendix A: Quick Facts about Head Lice

Quick Facts About Head Lice

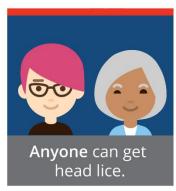
Learn about these common crawly critters!













Head lice are about the size of a sesame seed, and their eggs are about the size of a poppy seed!

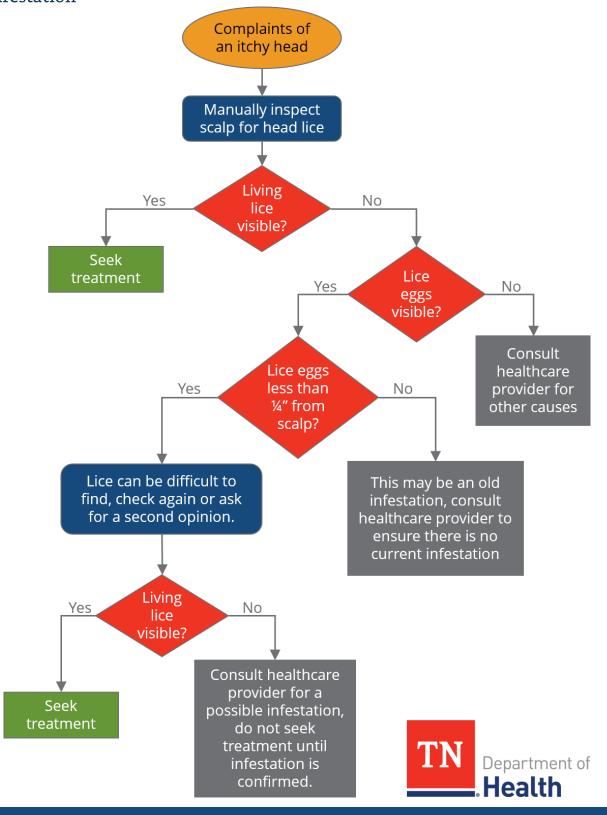


treatments 8-10 days apart.

There are many misconceptions about head lice, take the time to review current recommendations for treating head lice infestation. Learn more at cdc.gov/parasites/lice/



Appendix B: Decision Tree for the Diagnosis and Treatment of a Head Lice Infestation



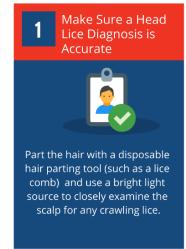
Appendix C: Quick Guide to Treat Head Lice



A Quick Guide to Treat Head Lice



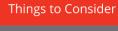
It is important to take preventive measures to control or avoid the spread of a head lice infestation. However, there are many common misconceptions on how to effectively treat head lice. A head lice infestation can be safely and easily eliminated with the following steps:













- A manual inspection for lice is time-consuming.
 Find an activity to keep the individual occupied while inspecting for lice.
- Monitor and treat (if necessary) family and close contacts.
- Monitor the infestation 2-3 weeks after treatment.

Resistance to Pediculicides



If re-treatment was applied and crawling lice are still present after 2-3 weeks, the head lice may be resistant to pediculicides. Visit a healthcare professional for additional assistance.