



MICHIGAN HEAD LICE MANUAL

A comprehensive guide to identify, treat, manage, and prevent head lice



The purpose of this manual is to provide schools, local health departments, healthcare facilities, and other group settings a comprehensive guide to identify, treat, manage, and prevent head lice infestations. This manual was designed to serve as a universal guide providing information about head lice in a technical sense, as well as a quick reference. This manual represents an update to the previous "Michigan Head Lice Manual" published in 2004 and was compiled by members of a workgroup consisting of school nurses, local public health officials, entomologists, and epidemiologists. Recognizing that head lice can be a sensitive topic, the group strived to examine the current body of research about head lice and make recommendations in the best interest of children and others impacted by them.

Thank you to those who assisted in the revision of this manual:

Susan Boley, RN, BS, CSN	Marshall Public Schools
Brenda Brennan, MSPH	Michigan Department of Community Health
Erik Foster, MS	Michigan Department of Community Health
Judith Goldberg, RN, BSN	Detroit Country Day School
Ronda Harrison, RN, BSN, NCSN	Michigan Association of School Nurses
Jayne Heringhausen, RN, MSN	Saginaw County Department of Public Health
Mary Larsen, RN, BSN, CSN	Farmington Public Schools
Linda Meeder RN, MS, C-FNP, NCSN	Michigan Department of Community Health Michigan Department of Education
Nancy Polmear-Swendris RN, MS, CSN	Ann Arbor Public Schools
Kimberly Signs, DVM	Michigan Department of Community Health

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Preface



Head lice (*Pediculus humanus capitis*) have been plaguing people for millennia. Once accepted as a common and unremarkable occurrence in society, head lice have attained almost "legendary status" for creating panic among parents of school-aged children in the United States.

Pediculosis is an infestation of head lice, not an infection. Infestations of head lice mostly affect children between the ages of 3-12 years. Head lice infestations are not a health hazard, and these lice do not spread disease.¹

However, inappropriate treatments can pose real and significant health hazards to the child and his or her household. The most common symptom of a head lice infestation is itching due to sensitization to allergens in lice saliva. Many times, there are no symptoms. Occasionally, scratching leads to chafing and secondary bacterial infection requiring treatment with an antibiotic.

While the public health impact from head lice is negligible, the social and economic costs can be substantial. Anxiety over head lice can actually cause much more harm than the infestation itself. A single case of head lice in a school or day care setting can create fear and anger among the community that is out of proportion to the actual threat it poses to others. Infested children and their families frequently suffer social punishment in the form of shame and embarrassment in the community. The economic impact of head lice in the U.S. is estimated to approach \$1 billion dollars annually, including both direct costs (products and treatments used to kill lice and their eggs) and indirect costs (missed school and work days, misdiagnosis, misuse of pediculicides and other agents).² Ineffective and outdated "no nit" policies contribute greatly to the social stigma of lice infestations, but have no impact on preventing additional infestations in the community.³ (See MDCH and MDE Recommended Head Lice Policy, page 22)

Utilizing the 2010 recommendations of the American Academy of Pediatrics and many other peer reviewed scientific resources, this updated manual intends to provide clarification of new recommendations for the effective treatment and management of head lice.

¹ Frankowski BL, Bocchini JA, (2010). Council on School Health and Committee on Infectious Diseases, "Head Lice," *Pediatrics*, 126 (2): 392-403.

² Hansen RC, O-Haver J, (2004). "Economic Considerations Associated with *Pediculus humanus capitis* Infestation," *Clinical Pediatrics*, 43 (6): 523-527.

³ Mumcuoglu KY, Meinking TA, Brukhart CN, Brukhart CG, (2006). "Head louse infestations: the "no nit" policy and its consequences," *Int J Dermatol*, 45 (8): 891-6.

What are Head Lice?

Human head lice (*Pediculus humanus capitus*) have been associated with humans for thousands of years. Head lice are minute (about the size of a sesame seed), wingless parasitic insects that must live on a person to survive. They survive by piercing the skin to feed on blood and are almost exclusively associated with hair on the neck and scalp (Figure 1).

Lice are flattened dorso-ventrally, or top to bottom, and have six jointed legs with specially adapted claws for holding on to hair (Figure 2). They can move about readily from hair to hair, but are most adept at clinging to prevent dislodgement. Head lice tend to adapt their color to their surroundings and may range in color from red to brown, gray, or black. Red colored head lice have likely recently fed. Because of their small size, flattened bodies, and color, they may be very difficult to see on someone's head.

The head louse feeds by using rasping teeth to penetrate scalp skin at the base of a hair or behind the ears. The louse then inserts its "straw-like" mouthparts into a blood vessel and feeds much like a mosquito. Over time, this feeding activity can be irritating to the skin and leads to the itching/scratching characteristic of the infestation. A louse can ingest several blood meals per day.

Figure 1.

Head lice feeding on a human scalp. Lice engorge and enlarge on blood and will become a reddish color when recently fed.

Figure 2.

A close up high-resolution image of an adult male head louse in its natural environment.

Figure 3.

Head lice eggs (nits) on a person's hair. Dandruff, hair casts, globules of hair spray, and scalp conditions such as psoriasis or eczema may easily be mistaken for nits.

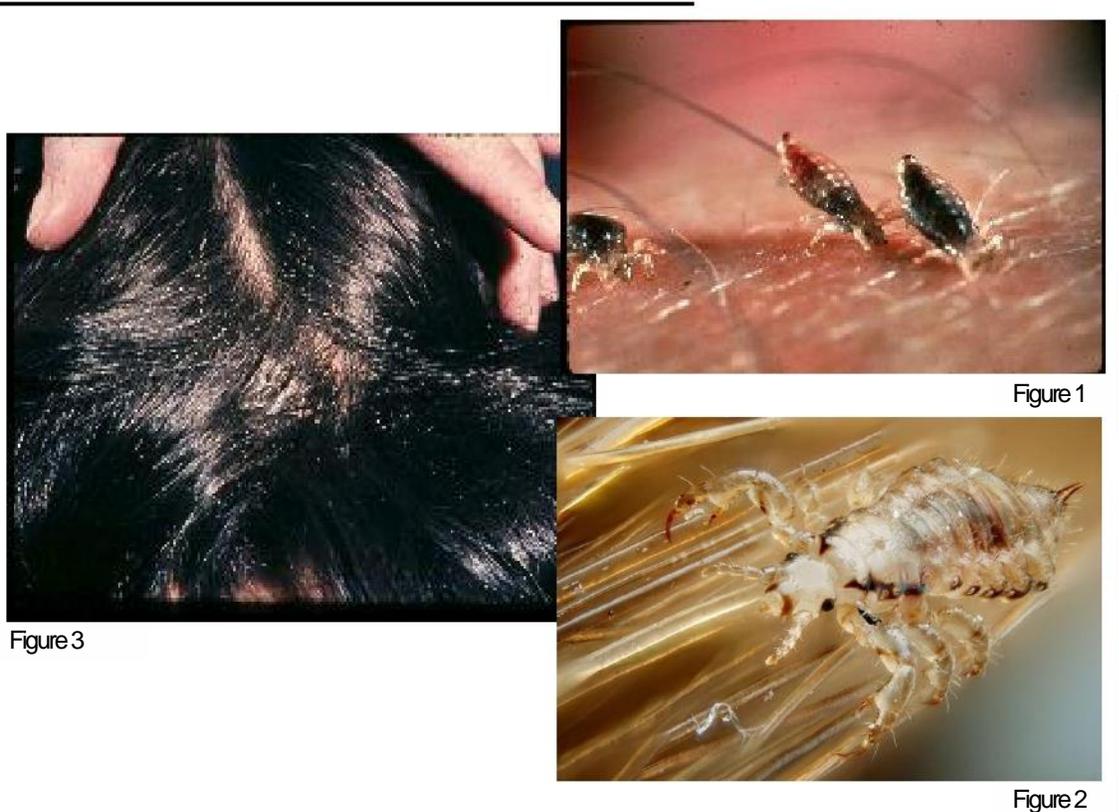


Figure 1

Figure 3

Figure 2

Life Cycle of Head Lice

Nits/Eggs:

Head lice begin their lives as eggs, or "nits." The female adult head louse may lay an average of five eggs per day.⁴ Eggs are attached singly to a hair shaft with a "glue" that is resistant to chemical and mechanical dislodgement (Figure 4). Eggs are normally cemented to the shaft of the hair very close to the scalp. Nits are oval or teardrop-shaped and may range in color from white, yellow, or tan to gray, depending upon age and whether or not the egg has hatched or been killed by head lice treatments. It is thought that eggs attached to hairs greater than one-quarter inch from the scalp have either already hatched, or will not hatch.

Nymphs:

Eggs spend seven to ten days incubating close to the scalp before hatching to release the first nymphal stage (Figure 5). Nymphal stage head lice look very much like a miniature adult louse (Figure 6). The newly hatched nymph will crawl and seek a place to feed immediately. There are three nymphal stages punctuated by molting (the shedding of exoskeleton or "skin"). The three nymphal stages last about 8-12 days.

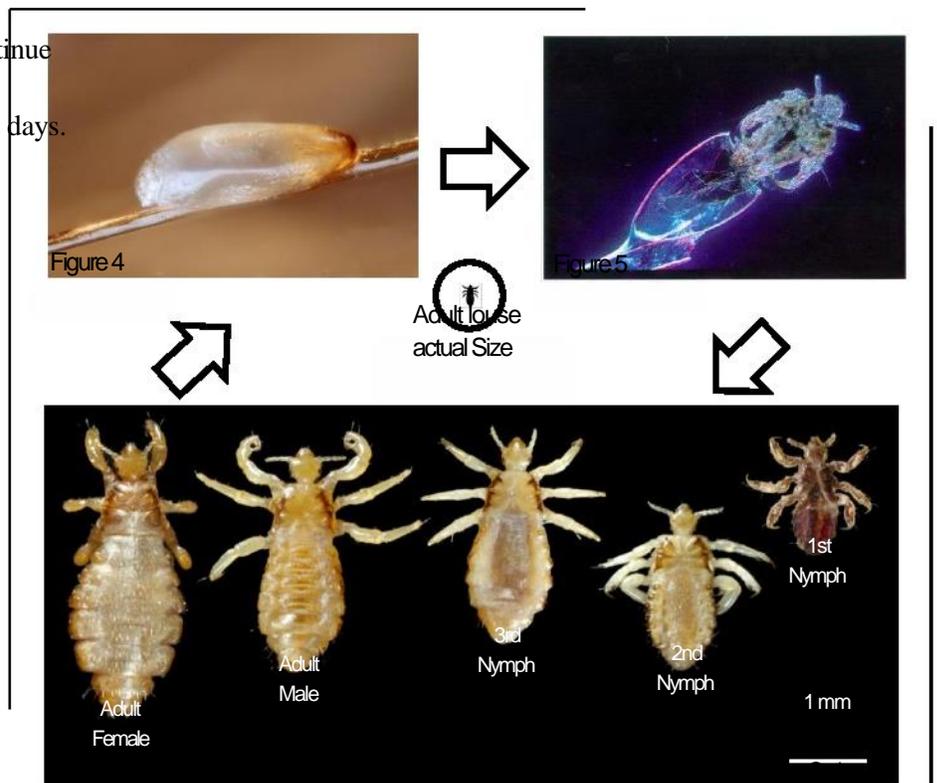
Adults:

The final molt leads to an adult stage (Figure 6) where body growth stops and sexual maturation occurs. Adult head lice continue to feed on blood every three to six hours. There are separate sexes in head lice, and females must mate and be fertilized in order to produce viable eggs. A mated female can continue to produce eggs for the duration of her life, which is about 30 days. She can lay an average of five eggs daily during this period.

Figure 4.
Head lice eggs, or nits, are attached singly to hair shafts close to the scalp. They may be confused with dandruff or dried particles of hair spray or gel.

Figure 5.
Head lice eggs will hatch into first stage nymphs in 7-10 days.

Figure 6.
Head lice progress through three nymphal stages into the sexually mature adult stage. All stages of head lice feed on blood.



⁴ Takano-Lee *et al.* (2003). In Vivo and In Vitro Rearing of *Pediculus humanus capitis* (Anoplura: Pediculidae). *J. Med. Entomol.*, 40 (5): 628-635.



Head Lice Myths and Facts

Definitions	
Infestation = having multiple insects present and reproducing, in this case, on a human head	
Lice = more than one louse	
Louse = small insect that lives on the scalp (singular)	
Nits = eggs, dead or alive, of a louse	
Parasite = an organism that lives off another, i.e. lice surviving on the blood of humans	
Pediculosis = having an infestation of lice	
Myth	Fact
<i>It is easy to get lice.</i>	Lice are spread by head-to-head contact and are much harder to get than a cold, the flu, ear infections, pink eye, strep throat or impetigo.
<i>Avoiding lice is important, as they are dirty and spread disease.</i>	Lice do not spread any known disease, nor are they impacted by hygiene.
<i>Head lice are very sturdy creatures and can survive many days off a human head in furniture, linens, or clothing.</i>	Head lice need a blood meal every few hours in addition to the warmth and humidity of the human scalp to survive. When off the human body, in optimal conditions, they cannot survive for more than 24 to 36 hours.
<i>Nits (lice eggs) can fall off a person's head, hatch, and cause another person to get lice.</i>	Nits are glued to the hair shaft by a cement-like substance and are very hard to remove. When a nymph is hatched, it must quickly have the warmth and food source of a head to survive.
<i>Cutting a person's hair will prevent head lice infestations.</i>	The length of a person's hair does not prevent head lice infestations.
<i>You can get head lice from sitting at a desk next to someone who is infested with head lice.</i>	Head lice are spread through direct head-to-head contact. The lice do not hop, jump, or fly, so sitting near someone with head lice does not increase the risk of getting the lice.
<i>Lice are commonly spread throughout schools.</i>	Transmissions in schools are rare. It is more common to get head lice from family members, overnight guests, and playmates who spend a lot of time together.
<i>Lice are commonly spread through hats, helmets, or headphones.</i>	Although the spreading of lice through hats, helmets, or headphones is possible, it is rare . It is more common for transmission to occur from pillows, hairbrushes, or bedding. Transmission primarily occurs through head-to-head contact.

Myth	Fact
<i>Schools and child-care facilities should screen all children for head lice, so everyone can be treated and the spread of head lice will be prevented.</i>	Having regularly scheduled mass screenings does not reduce the incidence of head lice.
<i>"No-nit" policies reduce the risk of head lice in schools and child-care facilities.</i>	Research shows "no-nit" policies do not decrease the number of cases of head lice. They do increase the risk of incorrect diagnosis of head lice, the number of days children are out of school, and negative social stigma associated with head lice. They also may hinder academic performance.
<i>You can get lice from your dog or other pets.</i>	Head lice are specific to humans. You can get human lice only from other humans. You cannot give your pets lice.

"Lice are spread by head-to-head contact and are much harder to get than a cold, the flu, ear infections, pink eye, strep throat or impetigo."



Image ©naturalchoicelicereoval.com

Transmission of Head Lice

Head lice are transmitted by:

- Person-to-person transmission (direct contact) - The majority of transmissions of head lice occur by direct head-to-head contact with an infested person. Most of the time this is a close friend or relative.
- Vector transmission (indirect contact) - This type of transmission may occur through the sharing of bedding, or by using personal items such as combs, brushes, scarves, hair ornaments, or hats of an infested person. Although transmission via indirect contact is possible, it is rare.



Common ways of transmission through head-to-head contact include:

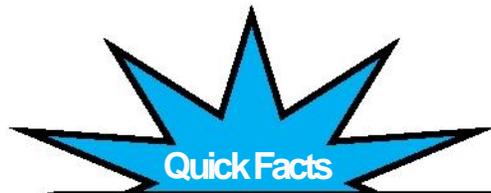
- Slumber parties
- Shared beds
- Sport activities
- Reading circles

Without head-to-head contact, these ways of transmission are highly unlikely:

- School buses
- Hats, helmets, or headphones
- Gym mats
- Sitting at a desk

Anyone can get head lice, but some people are at greater risk than others. Those people include:

- Children between the ages of 3 and 11 years
- Girls are more likely to get head lice than boys, possibly because of their play styles and sharing of personal items.⁵
- People with long or short hair can contract head lice. Although all races can get head lice, studies show that children of African-American descent are less likely to become infested.⁵



1. Head lice are adept at moving from hair-to-hair because of their specialized "claws." They **cannot jump, fly, or crawl great distances over hard surfaces.**
2. Head lice **cannot survive long away from a human head.** A nymph or adult louse that falls from its host will perish within a couple days under the most optimal conditions. Louse eggs do not hatch at normal room temperatures; they require the higher temperatures associated with a human body.

⁵ Centers for Disease Control and Prevention, Head Lice Epidemiology: <http://www.cdc.gov/parasites/lice/head/epi.html>.

Symptoms of Head Lice

Parents, teachers, and other care givers should be aware of the signs and symptoms of a head lice infestation because young children may not be able to express their discomfort directly. The following symptoms should raise the level of suspicion for a head lice infestation:

- Itching ("pruritis"): Caused by an allergic reaction to lice bites. When lice feed, they inject a small amount of saliva into the skin. Over time, the host can develop an immune reaction to the saliva which results in inflammation and itching. It may take four to six weeks for this reaction to occur in people infested for the first time. However, itching may not be present in all cases.
- Sores on the head: Rarely, scratching can lead to abrasions on the skin, allowing bacteria to enter and possibly lead to infection. In severe cases, lymph nodes around the head, neck and underarms can become swollen.
- Tickling sensation: Lice movements in the hair may be felt by some infested individuals.
- Sleeplessness and irritability: Lice are more active at night, possibly disrupting sleep.

Some people with head lice infestations have no symptoms. A lack of symptoms does not mean a lack of head lice. See page 8 for how to screen an asymptomatic person for head lice.



Head lice infestation may sometimes be characterized by the presence of scabs or scars on the scalp from itching. In the above photo, nits are also evident on hair shafts.

Image: Dermnet

Detecting Head Lice

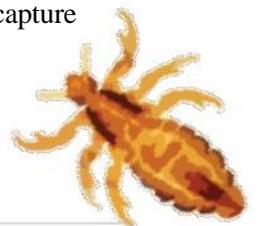
Inspection/Head-Check

Head lice may be brought home after a person has had direct head-to-head contact with someone who has an active head lice infestation. This is most often a close family contact or friend. Lice may spread rapidly to others throughout the home because of the close contact of family members. Whenever one person in the family has been identified to have lice, everyone living in the home should be checked. Any friends, family members, or other people who have had close head-to-head contact with the infested person over the previous week should be notified so they can be checked for head lice as well.

Careful inspection of the hair and scalp is necessary to see if a person has head lice.

Supplies needed for a head lice inspection include:

- **Time** - The person who is inspecting for head lice needs to conduct a careful and thorough search. Times may vary, but this process may take over ten minutes per person.
- **Strong source of natural light, high intensity lamp, or strong flashlight** - Nits reflect ultraviolet light, so natural light (near a window or outside) are the best. If natural light is not available, convenient, or sufficient, a lamp (>60-watt bulb) or strong flashlight (LED recommended) can be used.
- **Magnifying glass (with a light source if possible)(optional)** - Nits are small and may be difficult for some people to see. Newly hatched and adult head lice are also tiny, crawl fast through hair, avoid light, and may be difficult to see in contrast with certain hair colors. A magnifying glass may assist in focusing on a small area and detecting movement. It may also be helpful for people with problems focusing at close distances.
- **Fine-toothed comb (lice comb) or other disposable hair parting tool (optional)** - To examine the base of the hair nearest the scalp, most examiners will need to use a tool to part and lift the hair. If more than one person is being inspected, new tools should be used for each individual. The inspectors should wash hands between checking individuals for general hygiene.
- **Disposable gloves (optional)** - There is no evidence showing that head lice are spread through hand contact; however, some organizations or facilities may mandate barrier precautions for hygienic reasons. If gloves are used, they should be changed between each inspection.
- **Transparent tape (optional)** - If a head lice infestation is suspected and the person conducting the inspection is having difficulty identifying the insect, transparent tape may be used to capture and seal the insect for further identification by someone trained to identify head lice.



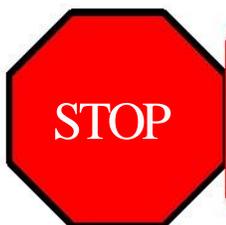
Inspection Method

Head lice are best identified by inspecting the hair and scalp for live lice or nits (eggs attached to the hair shaft close to the scalp). The standard for identifying head lice is finding a live louse on the head. Lice and nits are most often found at the nape of the neck and above and behind the ears.

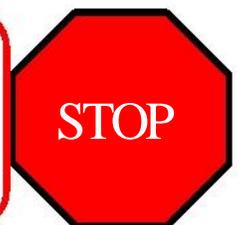
- Carefully part the hair and examine the hair and scalp for nits or crawling lice.
- Begin by inspecting the nape of the neck and the area behind the ears. If nothing is seen in these areas, continue to inspect the rest of the head.
 - Most recently laid nits will be opaque, white, shiny, and located on a hair shaft within one-quarter inch of the scalp. Empty nit cases are more visible and are dull yellow in color.
 - Dandruff, hair casts, globules of hair spray, and scalp conditions such as psoriasis or eczema may easily be mistaken for nits. To differentiate between nits and other debris, remember that hair debris is easily detached or loosened from the hair shaft, and nits are firmly attached to the hair and are not easily removed. Nits are also usually found one-quarter inch or more from the scalp due to hair growth following the initial attachment. By the time the hair has grown sufficiently for the egg case to be one-half inch from the scalp, the egg has either hatched or is non-viable.
 - Nits or lice in the eyelashes or eyebrows indicate possible infestation with other species of lice. Specimens should be submitted to a laboratory for full identification, and the case referred to a private physician or local health department, as a different form of treatment will be required.

Questions about identifying lice or nits should be referred to a health care professional familiar with head lice, such as a school nurse or local health department. Lice may be submitted to a laboratory in a clean/dry container or on a piece of transparent tape. Pieces of hair with possible nits attached may be snipped and submitted to a laboratory in the same manner. In Michigan, identification may be obtained through:

- Local or state health department
- Michigan State University Extension office
- Healthcare provider



Mass screenings are NOT recommended! Schools and child-care facilities should designate an individual or individuals who will be trained to inspect and assess for head lice on a private and confidential basis.



Management and Treatment

Head lice infestations have been occurring for thousands of years, and although numerous efforts have been tried to prevent them from occurring, nothing has proven to be 100 percent successful. However, when they do occur, head lice infestations can be managed. It is important not to panic and/or to cause undue stress for those infested and others around them.

If head lice are suspected, it is recommended the individual be inspected by a school nurse, a public health nurse, or a medical provider.⁶ It is recognized that not all families, schools, or child-care facilities have access to a school nurse, a public health nurse, or medical provider. In those situations, it is recommended that schools and child-care facilities designate an individual or individuals who will be trained to inspect and assess for head lice on a private and confidential basis.

Management activities include treating close contacts with head lice, and the elimination of lice and nits from the living environment and personal items.

Treatment should be considered only if lice or viable eggs are observed. Once a head lice infestation is determined, there are several treatment options to choose from. Methods include:

1. Treatment with pediculicides (substances used to treat lice)
2. Manual removal
3. Alternative or natural methods

Treatment with Pediculicides

Pediculicides are substances or agents used to kill head lice. There are many medicated products available for treatment of head lice, and they normally come in the form of shampoos. Most are available over the counter, but some are by prescription only and may be reimbursable through insurance. **All products must be used strictly in accordance with label directions to ensure effectiveness and prevent adverse reactions from overuse or misuse.** When used properly, their effectiveness has been reported to be 80-95 percent. Repeat treatment with the pediculicide in 7 to 10 days may be needed if indicated on the product label. (See Treatment Failure section, page 11)



⁶ Frankowski BL, Bocchini JA, (2010). Council on School Health and Committee on Infectious Diseases, "Head Lice," Pediatrics, 126 (2): 392-403.



Important Things to Know About Pediculicides:

- **Never treat unless there is definite evidence of head lice.**

Pediculicides are to be used for the treatment of head lice only when there are active lice or viable nits present in the hair, or when individuals share the same bed with someone who has live lice or viable nits (AAP, 2010). They should not be used as routine shampoo or conditioner.

- **These products do not prevent someone from getting head lice.**
- No product is 100 percent effective at getting rid of lice and their eggs.
 - Head lice infestations will be resolved more quickly by manually removing or combing nits within one quarter inch of the scalp after treatment. This will prevent eggs not killed during treatment from hatching. Nits further than one quarter inch from the scalp have likely hatched or are not viable.
 - A second treatment may be required as recommended on the product label.
- Non-prescription pediculicidal products generally are effective and safe if used according to the manufacturers' directions. **To ensure proper treatment, follow all recommendations and directions on the label.** All safety precautions listed on the product label should be observed.
- **Pediculicidal products are for external use only, and should only be applied to the scalp. These products are harmful if swallowed or inhaled. If accidental ingestion does occur, contact poison control at (800) 222-1222.**

Treatment Failure

None of the current pediculicides are 100 percent ovicidal (effective at killing nits), and resistance has been reported with pyrethrins and permethrin⁷ products. This is not unusual, as insects can develop resistance to products over time. Resistance will vary from one community to another.

When faced with a persistent case of head lice, consider several possible explanations, including:

- Misdiagnosis (no active infestation or misidentification)
- Noncompliance (not following treatment protocol or directions per manufacturer's label)
- Re-infestation (lice re-acquired after treatment)
- Failure to treat all affected family members or close contacts at the same time
- Resistance of lice to the pediculicide

Many cases of suspected resistance represent either misdiagnosis of old nits as active cases or a re-infestation. Individuals who are chronically infested and have been treated multiple times with pyrethroid shampoos are more likely to have resistant cases.

Although Permethrin 5% lotion has been tried for suspected resistant cases, it is unlikely that an increased concentration or prolonged application time would be effective in cases of true resistance to Permethrin 1%. Studies have shown that resistance to permethrin is not dose-dependent.

Nit Removal after Treatment with a Pediculicide

Because none of the pediculicides are 100 percent ovicidal, manual removal of nits after treatment may be done to reduce worries of another lice infestation or for cosmetic reasons.

⁷ Durand *et al.* (2012). Insecticide resistance in head lice: clinical, parasitological and genetic aspects. *Clin Microbiol Infect.*, (4):338-344.



SAFETY AND PRECAUTIONS



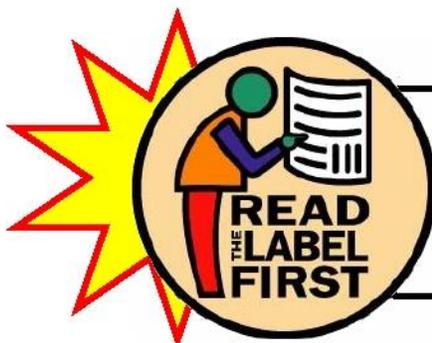
Pediculicides are substances that kill live lice and can be dangerous if misused or overused.

Do not use pediculicide products if the following conditions are present. In these instances, consult a school nurse or other healthcare professional for safe alternative treatments:

- Known sensitivity to any component of a product (read package insert thoroughly).
- A child younger than the age recommended on the product label. For very young infants and children, lice and nits may need to be removed manually using a lice comb. (see page 15 for nit removal instructions)
- The person has an infestation of the eyebrows or eyelashes. Many lice medications cannot be used near the eyes. This can also be indicative of a pubic or body louse infestation.

The following people should consult their healthcare provider before treating themselves or another person for head lice using a pediculicide:

- Pregnant women and nursing mothers.
- Individuals with cancer.
- Individuals with asthma or other breathing difficulties (some pediculicidal products can cause breathing difficulties or asthmatic episodes in some individuals).
- Individuals who are allergic or sensitive to ragweed or chrysanthemums may have allergic reactions to some of the pediculicides.



Always read the medication/product label before applying medication to the head. If there are questions about contraindications or product safety, contact your healthcare provider.

The following pages will describe active ingredients, brief instructions, and precautions for over-the-counter pediculicides, prescription pediculicides, manual removal of lice, alternative or natural methods, other substances, and oral treatments for head lice.

Over the Counter (OTC) Pediculicides



Permethrin (1%) - Nix

- Manufactured as a synthetic pyrethroid, permethrin 1% is currently the recommended treatment of choice by the American Academy of Pediatrics (AAP) for head lice in newly diagnosed cases.
- It is indicated in treatment of head lice for those individuals aged two months and older.
- Permethrin has low toxicity and does not cause allergic reactions in individuals with plant allergies.
- The product is a cream rinse applied to hair that is first shampooed with a non-conditioning shampoo and then towel dried. It is left on for 10 minutes and then rinsed off. It leaves a residue on the hair that is designed to kill nymphs emerging from the 20-30 percent of eggs not killed with the application. In order not to remove the residue, the hair should be rinsed with plain water after application in a sink rather than the bathtub to limit exposure and with cool rather than hot water to minimize chemical absorption through the scalp.
- It is suggested that the application be repeated if live lice are seen 7 to 10 days later. Many experts recommend routine re-treatment (preferably on day 9).

Pyrethrins plus piperonyl butoxide - RID, A-200, R & C, Pronto, Clear Lice System

- Manufactured from natural extracts from the chrysanthemum, pyrethrins plus piperonyl butoxide has low toxicity for people, but is neurotoxic to lice.
- It is indicated in treatment of head lice for those individuals aged two years and older.
- Pyrethrins should be avoided in persons allergic to chrysanthemums or who suffer from asthma.
- The labels warn against possible allergic reaction in patients who are sensitive to ragweed, but modern extraction techniques minimize the chance of product contamination, and reports of true allergic reactions are rare.
- These products are mostly shampoos that are applied to dry hair and left on for 10 minutes before rinsing. All topical pediculicides should be rinsed from the hair over a sink rather than in the shower or bathtub to limit exposure. Rinsing should be done with cool rather than hot water to minimize chemical absorption through the scalp.
- None of these natural pyrethrins are totally ovicidal (have the ability to kill a louse through the egg before hatching), as newly laid eggs do not have a nervous system for several days; 20-30 percent of the eggs may remain viable after treatment.
- A second treatment is necessary 7 to 10 days after first treatment to kill newly emerged nymphs hatched from eggs that survived the first treatment.

Prescription Pediculicides

Malathion (0.5%) - Ovide

- The organophosphate (cholinesterase inhibitor) 0.5% malathion was reintroduced to the U.S. market as a head lice treatment in 1999.
- It is indicated in treatment of head lice for those individuals aged six years and older.
- Available as a lotion that is applied to the hair, left to air dry, then washed off after 8 to 12 hours (although some studies suggest effectiveness when left on for as short a time as 20 minutes).
- Malathion has high ovicidal activity and a single application is adequate for most individuals, but the product should be reapplied if live lice are still seen in 7 to 9 days.
- A concern about this product is its high alcohol content (78% isopropyl alcohol), making it potentially flammable. Users should be instructed not to use hair dryers, curling irons or flat irons while the hair is wet, and not to smoke near a person receiving treatment.
- There is a risk of severe respiratory depression if accidentally ingested, although no such cases have been reported.

Benzyl alcohol lotion (5%) - Ulesfia

- Approved in 2009, this product kills head lice by asphyxiation.
- It is indicated in treatment of head lice for those individuals aged six months and older.
- The product is to be applied topically to the scalp for 10 minutes and repeated in 7 days (retreating in 9 days is optimal).
- The most common adverse effects include pruritis, erythema, pyoderma, and ocular irritation.
- Benzyl alcohol is not ovicidal (have the ability to kill a louse through the egg before hatching).

Ivermectin lotion (0.5%) - Sklice

- Applied as a topical lotion, this product affects the nerve cells of lice, causing paralysis and death. It is indicated in treatment of head lice for those individuals aged six months and older.
- Applied to dry hair in an amount sufficient (up to one tube) to thoroughly coat the hair and scalp for 10 minutes and then rinsed with plain water.
- Ivermectin is both pediculicidal and partially ovicidal.
 - Sklice may be a one-time treatment - retreatment may not be necessary. In a study, 73.8 percent of individuals who received one treatment remained lice free after 15 days.
- Common side effects include eye redness or irritation, dandruff, dry skin, or burning sensation of the skin.

Spinosad suspension (0.9%) - Natroba

- Topical suspension with active ingredient of spinosad which causes neuronal excitement leading to paralysis and death of lice.
- It is indicated in treatment of head lice for those individuals aged four years and older.
- Product is applied to dry hair and scalp. Once washed off, a fine-toothed comb may be used to remove treated lice and nits from the hair and scalp.
- Use product in one or two treatments that are one week apart. If live lice are seen one week (7 days) after first use, re-treat.
- Contains benzyl alcohol. Common side effects include eye and scalp redness and irritation.

Topical Reactions to Pediculicide Treatment

Itching or mild burning of the scalp caused by inflammation of the skin in response to topical therapeutic agents can persist for many days after lice are killed and are not a reason for re-treatment. Topical corticosteroids (i.e., hydrocortisone creams) and oral antihistamines (i.e., Benadryl®) may be beneficial for relief of these symptoms. Please consult with the child's physician/pharmacist before starting any topical therapies.



Image © Melanie Martinez

Manual Removal of Lice and Nits

Manually removing lice and nits may be effective at quickly resolving a head lice infestation. Pediculicide treatment may not be 100 percent ovicidal. For this reason, removing viable eggs may prevent the need for a second treatment. Whether using a pediculicide or manual removal as a stand-alone treatment, the more lice and nits that are combed from the hair, the faster the infestation will be resolved.



To manually remove lice after pediculicide treatment or as a stand-alone treatment:

1. Work in an area with good visibility and light, such as from a lamp or natural sunlight through a window.
2. Make sure a standard comb moves through the hair without difficulty before attempting to use a fine-toothed lice comb. Combing may be easier if the person's hair is slightly wet.
3. Part the hair into sections and hold sections in place with rubber bands or hair clips.
4. Sit behind the person and use a bright light (and magnification if available) to inspect and comb through the hair, one small section at a time. Remove nits using the comb, fingernails, or by cutting the strands of hair.
5. Clean the louse comb frequently to remove any caught lice or eggs using soapy water or paper towel. It may require several hours each night for several nights to successfully remove all nits and lice. An entertaining video may help keep children occupied during this exercise.
6. Combing may be repeated daily until no lice are seen. Continue monitoring for two to three weeks.

Many types of fine-toothed combs may be included within packages of pediculicides, or they may be purchased from most drug stores or internet retailers. The effectiveness depends on their composition (metal or plastic) and construction (length and spacing) of the comb teeth, the texture of the hair to be combed, combing technique, and the time and care expended in the effort.

Electronic combs may be useful for detection (if vision is limited), since they emit a sound when a live louse is present.



Alternative or Natural Methods

Several products are marketed as alternative or natural methods of treatment. A number of shampoos and rinses contain herbs, oils, or enzymes believed to aid in lice removal. The majority of alternative or natural products are suffocants or enzymes.

Natural or herbal products are not required to meet FDA efficacy and safety standards. These products do not have licenses for the treatment of head lice, and in some cases, have little or no data to support their effectiveness. Although natural products are often perceived as being intrinsically safe, the **State of Michigan cannot recommend these treatments without further evidence of their effectiveness.** Please contact your local health department or family physician to make sure there are no potential health consequences of alternative or natural methods.

Suffocants - petroleum jelly, mayonnaise, plant-based oils, or Cetaphil

- Suffocants can obstruct the respiration of adult lice as well as suffocate lice eggs by blocking efficient air exchange.
- For all products except Cetaphil, the product is massaged on the entire surface of the hair and scalp, covered with a shower cap, and left on for at least eight hours (see safety precautions page 19). The suffocant can then be used as a lubricant to aid in nit removal by combing.
- Cetaphil is massaged on the entire surface of the hair and scalp, the excess product is combed out, hair is dried with a hair dryer, and the hair is washed eight hours or more later.⁸
- Diligent shampooing is usually necessary for at least the next 7 to 10 days to remove the residue.
- To date, little scientifically published information is available on the effectiveness of these methods.

Enzymes - LiceLogic, Lice B Gone, Lice R Gone

- Treatment products containing "enzymes" claim to dissolve or soften the glue that attaches the nit to the hair shaft, thereby providing easier removal of lice and nits when combing. To date, only anecdotal information is available on their effectiveness.

Desiccation (Heat Treatment) - LouseBuster, hair dryers, etc.

- The LouseBuster is a custom-built machine that uses one 30-minute application of hot air in an attempt to desiccate active lice and their eggs.
- One study has shown that subjects had nearly 100 percent mortality of eggs and 80 percent mortality of hatched lice.
- The LouseBuster is expensive and requires training in its use. Some businesses offer convenient heat treatments for a fee (normally not covered by insurance).
- A home hair dryer should not be used in the same way. Studies have also shown that using home hair dryers, commercial (salon) dryers, and drying bonnets are not as effective as the steady and diffused heat offered by professional products.



⁸ Peartman, DL (2004). A simple treatment for head lice: Dry-on, suffocation-based pediculicide, *Pediatrics*, 114 (3): 275-279.

Other Substances

Flammable or toxic substances, such as gasoline or kerosene, **should never be used**. Products intended for animal use (e.g., flea collars or topical insecticides) **should not be used** to treat head lice in humans.

Oral Treatments (Used Off-label for Lice)

A promising oral treatment method, oral Ivermectin (Stromectol), is an anti-parasitic agent similar to a macrolide antibiotic but without antimicrobial activity. Other agents used off-label are currently being researched, however, the Federal Drug Administration (FDA) has not approved any oral drugs for the treatment of head lice infestations.

Table 1. Comparison of various head lice treatments including over-the-counter, prescription, and alternatives.

Treatment	Active Ingredient	Advantages	Disadvantages
Over-the-Counter			
Nix	Permethrin lotion 1%	Most studied and least toxic to humans. Generally effective and safe if used according to the manufacturer's directions. Does not cause allergic reactions in individuals with plant allergies. For use in children over 2 months of age.	Non-ovicidal; adverse effects include pruritis, erythema, and edema. Repeat treatments are often required or recommended by the manufacturer.
A-200, Pronto, R&C, Rid, Triple X	Piperonyl butoxide (4%) Pyrethrum extract (equivalent to 0.33% pyrethrins)	Generally effective and safe if used according to the manufacturer's directions. For use in children over 2 years of age.	Non-ovicidal; avoid in people who are allergic to ragweed or chrysanthemums. Repeat treatments are often required or recommended by the manufacturer.
Prescription			
Ovide	Malathion lotion (0.5%)	Single application is adequate for most patients; partially-ovicidal. Malathion is approved for use in children over 6 years of age.	Due to isopropyl alcohol content, Ovide is potentially flammable; use caution. May cause skin irritation or stinging sensation.
Ulesfia lotion	Benzyl alcohol lotion (5%)	Not neurotoxic and kills head lice by asphyxiation. For use in children over 6 months of age.	Non-ovicidal; contains benzyl alcohol which may cause eye and scalp redness and irritation.
Sklice	Ivermectin lotion (0.5%)	May be both pediculocidal and ovicidal. Approved for use in children over 6 months of age.	Side effects may include eye redness or irritation, dandruff, dry skin, or burning sensation of the skin.
Natroba	Spinosad lotion (0.9%)	For use in children over 4 years of age.	Non-ovicidal; contains benzyl alcohol which may cause eye and scalp redness and irritation.

MDCH and MDE Recommended Head Lice Policy



Treatment	Active Ingredient	Advantages	Disadvantages
Petroleum jelly (Vaseline)	Viscous material which potentially asphyxiates head lice.	"Non-chemical;" perceived as a natural option.	Effectiveness unknown; very difficult to remove from hair.
Mayonnaise	Viscous material which potentially asphyxiates head lice.	"Non-chemical;" perceived as a natural option.	Effectiveness unknown; difficult to remove from hair.
Oil (vegetable, olive, mineral)	Viscous material which potentially asphyxiates head lice.	"Non-chemical;" perceived as a natural option.	Effectiveness unknown; difficult to remove from hair.
Cetaphil	Viscous material which potentially asphyxiates head lice.	"Non-chemical;" perceived as a natural option.	Not approved by the FDA for use as a pediculicide.
Desiccation (Heat)	Controlled, heated air causes desiccation in head lice and eggs.	"Non-chemical;" perceived as a natural option. Ovicidal; one-time treatment usually effective.	Expensive equipment; individual providing treatment must be trained and competent.
Enzyme Products		"Non-chemical;" perceived as a natural option.	Effectiveness unknown.

Note: The use of brand names in this document is for identification purposes only, not for product endorsement.

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Safety Precautions

NEVER USE:

Treatment should never consist of toxic and/or flammable household products such as kerosene, gasoline, paint thinner, turpentine, or any other household cleaners. Pesticides intended for use on insects or bugs other than head lice, or pesticides intended for use on animals, should never be used on humans. **Every year children are seriously injured as a result of these types of products.**

CAUTION:

Use caution when putting small children to bed wearing a shower cap. Shower caps may be a suffocation risk.

10 Steps to Keep Ahead of Head Lice

- 1) *Watch for signs of head lice, such as frequent head scratching, flaky or irritated scalp, scabs, or the presence of nits. Anyone can get lice, mainly from direct head-to-head contact or possibly by sharing hats, brushes, beds, pillows, towels, etc.*
- 2) *Check all household members and close contacts for lice and nits (lice eggs) at least once a week.*
- 3) *Be sure not to confuse nits with hair debris (i.e., dandruff, hair spray droplets, or hair casts). Nits are yellowish-white, oval-shaped, and are **attached** at an angle to the side of the hair shaft.*
- 4) *Consult a pharmacist, physician, or school nurse before applying pesticides or other lice treatments. If anyone to be treated is pregnant or nursing, has allergies, asthma, or has nits in the eyebrows or lashes, contact your physician. Never use a pesticide or lice treatment on or near the eyes.*
- 5) *Consider all of your treatment options. Remember, lice-killing products are pesticides and must be used with caution. If you choose alternative methods, they may not have been studied thoroughly enough to determine long-term outcomes. The most effective and safe alternative is manual removal by combing.*
- 6) *Remove all nits. Separate hair sections and remove nits with a lice comb, baby safe scissors, or your fingernails.*
- 7) *For lice treatment, follow package directions carefully. Use the products over the sink, not in the tub!*
- 8) *Wash bedding and all recently worn clothing in hot water and dry in high heat for at least 30 minutes. Combs and brushes should be soaked in hot water (not boiling) for 10 minutes.*
- 9) *Avoid lice sprays! Vacuuming is the safest and best way to remove lice or fallen hairs with attached nits from furniture, rugs, stuffed animals, and car seats.*
- 10) *Notify your child's school, camp, child-care provider, play partners, and neighborhood parents. **Check for lice on a regular basis.***

Head lice are a common community problem.

Here are some Fast Facts:

- An estimated 6-12 million infestations occur each year among U.S. children 3 to 11 years of age
- Head lice often infest people with good hygiene
- Head lice move by crawling; they cannot jump or fly
- Head lice do not transmit disease, but can spread easily through close head-to-head contact
- It is important to talk to your school nurse, pediatrician, or family physician to learn about treatment options



Size comparison of head lice life stages.
Image: Centers for Disease Control and Prevention



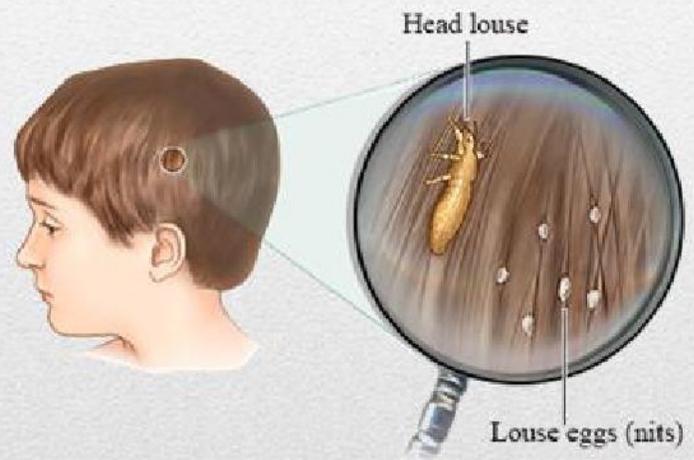
What Families Can Do About Lice

Focus on solutions, not on blame.

Remember: head lice can be picked up at sleepovers, camp, home, and other places where children share close quarters and come into close contact with someone who already has lice. Be sure to check your child's hair regularly, and especially before and after he/she attends a sleepover or other similar activity.

Stay calm. Anxiety and guilt can be common reactions to the news that your child has head lice. Be assured that personal hygiene or cleanliness has nothing to do with a child getting lice. The fact is, while lice may be upsetting and a nuisance, they do not spread disease.

Do not self-treat without consulting an expert. If you think you spot nits but do not see any moving, living lice, consult your child's school nurse or your pediatrician. Do not treat your child with medicated products without confirming that he/she does have head lice.



Head lice and their eggs (nits) can be seen on hair, the nape of the neck, and behind the ears. They can vary in color from white to brown to dark gray. The eggs are tiny round or oval shapes that are tightly attached to the hair near the scalp and do not slide up and down on the hair. The adult louse is about the size of a sesame seed.

Image: HealthWise, Inc.

For more information, contact:

Communicable Disease Division

Michigan Department of Community Health

201 Townsend Street, 5th Floor

Lansing, MI 48913

517-335-8165