Guide for Head Lice Management

Head lice (Pediculus humanus capitis) have been living on the scalps of humans for thousands of years. From the time of ancient Greece and Egypt, through the middle-ages and up to the present, the problem of head lice infestations has continued. Head lice are present in our communities most of the time. There are no known health risks from head lice, yet head lice may cause distractions, poor self-esteem and hesitancy to participate fully in school and/or recreational activities. Children and their families may feel embarrassed, angry, frustrated, guilty or ashamed that they are infested with head lice. Head lice can infest all people, regardless of age, race, socioeconomic status or hygiene practices. It is probable that head lice will never be eliminated completely; however, knowing the facts about head lice transmission, treatment and management will help to ensure the best control of infestations. This guide was developed to provide information about head lice, prevention actions, treatment options and guidelines appropriate for use in the home, schools and communities. There have been many changes in the recommended approaches regarding screening for and the management of head lice, including research finding that no-nit policies are ineffective in stopping transmission of head lice. Utilizing the 2010 recommendations of the American Academy of Pediatrics (AAP) as the primary reference and resource, this guide is designed to provide clarification of those recommendations for effective treatment and management of head lice.
What Are Head Lice?

Head lice (Pediculus humanus capitis) are small parasitic insects that live on the scalps and necks of people. Parasitic refers to an organism that survives on the body of a host. In the case of head lice, the host is a person. Head lice live on people and not on animals. It is specific to people. The adult louse is flat, wingless and crawls. It does not have the ability to fly, hop or jump. Lice tend to adapt to their surroundings (hair and skin color), and range in color from red, brown or black to grayish white and are often hard to see. A louse is very small (about the size of a sesame seed), has six legs, a diamond-shaped head and an elongated body. The mouth is shaped like a stylet (a slender probe or tube). This allows the louse to pierce a person’s scalp so it can feed (a blood meal).

Life Cycle of Head Lice

The life cycle of the louse consists of three stages:

**Stage 1 – Eggs**: The head louse begins life as an egg, commonly referred to as a nit. Nits are laid by the adult female. The nits are firmly attached to the base of the hair shaft, next to the scalp, by a glue-like substance produced by the louse. Nits range in color from white, yellow, tan to grayish, depending upon the stage of development and whether or not they have hatched or been killed by treatment. Nits are oval or teardrop shaped, smooth and very small (about the size of a knot of thread). Nits are hard to see and often are confused for dandruff, hair spray droplets or other debris.

**Stage 2 – Nymphs**: The nits are incubated by body heat for about seven to 12 days before they hatch to release a nymph and become adult lice 9 to 12 days after hatching. The nit shell remains on the hair shaft after hatching and becomes a dull yellow or translucent white and may have a wrinkled look. The nymph looks like an adult louse, but is only about the size of a pinhead. Nymphs need a blood meal within hours of hatching to survive. During the next seven to 10 days, the nymph continues to grow and mature, going through three molts, until it becomes a full adult louse.

**Stage 3 – Adults**: The adult louse is about the size of a sesame seed. The life span of an adult louse is about three to four weeks. The female usually is larger than the male and can lay up to 10 nits per day (only nits that are fertilized will develop and hatch). Adult lice feed every few hours by piercing the skin of the scalp and injecting salvia. Without blood meals, or once away from the human host, the adult louse can usually survive for no longer than 24 to 36 hours.
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 already infested person. Contact is common during play at home or school, slumber parties, sport activities, or camp.
- Vector transmission (indirect contact) – This may occur through using personal items of an infested person such as combs, brushes, or towels; hats, scarves, coats, sport uniforms, or hair ornaments; stuffed animals, bedding, furniture, or carpeting. Although transmission via indirect contact rarely occurs and is unlikely, it is possible. Head lice are not known to transmit disease.
- Head lice are not known to transmit disease
- Although there is a widespread misconception that head lice are found more often among lower income populations, head lice infests all socioeconomic groups.
- Children between the ages of 3 and 11 years are most often infested.
- Girls are more likely to get head lice than boys, possibly because of their play styles and sharing of brushes, combs, and hair accessories.
- Hair length does not seem to matter in regards to likelihood of getting lice. Although all races can get head lice, studies in the United States show children of African American descent are less likely to become infested.

Detecting Head Lice

The gold standard for diagnosing head lice is finding a live louse on the head. Nits that are viable are usually found at the nape of the neck or behind the ears, within ¼-inch of the scalp (CDC).

Signs and symptoms:

For many people, head lice cause no symptoms. When symptoms are present, they include:
- Itching – Itching of the head is the most common symptom. Itching is caused by the saliva-producing toxin that the louse injects into the scalp when it feeds. The amount of itching may be from slight to severe. The degree of itching that occurs is often dependent upon the extent of infestation. Itching may be very mild if the infestation has just occurred, or it may be severe if the infestation has gone untreated for a long time.
- Sores on the head – Occasionally, very tiny red areas on the scalp may be seen due to the bites from the louse. Sores on the head may develop from continued itching and scratching. Sometimes these sores can become infected. On rare occasions, a person may develop swollen glands in the neck or under the arms. You should contact your health-care provider if you think a sore has become infected, or if you have any swelling in the neck or under the arms. Most lice infestations do not lead to infections.
- Tickling feeling of something moving in the hair – Another symptom reported by some people is a tickling or crawling feeling in the hair.
- Sleeplessness – Difficulty sleeping is also a common sign of lice infestation as the lice are more active at night.

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. Head lice
infestation confers a social stigma. It is often mistaken associate with poor hygiene, poverty, or poor parenting. Most people have strong negative reactions to a diagnosis of head lice, including disgust, horror, embarrassment, anxiety, anger, frustration, and guilt. 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 screened by a school nurse, who is trained to inspect and assess for head lice.

Management and treatment of head lice includes:

1. Careful inspection and screening of the hair and scalp to identify lice and/or nits correctly.
2. Use of a pediculicidal (head lice) product if live lice or viable nits are found.
3. The cleaning of personal items and the environment.
4. A repeat treatment with the pediculicidal product nine days following the initial treatment, if not otherwise indicated on the product label.

Parents/guardians should contact their health care provider, pharmacist, or health department for treatment recommendations and for follow-up care.

1. Careful inspection and screening of the hair and scalp to identify lice and/or nits correctly

Head lice may be brought into the home after a person has had head-to-head contact with an infested person at child care, school, camp, sleepovers, etc. The most rapid spread of head lice occurs through the home because of the close proximity of family members. Whenever one person in the family has been identified to have lice, everyone living in the home should be inspected. Any friends, family member 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 inspected for head lice as well.

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

Basic supplies needed for a lice inspection include:

• Time – The examiner needs to conduct a careful search of the hair and scalp. This will take about three to five minutes per person.
  • A good light source – Nits reflect ultraviolet light, so sources that contain ultraviolet rays, such as natural light (near a window or outside) are the best. There is a special lamp called a Wood’s Lamp that works very well since the nits become fluorescent and are easier to see. If none of these light sources are available, a lamp with at least a 60-watt bulb can be used.
  • Magnifying glass (optional) – A magnifying glass can be helpful when looking for nits and lice. It may be especially helpful if the examiner has difficulty focusing at close distances, wears bifocals or has any other visual problems.
  • Disposable hair parting tools (optional) – Some examiners like to use hair dividing tools such as coffee stirrers, blunted toothpicks or the stick portion of a cotton swab. The stick is used to divide and lift the hair so the base of the hair shafts can be inspected for nits and/or lice. If more than one individual is being inspected, new sticks should be used for each person being examined. Using a louse (nit) comb helps to increase the efficiency of diagnosis.
  • Vinyl gloves (optional) – Some examiners like to wear vinyl gloves; however, the use of gloves is not necessary. There is no evidence showing lice are spread through hand contact and do not pose risk for disease transmission. Gloves should be changed in between each inspection (if used).
Performing the inspection for lice

The entire head should be examined, but special attention should be given to the places where lice are most likely to lay their eggs. These areas include the hair directly over and behind the ears, near the crown and at the back of the neck. The hair should be separated or parted into small sections so the base of each strand of hair can be inspected. The lice themselves may be hard to see since they move fast; more often the nits can be found. Viable nits are close to the scalp (less than ¼ inch). It is important to be able to tell nits from other debris in the hair. Debris in the hair such as hair spray particles, lint, scales or dandruff will brush off or can be blown away easily. The female louse produces a glue-like substance that firmly attaches the nit to the hair shaft. Nits cannot be brushed away, washed off or blown from the hair. In order to avoid mistaking debris for nits, attempt to pull the particle from the hair shaft. If the particle remains attached, then suspect nits.

If no nymphs or live lice are seen and the only nits found are more than ¼ inch from the scalp, the infestation is probably old and no longer active and does not need to be treated according to CDC guidelines.

2) Use of a pediculicide product if live lice or viable nits are found

Pediculicidal products – There are many pediculicidal products available for the treatment of head lice. Most over-the-counter pediculicidal products contain Permethrin 1% or Pyrethrin. Permethrin 1% is the most studied pediculicide in the United States (AAP, 2010) and is recommended as the first choice of treatment when no resistance to the product has been identified in the area. Prescription pediculicidal products contain stronger doses of Permethrin, Malathion, Benzyl alcohol (not rubbing alcohol) or Lindane. For further information on pediculicidal products, contact your local public health department, health-care provider, clinic or pharmacy.

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 live lice or viable nits present in the hair. They should not be used as routine shampoo or conditioners.
• These products do not prevent someone from getting head lice.
• Nonprescription 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.
• No product is 100 percent effective at getting rid of lice and their eggs. A second treatment nine days after the initial treatment, or as recommended on the product label, is encouraged.
• Pediculicidal products are for external use only. These products are harmful if swallowed or inhaled. If accidental ingestion does occur, contact poison control at 1.800.222.1222.
• The scalp may continue to itch for several days after treatment. Tender scalp, stinging of the scalp The scalp may continue to itch for several days after treatment. Tender scalp, stinging of the scalp or scalp irritation may be associated with treatment. These symptoms are not evidence of continued infestation. Generally, these symptoms occur within hours after treatment and may last up to 24 hours.
• Permethrin conditioners continue to work after the hair is rinsed during the initial treatment. Do not use other hair conditioners directly prior to, or after using the product, as these may interfere with the effectiveness of the pediculicide. Also avoid shampoos with conditioners and rewashing the hair for several days following the treatment.
• Use the entire contents of a container for each individual. Unless the container indicates multiple doses, a bottle of pediculicide should not be split and used by multiple individuals, nor should a dose be divided to use for more than one treatment. A second container of product may be needed to fully saturate the hair for someone with long hair.
SAFETY AND PRECAUTIONS

Do not use a pediculicide if:
- The person has a known sensitivity to any component in the product.
- The child is younger than the age recommended on the product label. This ranges from ages 2 months to 2 years. For infants younger than 2 months, head lice and nits should be removed manually by picking the lice and nits from the hair. A special comb may be needed for this.

The following groups of people should consult their health-care providers before treating themselves or another person with a pediculicide:
- Individuals who have neurological conditions, such as seizure disorders, cerebral palsy, etc.
- Pregnant women and nursing mothers
- Individuals who have cancer
- Individuals who have asthma and/or allergies
  ▷ Pediculicidal products may cause breathing difficulty or asthmatic episodes in some individuals.
  ▷ Individuals who have an allergy and/or sensitivity to ragweed, chrysanthemum or roses may have an allergic reaction to some of the pediculicides.

Procedure for treatment of an individual
- When head lice have been identified on one family member, ideally all household members should be inspected before treatment is started. All household members found with infestation should be treated the same day. Treat only those who are infested. Some experts recommend treatment for persons who share a bed with an infested individual.
- Most pediculicides come packaged in single-dose containers. Do NOT divide the product and/or use a single container for multiple heads unless it is marked as a multiple-dose container. Read the package insert carefully. Use the entire contents during a single treatment, making sure the hair is entirely saturated. If more treatments are necessary, obtain more products.
- Remove the individual’s shirt. Cover the shoulders and arms with a towel. To protect the eyes, cover them with a washcloth.
- To confine the product to the head and scalp, have the individual lean over the sink or bathtub. Do not treat while bathing or showering, as the product may flow onto the body and expose greater amounts of skin.
- Follow the manufacturer’s directions and apply the treatment.
- Unless instructed otherwise on the product instructions allow the hair and scalp to dry in open air. Hot hair dryers or blowers may reduce the effectiveness of some lice treatment products.
- Following the treatment, have the person put on clean clothing.
- Hair conditioners and vinegar rinses may reduce the effectiveness of some lice treatment products. Remember to follow the manufacturer’s instructions. If shampooing is needed during the week following treatment, use regular shampoo only.
- No treatment kills 100% of eggs. A second treatment should be provided nine days after the initial treatment if not otherwise specified on the product label.
- Removal of nits immediately after treatment with a pediculicide is usually not necessary to prevent the spread of lice, but may be encouraged for cosmetic reasons, to decrease diagnostic confusion during future head checks.
- Cleaning of personal items and the environment should be done on the same day of treatment.

If lice persist or if treatment does not seem to be working, consider the following:
• Was the hair too wet during application of treatment?
• Were product directions followed exactly as stated on the label?
• Was the product left on long enough?
• Was the person really infested?
• Were other shampoos or conditioners used that may have interfered with treatment?
• Could the person have become reinfested with lice due to contact with an untreated infested person or an environmental source?
• Is this a case of resistant head lice?
• Was enough treatment product used?

**Alternative therapies**

Many products are listed as “natural.” It is important to remember the term “natural” does not always mean safe or effective. If you choose a product different than those previously mentioned to treat head lice, it is advisable to confirm that the product has been approved by the Federal Drug Administration (FDA) for use in the treatment of head lice. This information can be found on the product label. Products should also have a toll-free telephone number on the package so you can call the company with questions regarding possible side effects, what actions to take if side effects occur and proper use. Products should list the active ingredient(s) so you can consult with a health-care provider or pharmacist about the possibility of allergic reactions, possible side effects and contraindications of use of the product if needed.

Home remedies have been around as long as head lice. Although widely used, these products are not approved by the FDA for treatment of head lice and do not have to meet safety and efficacy standards. Examples of home remedies include olive oil, mineral oil, petroleum jelly, mayonnaise, Cetaphil, vinegar, and “natural” products such as essential oils. The most common of these are the oil-based products applied to the hair and then covered by a shower cap or plastic wrapping. Oil-based products appear to work by clogging the breathing pores of the louse, thereby smothering or suffocating it. It should be noted that these products are generally difficult to remove from the hair. Also, scientific studies have not found oil-based products as effective as pediculicides. Home remedies such as dying hair will not get rid of head lice.

**Head shaving and/or cutting hair**

Some parents may want to shave the child’s head to get rid of the lice problem. Shaving or cutting hair may be at a high emotional cost to the child and is not necessary. Others think cutting a child’s hair reduces the chance of infestation. Shorter hair may make it easier to locate and remove lice and nits, but does not reduce the risk of infestation.

**SAFETY PRECAUTIONS:**

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 not be used on humans. *Every year children are killed or seriously burned as a result of these types of products.*

**Never put a child to bed with a shower cap or with plastic covering his or her head! This can cause a suffocation concern.**

**3) Cleaning of personal items and the environment**

When it comes to the cleaning of personal articles and the environment, it is important to remember:
• Head lice generally cannot survive more than 24 to 36 hours at room temperature off of a human host.
• The viable nits attached to hairs that become separated or detached from the human host may remain viable for between 10 to 14 days; however, there needs to be an ideal temperature for them to hatch and once the nits hatch, the nymphs must find a human host within hours to survive.
• You do not need to spend a lot of money for cleaning supplies. Sprays for the house and furniture are not needed and are not recommended. The use of pediculicidal (or pesticides) or insecticidal sprays is strongly discouraged and in NOT recommended, as these may be harmful to family members and pets.
• Even though cleaning the environment is important, excessive cleaning such as scrubbing walls and cleaning curtains is not necessary. Concentrate on heads, where lice live and feed. Appropriate initial treatment and a repeat treatment nine days following will go much further in managing head lice than excessive cleaning.

**Family combs and brushes**

• Soak hair-care tools in hot water (130°F) for at least 10 minutes. Heat may damage some plastic combs and brushes. Place these items in a sealed plastic bag for two weeks (CDC).
• When possible, make sure every member of the household has his or her own comb or brush. Tell children not to share these items with others.

**Articles of clothing and bedding**

• To kill lice and nits, machine wash all washable clothing and bed linens used by the infested person(s) during the two days before treatment. Use the hot water (130°F) cycle during the washing process then dry laundry using high heat for 20 minutes.
• Washing clothes to remove lice and nits does not need to be repeated daily and is only necessary on the day of treatment and retreatment.
• Articles that cannot be machine washed, such as stuffed animals, pillows or comforters, can be vacuumed, dry cleaned or stored in a sealed plastic bag for two weeks. Remember to keep plastic bags out of the reach of young children, as the bags may pose a suffocation hazard. Another option is to place the item in a hot dryer for 20 minutes, if the recommended care label approves the use of dryers.

**Treatment of the environment**

• The spread of head lice by contact with inanimate objects may occur, but is very uncommon. Head lice would have difficulty attaching firmly to smooth or slippery surfaces like plastic, metal, polished synthetic leathers and other similar materials. In addition, head lice cannot survive on inanimate objects (CDC, 2010).
• Floors, carpet, upholstered furniture, pillows and mattresses should be vacuumed to pick up any hairs that may have living lice or nits attached to them.
• Vehicle car seats and child safety seats can be cleaned by vacuuming or running a lint remover (rollers with sticky surfaces) over the seats.

**4) Repeat treatment with the pediculicidal product**

No treatment is 100 percent effective. Some nits may survive the initial treatment and hatch live nymphs. Retreat nine days after the initial treatment if not otherwise specified on the product label. A second treatment with the pediculicidal product should kill any newly hatched nymphs prior to them maturing into lice and gaining their ability to lay new nits.

**Manual Removal of Head Lice/Nits**

Some parents do not want to use potentially toxic chemicals on their child’s head or scalp. Lice/nits can be safely removed by manual removal. Nit removal can be difficult and time consuming.
The following actions should assist you in the process of removing nits.

Wearing gloves during lice/nit removal is a personal choice; however, it is not necessary. There is very little chance of spreading the infestation, and gloves often make the job more difficult.

• Work in an area with good visibility and light, such as from a lamp or natural sunlight through a window. It may be easier to see and remove nits during the day when there is more natural light.
• Hair should be clean, damp and untangled. A lubricant such as water, oil or conditioner may be used to help guide the nit comb through the hair.
  ▷ Use a grooming comb or hairbrush to remove tangles.
  ▷ During the combing to remove the nits, using a good lice or nit comb is most effective.
  ▷ It is best to have hair that is slightly damp when removing the nits.
• If the hair is too wet, the nit comb slips through too quickly.
• If combing is done on dry hair, individuals often complain of discomfort.
• Part the hair into sections and hold sections in place with hair clips. This makes it easier to see lice and nits.
• Comb and/or pick out all the nits.
  ▷ Some examiners recommend combing the hair slowly away from the scalp, inserting the comb as close to the scalp as possible and pulling the comb completely through the hair from root to the end. Pay special attention to the nits right next to the scalp.
  ▷ Others advise holding the hair at the end and combing with a back motion towards the scalp, reporting this approach as more likely to break the nit from the glue-like substance that attaches it to the hair shaft.
• Comb one section at a time, pulling the comb slowly through the hair several times.
  ▷ Examine all sides of the hair shafts for nits.
  ▷ Although using a nit comb removes most of the nits, sometimes you may need to remove a stubborn nit by pinching it between two fingernails.
  ▷ If you are unable to remove a stubborn nit by combing or with your fingernails, you can simply cut off the hair shaft with a small scissors.
  ▷ Check the section one last time to make sure it’s clean and then pin it out of the way by curling it flat against the head. This will help you keep track of the sections you have already combed and those that still need combing.
• Check the comb after each pass through the hair. Whenever you comb out nits or lice, clean the comb under running water or dip it into a bowl of water. You also can clean the comb with a paper towel or tissue. Hold the comb up to the light to make sure it is completely clean before the next stroke.
  ▷ Paper towels or tissue can be thrown into the garbage. Simply tie the garbage bag and remove from the house when finished.
• After combing is complete, soak the lice comb in hot water (130 degrees F) for at least 10 minutes. Use an old toothbrush to clean the comb.
  ▷ Check the comb under a bright light to make sure all lice and nits are gone. The comb can now be used on another family member or is ready for the next combing.
• There are many different nit-removal combs on the market. Nit combs often are included in the packages of many head lice removal products. The comb should have an inner tooth space smaller than the nits (0.5 to 0.8 mm) to be effective. Metal combs are sturdier and less apt to break than plastic combs. Some metal combs have “micro grooved teeth” that are distributed along the teeth in a tight-spiral form. These combs cause injuries at different points on nits together with the dragging action to destroy them.
Educational Resources

For families seeking additional information a number of online resources are available, including:

- Centers for Disease Control and Prevention – http://www.cdc.gov/parasites/lice/head
- National Association of School Nurses- http://www.nasn.org

Other resources:

- Nit Free Terminator Comb – http://nitfreecomb.com
- patient.info/health/wet-combing-treatment-for-head-lice
- PEDIATRICS Volume 135, number 5, May 2015
- http://nasn.org/ToolResources/HeadLicePediculosisCapitis
- www.cdc.gov/parasites/lice/head/biology
- www.cdc.gov/parasites/lice/head/treatment
- www.cdc.gov/parasites/lice/head/schools
- www.pediatricnursing.net/ce/2016/article4005226235