



Head Lice (Pediculosis)

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Head lice are parasitic insects that live and feed on the human scalp. Anyone can become infested if a louse crawls from the clothing or hair of an infested person to their clothing or hair. Head lice are usually brought into the school on children’s hair, hats or coats and move to another child who shares a school bus seat or a coat rack.

Many Washington communities now have an on-going problem with head lice in school age children. Lice on individual children cannot be effectively treated at the school because the child will become re-infested if there are lice at home. Nevertheless, schools have become the major source of children’s and parent’s education on head lice control.

Lice that have fallen off children onto floors, furniture and bus seats can be physically removed without exposing children to pesticide space sprays. This document covers Integrated Pest Management (IPM) techniques for management of head lice.

How to identify a head louse

Adults and immatures (**nymphs**) are brown or grayish white in color, very small (1/16 to 1/8 inch long), but can usually be seen with the naked eye. The eggs or **nits** are glued to hair where it grows out of the scalp. An **active infestation** means that living adult lice and or living eggs are present on the hair shaft. Living or **viable nits** are yellow to gray in color and darken to brown as they mature. They are found close to body heat, usually within 1/4 inch of the scalp.

Head lice prefer to be in the hair at the back of the neck and behind the ears. Empty egg cases of nits that have hatched or dead nits are further from the scalp because the hair has grown out.

Head lice and nits are easily confused with other debris that may be found in hair such as dandruff, lint and flakes of hair spray. Nurses or screening volunteers need training in head lice detection.

Facts about head lice

Contents

Facts	2
How head lice get into schools.....	4
The key to controlling head lice.....	4
<u>Head Lice Control</u>	
Techniques for School Administrators.....	5
Techniques for Custodial Staff.....	6
Techniques for the School Nurse.....	7
Techniques for Teachers and Clerical Staff	8
For More Information...	11

Hazards of head lice

The main hazard of head lice in the United States is the often unnecessary and sometimes repeated exposure of children and parents to pesticides and the disruption of learning caused by school absences for treatment. The scalp may become torn and infected by repeated scratching of the itchy bites. Head lice are not known to carry diseases in the United States, but the scalp can become irritated and infected from being scratched.

Head lice are closely related to **body lice**, which are not common in this country. Body lice live in unwashed clothing and move to the skin to feed. Historically, body lice are one of the large scale killers in times of war and refugee migration (millions in Europe during World War I, 3 million Russians in World War II). Body lice are transmitters of serious diseases, particularly typhus and trench fever.

Hazards of pesticide treatment

- Many doctors who prescribe head lice shampoos are not familiar with pesticides and may not ask if parents are using other pesticides, such as space sprays.
- Many parents do not think of head lice shampoos as pesticides and do not realize that the shampoos are toxic to their family's health when misused.
- Parents do not always read and follow the directions on pesticide shampoos and may use the products on the face or the rest of the body, not just the scalp and hair.
- Parents or school staff members who wash the hair of several children may fail to protect themselves from repeated contact with the pesticides by using gloves and eye protection.
- Parents who are frustrated by the failure of a head lice shampoo will try different products in succession.
- Children have been injured by attempts to use kerosene or products for animals when the over-the-counter lice shampoos do not work.
- Parents who use pesticide shampoos often re-apply them repeatedly in an attempt to kill resistant nits and lice.

- ☑ Children may be exposed to additional pesticides in sprays used at home and by school staff attempting to kill head lice in the building or on school buses.

Why head lice problems are increasing

Schools are now faced with a head lice crisis because the traditional approach to managing head lice has become ineffective. The traditional treatment is to wash the affected child's hair with a pesticide shampoo. Home treatment of head lice has been failing, so some schools have turned to using insecticide sprays on furniture and in rooms.

- ☑ Insecticidal shampoos are not completely effective at killing lice because some or all of the nits are not affected.
- ☑ There is increasing evidence that lice populations are becoming resistant to the insecticides in shampoos and room sprays. Resistant lice pass their genetic resistance on to their offspring, thus breeding a more resistant population.
- ☑ Shampoos do not remove nits. These must be physically removed by combing or cutting them out of the hair. If not removed, living or viable nits hatch and breed a new generation.
- ☑ Children are easily re-infested by contact with infected relatives, playmates and classmates unless they are educated about how lice are spread.
- ☑ Some parents or guardians do not take head lice very seriously, or their living situations are such that they cannot treat their children or isolate them from others with lice.
- ☑ Many parents cannot afford the expensive head lice shampoos and do not attempt to manage the lice at all.

Since head lice do not cause or transmit diseases, the medical research community has not been active in searching for alternative solutions to these problems. Health departments do not require reporting of head lice so there is a lack of specific information about resistant populations. The National Pediculosis Association collects voluntary information about head lice infestations, especially resistance. They claim to receive an average of 50 calls a day about resistant lice populations.

Head louse food

Head lice feed four to six times a day by biting a human scalp and sucking the victim's blood. The bite is usually not felt at first, but soon begins to itch intensely.

The head louse life cycle

Female head lice glue their **nits** (eggs) on hairs close to the human scalp. Nits hatch in a week or so and the new **nymphs** begin to feed at once. They molt several times in the next month and become **adults**. Adult females are able to lay their eggs in 10 days and can lay from 50 to 300 eggs each. The adults can live for several weeks on a human head. They can live only for about a week off a human, and cannot live on pets or other animal hosts.

How head lice get into schools

Anyone can get head lice, but it is usually the younger children (age 3 to 10) in a school who are most susceptible. Head lice cannot jump or fly although they can move rapidly. They spread from person to person when people are in close contact or when they share clothing or personal items that have been in contact with the head or neck. Hats, coats, combs and hair ornaments, stuffed animals, and nap blankets or pillows that have recently been in close contact with an infested child commonly harbor head lice.

Schools can take steps to minimize the spread of head lice from infested individuals to others by segregation of clothing and by establishing a “no admittance with nits” or “no admittance with viable nits” policy.

The key to controlling head lice

The keys to successful control of head lice are:

- monitoring of children by trained individuals;
- establishing a school policy for dealing with head lice problems;
- physically separating individual coats and hats;
- physically removing lice on surfaces; and
- educating of parents and children on the safest methods to eliminate head lice and to prevent re-infestations.

Since head lice cannot live long off a human host, it is useless to spray a room or furniture to kill them.

Methods in Integrated Pest Management: Head Lice Control

Techniques for School Administrators

✂ Establish a school policy for head lice problems

- Never** let other children know the identity of the children with head lice.

- Children with an active infestation should be sent home for treatment.

- Re-admit children to school only after treatment for head lice has killed the adults and eggs. Parents may not take action to remove dead nits. In the interest of preventing further exposure to pesticides, schools may choose to re-admit children with **non-viable** nits.

- Provide a way to keep each child's clothing, headwear, nap blankets and mattresses physically separated.
 - If possible provide individual lockers with doors for each child's clothing and blankets, or individual cubbies with a wall between for each child's clothing.
 - If this is not possible, at least try to provide individual coat hooks with plastic bags and twist-ties for each child's coat and head wear.

- Establish training for staff on non-toxic and least toxic methods of head lice management.

- Provide information to educate parents and children on the mechanics of how head lice are spread from child to child.

Techniques for Custodial Staff

 Non-toxic and effective methods to kill or remove lice on objects

These methods help to keep lice on clothing or toys from moving to another child within the hours they can live off a human body. Head lice cannot live long without human blood and warmth. Space sprays should never be used against head lice because they are useless against lice that have dropped off a human host, and because they expose everyone in the room to pesticides. Most items and surfaces in the school can be cleaned in one or more of the following ways:

Vacuum carpets, furniture and toys that might harbor lice

This will pick up any stray hair and adults or immatures that have dropped off the children. Use a vacuum with a HEPA filter. A little cornstarch in the vacuum bag helps smother the lice. Always remove the vacuum bag, tape or seal the openings, and dispose of it promptly to prevent any living lice from escaping.

Launder washable items and /or put them in a dryer

Wash throw rugs, play costumes, art aprons, and nap bedding in hot (140 degree F) water for 10 minutes. Stuffed animals and some coats and hats can be put in a dryer on the hot cycle for 20 minutes. Brushes and combs can be soaked in hot water until it cools.

Quarantine toys or objects

After vacuuming, seal any items that can't be washed (such as stuffed animals) in a plastic bag for 10 days. Living nits will hatch and die without a blood meal.

Techniques for the School Nurse

 The school nurse should provide training to staff who screen children for head lice

Teachers, their assistants, clerical staff or any volunteers working with preschool to elementary school students need to be trained to recognize symptoms of a head lice infestation. Staff who will be diagnosing head lice and deciding if a child needs treatment or if a child can be re-admitted after treatment need to be trained.

- The inspectors should learn not to confuse an infestation with normal hair dandruff, dried hair spray etc.
- It is important for the persons doing the screening to know how to avoid becoming infested with the lice themselves.
- Two persons searching the head is most effective because one person cannot see the entire scalp.
- Inspectors should use a magnifying glass to aid their eyesight and disposable wooden sticks to part the hair.
- It can be difficult for people to tell if a nit is alive, but if the school policy recommends re-admittance of children with non-viable nits, a teacher or clerical staff person will need to be able to recognize whether any nits are living or dead.

 The nurse also needs to become familiar with the basic facts of head lice treatment

Nurses need to be able to communicate information to parents and school staff and to know the limitations of current knowledge.

- The effective alternatives to pesticide use and where to get more information.
- Why it is essential to read and follow instructions on the pesticide shampoo label if a parent chooses to use a pesticide.
- The basic biology of head lice life stages and needs.
- The limitations and actual effects of over the counter and prescription pesticides on head lice at their different life stages.

- ☑ The particular susceptibilities of children and adults to pesticides, especially where there is repeated use, asthma, allergies or other conditions of impaired health.
- ☑ The lack of scientific knowledge on the safety of repeated pesticide treatments for individual children or their parents.

Techniques for Teachers and Clerical Staff

Regularly inspect children ages 3 to 10 for head lice

Most Washington schools do not have a nurse available every day to refer children to for head lice examination, either for diagnosing an infestation, or for a child's re-admittance to school after home treatment. Trained teachers, clerical staff and volunteers are usually the school personnel available to screen children with symptoms such as frequent head scratching.

- ☑ It is important to have someone available (as soon as possible) to determine if a child with symptoms is infested, rather than having the child wait to be returned to class or sent home.
- ☑ Preventative head lice inspections should be scheduled when school starts in September, and when children return from winter and spring breaks.

Know effective and least toxic methods to kill and remove adult and larval lice from people

School staff or parent volunteers have sometimes helped to wash hair to control lice. **No shampoo will remove nits** which are glued to the hair. Nit removal is usually a requirement for a child's re-admittance to school after being sent home for head lice treatment. A person who washes children's hair has the following choices to kill and wash away adult and larval lice.

Regular Shampoos

Many types of shampoos are non-toxic to children, easily available and inexpensive.

- ☑ **Regular detergent shampoos** will wash out the adult and larval lice.
- ☑ **Coconut and olive-oil based non-detergent shampoos** have fatty acids that are harmful to head lice.
- ☑ **Coconut and olive oil-based bar soaps** have fatty acids, but dry and tangle the hair so they must be followed by a conditioner.

Pesticide Shampoos

Shampoos that are registered pesticides may require a doctor's prescription and are very expensive. Pesticide shampoos and rinses do not kill all nits on the scalp and do not remove any nits. Pesticide use will eventually develop a population of resistant lice no longer affected by the pesticide ingredients.

- ☑ Pesticide shampoos should not be used on eyebrows or scratched or inflamed skin. They should not be used on or by persons with asthma, allergies or impaired health.
- ☑ Anyone washing several individual's hair with a pesticide shampoo should wear gloves to protect their hands from absorbing the pesticide. It is not known what kind of glove - rubber or plastic - will offer the best protection.
- ☑ A repeat treatment is often necessary to kill the next hatch of nits.
- ☑ Since it is a registered pesticide, there is a requirement to follow label instructions exactly, and many parents will not or cannot read or follow these directions.
- ☑ **Pyrethrin-based shampoos** Pyrethrins are natural chrysanthemum extracts which attack the nervous systems of insects. Pyrethrins synergized with piperonyl butoxide are in the shampoo products, A-200 Pyninate[®], RID[®] and Pronto[®] which are available over the counter.
- ☑ **Permethrin-based cream rinse** A 1 percent solution of permethrin, a pyrethoid, (synthetic pyrethrin) is found in NIX[®] which is a cream rinse for hair. The Warner Lambert company was quoted in the Oregon Health Division, "CD

Summary” newsletter of August 20, 1996, as claiming their product kills 70 to 75 percent of the nits on the human scalp. The company spokesperson commented that the effectiveness of their product is often reduced by residuals left on the hair from vinegar or commercial nit removal products, shampoos and hair care products.

The National Pediculosis Association, based on a number of clinical comparison trials feels that NIX® is more effective than Lindane.

- ☑ **Lindane-based shampoos** Lindane is a registered pesticide (an organochlorine insecticide) and a central nervous system stimulant. In ‘pure’ form it is highly toxic and carries the signal word WARNING. It is the active ingredient in Kwell® and some generic brands. It is available by prescription only due to its toxicity, its ready absorption into the human bloodstream. Because lice have become resistant to lindane, it is not used as much as in the past.

Lindane is able to cross the placental barrier to expose the fetus, so it should not be used by any pregnant or lactating woman who is applying it to her own or to a family member’s hair.

Know effective and non-toxic methods to remove nits from people

Most schools require all nits to be removed before a child is re-admitted to classes. Shampoos do not detach and wash out either living or dead nits, so shampooing must be followed by physical nit removal, both to reduce survival chances of another generation of lice and for a child’s re-admittance to school. There are only two ways to effectively remove living or dead nits from the scalp. Both methods are time consuming, but are non-toxic.

Comb the nits from the hair

Nits can be combed out of the hair with a special comb available at drug stores and most grocery stores. Metal combs are said to be more effective than plastic ones. Separate damp hair into small sections with a comb and work through one section a time. Nits will be within a few inches of the scalp. Rinse the comb in water periodically. Some people feel that fingernails scraped along the hair shaft pull lice off more effectively than a comb.

Cut out the individual hairs with nits attached

Any hairs with nits attached should be cut off at the scalp with a pair of safety (round ended), baby, or nail scissors. This may be more difficult and dangerous than combing.

For More Information

For further information, educational materials for parents and schools, and head lice screening supplies please contact:

National Pediculosis Association
Post Office Box 149
Newton, MA 02161
(617) 449-6487
www.headlice.org

Related Publications

In addition to this fact sheet, staff working on the Integrated Pest Management in Schools Project have created eight other documents that describe the least toxic methods for controlling pests in a school setting. Call (360) 407-7472 to request any of the documents listed below:

Publication Number	Title
#97-420	<i>Integrated Pest Management in Schools Project: Carpenter Ants</i>
#97-421	<i>Integrated Pest Management in Schools Project: Fleas</i>
#97-422	<i>Integrated Pest Management in Schools Project: Flies</i>
#97-424	<i>Integrated Pest Management in Schools Project: Cockroaches</i>
#97-425	<i>Integrated Pest Management in Schools Project: Rodents</i>
#97-426	<i>Integrated Pest Management in Schools Project: Termites</i>
#97-427	<i>Integrated Pest Management in Schools Project: Yellowjackets and other Wasps</i>
#97-428	<i>Integrated Pest Management in Schools Project: Nuisance Ants</i>

If you have special accommodation needs, and require this document in an alternate format, please contact the Hazardous Waste and Toxics Reduction Program at (360) 407-6700 (Voice) or (360) 407-6006 (TDD).