

## **Head lice: Information and Frequently Asked Questions.**

Infestations by head lice become most apparent at the beginning of each school year. Parents, day care providers, school officials and healthcare professionals frequently seek information and solutions to this burdensome problem. Accordingly, we have provided answers to frequently asked questions concerning this subject. We hope this information will be useful.

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**What are head lice, and how do they differ from other lice?** Head lice (*Pediculus capitis*) are small parasitic insects exquisitely adapted to living mainly on the scalp and neck hairs of their human host. Their six impressive legs are elegantly evolved to grasp hair shafts and provide a striking example of biological specialization. Long associated with people, head lice have been recovered from prehistoric mummies. Head lice are equal opportunity parasites; they do not respect socio-economic class distinctions. Their presence does not connote a lack of hygiene or sanitation practiced by their host. Head lice are mainly acquired by direct head-to-head contact with an infested person's hair, but may infrequently be transferred with shared combs, hats and other hair accessories. They may also remain on bedding or upholstered furniture for a brief period. In North America and Europe, children are more frequently infested than are adults, and Caucasians more frequently than other ethnic groups. Neither able to fly nor jump, lice are also unlikely to wander far from their preferred habitat. Lice and their eggs are unable to burrow into the scalp. Lice are sometimes referred to as *cooties*, eggs as *nits* and infested people as *lousy*. The infestation by head or body lice is termed *pediculiasis*, and the associated "disease" *pediculosis*. *Delousing* (more properly termed *lousing*) consists of any method for eliminating an infestation. Chemical treatments directed against lice are *pediculicides*. Those that kill adult and nymphal lice are sometimes called *lousicides*; those that kill the developing embryo within the egg are *ovicides*. This discussion relates to head lice unless specific mention is made of other types of lice.

Head lice derive nutrient by blood-feeding once or more often each day, and cannot survive for more than a day or so at room temperature without ready access to a person's blood. A nymphal louse hatches from its egg after about 8 days of development, and begins to feed, grow and develop until it attains the adult stage about 9-12 days after hatching. A female louse may deposit more than 100 eggs at a rate of about six eggs each day. Only those eggs deposited by inseminated female lice will hatch. Generally, an infested person has fewer than a dozen active lice on the scalp at any time, but may have hundreds of viable, dead and hatched eggs. With adequate magnification, the developing nymph can be seen within the egg; hatched eggs are nearly transparent (see [photos](#) accompanying this site).

Treatment should be considered only when active lice or viable eggs are observed. Itching of the scalp or the perception that something is crawling on the head do not warrant treatment for lice. Without magnification and suitable experience, they may be difficult to correctly distinguish from other material caught in the hair. Amongst presumed 'lice' and 'nits' submitted by physicians, nurses, teachers and parents, most are simply artifacts such as dandruff, hairspray droplets, scabs, dirt, or other insects (e.g. aphids blown by the wind and caught in the hair). To confirm the identity of suspected material, save a few lice and louse eggs under clear tape on our specimen submission form, and record the requested information. Submit the samples to us or to a qualified physician or entomologist to confirm the identity of the offending creatures (to learn more about this, visit the section: [Specimen evaluation](#)).

**Body lice** (*Pediculus humanus*) are closely related to head lice, but are less frequently encountered in the US. As the name implies, body lice generally feed on the body, but may rarely be discovered on the scalp and facial hair. They usually remain on clothing near the skin, and generally deposit their eggs on or near the seams of garments. Body lice are acquired mainly through direct contact with an infested person or their clothing and bedding, and are most commonly found on individuals who infrequently change or wash their clothes. A change to clean clothes, and laundering of infested garments (especially drying with high heat or ironing), are generally effective to eliminate this burden.

Body lice (but not head lice or pubic lice) serve as vectors of certain human pathogens. Epidemics of louse-borne typhus, louse-borne relapsing fever and trench fever decimated the populace through the ages, and millions more perished from these infections during the 1900's during major conflicts and famines. Fear of these diseases fueled atrocious and perverse campaigns to quarantine and assault unpopular ethnic groups suspected of promoting risk. Current efforts to seek out and quarantine individuals infested with head lice may be driven, in part, by those who misinterpret or intentionally misapply certain principals of public health.

**Pubic or 'crab' lice** (*Phthirus pubis*) have a short crab-like body easily distinguished from that of head and body lice. Pubic lice are most frequently found around the pubic region of the infested person, but may also be found elsewhere on the body (including facial hair and eyelashes). The infestation by pubic lice is termed '*pthiriasis*'. Mechanical removal of these lice and their eggs is the preferred method of treatment. Because pubic lice are acquired mainly through sexual contact, their presence may be associated with other sexually-transmitted diseases. Pubic lice on a child may cause the physician to consider the possibility that the child may have had inappropriate contact. Pubic lice may also be acquired through more innocent means, such as by sharing a bed with an infested person.

**Book, bark, beggar's and sea 'lice'** are quite unrelated to human biting lice. Book and bark lice are insects commonly found in organic material such as leaf litter, under bark of trees, and even within the pages of books. Book lice, when abundant, can cause damage to books and are considered pests in library collections. Book and bark lice are occasionally submitted for identification as presumed parasites. Their presence on a person's body is merely incidental; they do not parasitize people. Diverse types of plant seeds adhere to clothing and hair, and are commonly termed 'beggar's lice'. Some insects related to aphids are known as 'plant lice'. Certain parasites of fish are known as 'sea lice', but this term is often misapplied to a condition known as 'seabathers' eruption' that seasonally affects bathers along the seacoasts (apparently due to contact with stinging cells of certain jellyfish). Finally, although diverse types of lice parasitize mammals and birds, these rarely affect people.

**Cryptic 'infestations'** Some people earnestly believe that they are actively infested, even though no louse or other parasite can be detected. These cases can be particularly difficult to manage, and the affected individual should not be dismissed as being unstable. Every reasonable effort should be explored to identify the cause of the irritation and to capture and

identify any offending creature on the scalp or body. The irritant may, indeed, be a louse or some other type of biting insect or mite, but may not necessarily be infesting the person at the time of examination. Diverse insects (e.g. mosquitoes, fleas, bedbugs) may only transiently visit a person, and may or may not be noticed in the act of biting. Certain mites associated with bird nests occasionally wander into a house and cause annoyance. Itching and irritation in some cases may also be ascribed to hair care and laundry products, industrial fibers, underlying disease, or even to the pediculicidal (anti-lice) treatment. The clinician will often find it valuable to consult with an entomologist on these matters (to learn more about this, visit the section: [Specimen evaluation](#)).

A few people remain convinced that their infestation is real, even though they have been examined by one or more competent specialists who can find no physical cause for their discomfort. Some of these patients may pose a danger to themselves and others by resorting to the use of toxic or flammable substances in attempts to rid themselves of their real or perceived infestation. Such a person may, indeed, be delusional, and should be treated with care and respect when referred for counseling. Certain people develop an extreme phobia or irrational fear that they will acquire lice or other parasites from virtually any animate or inanimate object. Patients that are unduly burdened by this condition are likely to benefit from counseling with a clinician specializing in phobias and obsessive-compulsive disorders.

**[Do head lice cause harm?](#)** Head lice rarely (if ever) cause direct harm, and they are not known to transmit infectious agents from person-to-person. Thus, they should not be considered as a medical or a public health problem. These lice may occasionally be burdensome because of annoyance; their presence may cause itching and loss of sleep. The louse's saliva and feces may sensitize people to their bites, thereby exacerbating the irritation and increasing the chance of secondary infection from excessive scratching.

The greatest harm associated with head lice results from the well-intentioned but misguided use of caustic or toxic substances to eliminate the lice. A few lice on the head should not cause alarm; rather, they present an opportunity for parents to spend the needed time with their children in order to find and remove the offending insects. Grooming can be an effective method to remove lice, and engenders several associated physiological and behavioral benefits as well. Because of unfounded fears, some parents have suggested that children refrain from sharing protective batting or biking helmets. The miniscule risk of acquiring lice from such devices pales in comparison to the hazards averted by helmets.

**[Why were my children sent home from school \(the 'No Nits' policies\)?](#)** The *no-nits* policies variously drafted and adopted by school administrations aim to reduce the transmission of lice by excluding infested children from school. Whereas these policies are meritorious in principle, they are virtually always counterproductive when applied. School nurses are generally amongst the most capable to spot signs of infestation, but lack the expertise and equipment to distinguish active from inactive infestations. School personnel and parent volunteers often conduct mass-screenings in misguided and failed attempts to identify infested children and ensure their treatment. Concerned parents, nurses and school

administrators may find it valuable to cooperate by drafting rational policies. *The discovery of lice or their eggs on the hair should not cause the child to be sent home or isolated. Furthermore, treatment is not indicated if the infestation is not active.*

Although lice and their eggs may be seen without the help of magnifying devices, the viability of the eggs cannot be judged without magnification and a degree of training. Of more than six hundred samples of presumed lice and nits submitted to us for examination, fewer than two-thirds contained evidence of any infestation. The remainder of the samples were composed of miscellaneous insects or of artifacts that resembled eggs. Of those samples that did contain bona-fide louse eggs, many were comprised solely of hatched or dead eggs; thus, no treatment would be warranted. We noted that:

- 1) health care professionals as well as non-specialists frequently over-diagnose this infestation,
- 2) non-infested children are quarantined as often as infested children,
- 3) traditional pediculicides and 'alternative' formulations are frequently over-applied,

Because pediculiasis is generally misdiagnosed, and because few symptoms and no direct infectious processes are known to result from an infestation, we suggest that the practice of excluding presumably infested children from school is unwarranted.

The full citation of our published article is:

Pollack RJ, Kiszewski A, Spielman A. Overdiagnosis and consequent mismanagement of head louse infestations in North America. *Pediatric Infectious Disease Journal*. 2000; 19:689-693.

The abstract and article may be accessed through the Journal's web site: <http://www.pidj.com/>

Although head lice are transmissible, their potential for epidemic spread is minimal. Indeed, the basic reproduction number (a measure that defines the number of secondary infections arising from an index case) would be far lower for head lice than for infections due to cold or flu viruses - yet children are rarely excluded from school because of these often more-debilitating infections. Furthermore, we are unaware of any convincing data that demonstrates that enforced exclusion policies are effective in reducing the transmission of lice. These quarantine policies seem a disagreeable vestige of certain offensive and supposedly 'health'-based anti-ethnic strategies practiced mainly in Europe earlier this century. It is our professional opinion that the *no-nits* policies are imprudent, as they are based on intolerance, hysteria and misinformation rather than on objective science.

Lice on children's heads, by themselves, should not be cause for the schools or courts to brand the parents as 'neglectful' or 'abusive'. We are aware of several cases where the courts have ordered children removed from the custody of their parents because of their apparent failure to eliminate the infestations. Such extreme actions to an infestation are

generally unwarranted and may suggest poor judgment on the part of those making policy decisions. We are also aware of legal actions brought against the schools by the parents of children who have been excluded from school. These actions should now prompt school administrators to reevaluate their practices of identifying infestations as well as their exclusion policies and treatment recommendations. *We encourage parents and school administrators affected by these policies to send us details of their cases.*

### **From whom did my child acquire head lice?**

Head lice are acquired from other infested people. Upon learning of their child's infestation, parents frequently seek to ascribe blame. This 'knee-jerk' reaction is understandable but unproductive. The offending lice came from some other person, but it is not currently possible to determine the identity of the donor. Parents are encouraged to focus their energies on education and treatment rather than on unsuccessful witch-hunts. Rather than accusing the school administrators or other parents for not preventing spread of head lice, parents are likely to benefit more by ensuring all children and adults in the home are inspected and treated as appropriate.

### **What is the origin of head lice?**

Human lice likely co-evolved with people. Our primate relatives harbor their own species of lice. Lice are quite host specific; human lice, for instance, will not feed upon other animals, and lice of other animals would rarely feed upon a person.

### **How many people are infested by head lice?**

Few useful statistics are available for estimating the prevalence of infestation. Far fewer people seemed infested than the general public or the medical community might believe. Reports of 'epidemics' of head lice may generally be attributed to incorrect identifications and misdiagnoses. The apparent annual and seasonal 'increases' in prevalence may be real or due to peculiarities in monitoring activities. The perception that lice are more prevalent today than in past decades may, perhaps, reflect societal changes in candor in discussing such issues.

**What methods can I use to treat the infestation?** First, ensure that a correct diagnosis/identification has been made before considering treatment options. An old infestation, manifested solely by hatched eggs, is not a cause for treatment. Treatment should be considered only when active lice or viable eggs are observed (refer to the [images](#) of lice and eggs). Several options exist to eliminate the infestation, but some are better tested than others. Success will likely depend on an integrated approach that relies on several of the methods listed below, combined with perseverance and a bit of levity. Because the egg is particularly resistant to some chemical treatments, a second treatment is often required about 10 days later to target the nymphs that hatch after the initial treatment. We have drafted [management schemes](#) to assist the parent and school administrator.

**Should everyone in the home be treated?** Only those with live lice or viable eggs should be treated. Each person (adults as well as children) within the home should be inspected to

determine if live lice are present. All those found to be infested should be treated simultaneously.

**Are head lice resistant to insecticides?** Parents and health care providers are reporting 'treatment failures' with increasing frequency when traditional louse shampoos are used. "Failures" may be due, in part, to:

- a) Misdiagnosis (no active infestation, or misidentification),
- b) Non-compliance (not following treatment protocol)
- c) Resistance by lice to the insecticide
- d) New infestation (lice acquired after treatment)
- e) Lack of ovicidal (egg-killing) or residual properties of the product.

Reports of resistance or lack of sensitivity to insecticides by head lice in other countries have been published in the scientific literature, and non-peer-reviewed reports abound elsewhere. Accordingly, we investigated whether head lice in the US had developed resistance or tolerance to pyrethroid insecticides. We developed a bioassay to test the responses of lice to permethrin, and identified infested children who could provide us with the needed samples. Our findings were published in a peer-reviewed medical journal. In brief, we reported that:

- 1) head louse infestations in the US are surprisingly infrequent,
- 2) head lice sampled from children who were chronically-infested and treated multiple times with pyrethroid shampoos tend to be resistant to permethrin,
- 3) head lice sampled from children living where pyrethroids are rarely used against lice (Malaysian Borneo) tend to be susceptible to permethrin,
- 4) lice that are resistant to permethrin at low doses are generally resistant to high doses as well; thus prescription formulations of containing permethrin at concentrations of 3-5% are unwarranted,
- 5) the prevalence of resistance to permethrin has yet to be determined. This final point is of critical importance in understanding the significance of our findings. In our report we document the existence of permethrin-resistant head lice in the United States. This should not be interpreted as meaning that all (or even most) head lice are resistant to permethrin and related compounds. Permethrin and pyrethrins remain the treatment of choice for newly-identified infestations. If live lice persist following such treatments, then one may consider that these lice may be resistant to this family of insecticides. Further treatment may be warranted with pediculicides containing other insecticides. Refer to the discussions on [malathion](#) and [lindane](#) elsewhere on this web site.

The full citation of our published article is:

Pollack RJ, Kiszewski A, Armstrong P, Hahn C, Wolfe N, Rahman HA, Laserson K, Telford SR III, Spielman A. Differential Permethrin Susceptibility of Head Lice Sampled in the United States and Borneo. Archives of Pediatrics and Adolescent Medicine. 1999;153:969-973.

The full article can be viewed on the American Medical Association's web site: <http://archpedi.ama-assn.org/issues/v153n9/full/poa8565.html>.

### **Do insecticides cause resistance?**

Insecticides generally do not cause mutations leading to insecticidal resistance. Rather, any insect (or any organism) may, by chance, have the capacity to avoid, detoxify or eliminate toxins from its body. These few individuals may survive treatment, reproduce and serve to establish a larger population of lice that are less susceptible to that insecticide and perhaps to related compounds.

**Mechanical removal** Mechanically removing lice and nits can be an effective but time-consuming method. Because most eggs will be non-viable, their removal is often impractical and unjustified. An infestation may be eliminated by combing each day to remove the live lice (including those that have hatched since the previous day). Comb daily until no live lice are discovered for about two weeks. Use illumination, magnification and a good louse or nit comb to locate and remove the offending insects. Although the hair may appear 'peppered' with eggs, there generally are fewer than a dozen active lice on the head at any time. Adult female lice usually cement each egg to the base of a hair shaft near the skin. As the hair grows (from the base), these attached eggs are transported away from the scalp. Eggs more than one-half of one inch away from the scalp are nearly always hatched and do not, by themselves, indicate an active infestation.

Louse or nit combs can be useful in removing lice and eggs. Diverse types of fine-toothed combs may be included within packages of pediculicides or they may be purchased from virtually any drug store, pet supply store (often at a discount) or via the web. Some louse combs are better than others; their effectiveness depends on a) their composition (metal vs. plastic) and construction (length and spacing of the comb teeth), b) the texture of the hair to be combed, c) the technique used to comb, and d) the time and care expended in the effort. Whereas straight hair is usually readily combed, tight curls may present an impossible and impractical challenge. Hair should be cleaned and well-combed or brushed to remove tangles before attempting to use a louse comb. Clean the louse comb frequently to remove any caught lice or eggs. It may require several hours each night for several nights to tackle the problem. An entertaining video may help keep the child occupied during this exercise. Sit behind the child, and use a suitably bright light (and magnification if available), to inspect and comb through the hair, one small section at a time. Repeat until no more active lice are observed. Some parents report that water, vegetable oils or hair conditioners help lubricate the hair and ease the combing process; others report that these lubricants make it more difficult to see the eggs.

'Electronic' louse combs that resemble small bug 'zappers', or those with oscillating teeth would seem to offer little advantage, if any, over a well-designed traditional louse comb. Teeth of these devices may not effectively reach to the scalp and may not kill or remove eggs.

**Pyrethroid insecticides** Infestations may be treated with shampoos containing permethrin or pyrethrins specifically labeled for use on people. Some formulations also contain a synergist, a chemical that may enhance the activity of the insecticide. As with any insecticide or drug, read and follow the label directions. Because these products seem to have limited ovicidal (egg-killing) activity, a second treatment is often necessary about 10 days later to target lice that hatch after the initial treatment. Susceptible lice do not fall from the hair or die immediately upon treatment with pyrethroids; one should wait until the next morning to determine the fate of treated lice. As is true of any pediculicide, pyrethroids do not remove the eggs from the hair.

Some physicians treat apparently resistant infestations with a prescription-strength pyrethroid (3 - 5%) preparation normally meant for treating scabies infestations. In our recently published article we report that some head lice in the United States are resistant to permethrin, and that higher doses of this insecticide generally were not more effective. Thus, prescription-strength pyrethroids are not likely to be effective. Although permethrin and pyrethrins differ in chemical structure, their mode of action is quite similar. Thus, we would anticipate that pyrethrins would also be ineffective in killing permethrin-resistant lice.

**Non-pyrethroid insecticides** Other insecticides should be avoided unless specifically prescribed by a physician. The organochlorine insecticide lindane, and the organophosphate insecticide malathion are two of the active agents within pediculicides available by prescription. The current susceptibility of these insects to lindane or malathion has not yet been analyzed in the United States. Prescription preparations containing these insecticides may be considered as alternative pediculicides if live lice persist after two treatments with pyrethroid-based pediculicides. Refer to our [management flowcharts](#).

Use caution when dealing with any insecticidal agent, particularly on children. Read and follow label directions. Do not apply any insecticide or other chemical not specifically labeled for use on people. Well-intentioned parents treating their children with toxic or flammable substances have caused several deaths and poisonings.

**Essential oils** Numerous 'home recipes' and commercial preparations are based on mixtures of essential oils, salts or other 'natural' substances. Data is lacking to support the claims of their efficacy. Several formulations include substances that should not be used on the skin, and may not be registered for such use by government regulatory agencies (such as EPA or FDA).

**Enzyme treatments** The chemical structure of the 'cement' that binds the egg to the hair is not well-defined. Nonetheless, it is an exceptionally stable substance that resists degradation by diverse chemicals. Several commercial products are advertised to 'dissolve' the eggs or the cement by which the eggs are attached to the hair. We are not convinced of the effectiveness or safety of these products.

**Antibiotics** The guts of human lice contain a specialized organ that harbors an unusual type of bacteria. These bacteria may aid the louse in digesting the blood meal or by providing essential nutrients. Certain antibiotics may affect or eliminate these bacteria from the louse's gut, and body lice that have fed upon antibiotic-laden blood of people may be burdened and die. The effect of antibiotics on the health of head lice has yet to be determined conclusively. Physicians increasingly seem to prescribe combinations of the antibiotic agents trimethoprim and sulfamethoxazole (e.g. 'Bactrim', 'Septra') in attempts to treat head lice. We oppose this practice because these antibiotics are not approved as pediculicides, and they are valuable in fighting life-threatening infections. Their use for treating such a relatively innocuous condition as a louse infestation may accelerate the emergence or spread of bacterial resistance, thereby diminishing the usefulness of these antibiotics.

**Antiparasitic drugs** Diverse antiparasitic agents have been proposed for treating human lice, but none has been evaluated critically. The drug ivermectin, for example, is widely used in veterinary medicine as an antiparasitic agent, and is available for human use for treating infestations caused by certain worms; it is not approved for use against human lice. Accordingly, we suggest that such treatments be avoided.

**'Suffocating' agents** An increasingly popular 'alternative' treatment involves the use of food-grade oils or hair gels in attempts to smother lice on the scalp. Many people have provided anecdotal reports of their successes with this old method, but we have also heard of nearly an equal number of failures. Virtually no data, however, is available to assess the efficacy of this technique. As with any hair conditioner, oils may lubricate and ease efforts to pass louse or nit combs through the hair. Olive oil (or any similar food-grade product) would seem intrinsically safe, but may have associated hazards, nonetheless. Oil may cause accidents (slips), and would be difficult to remove from the hair and scalp (detergents can cause irritation). Do not use motor or machine oils, as these materials can be harmful.

As a preliminary test to measure the effect of such agents on lice, we submerged six active lice in olive oil, and maintained an equal number of non-treated lice in a separate container. Lice removed from oil after one hour recovered, but those submerged for two hours succumbed. Non-treated lice survived for at least 18 hours. We have not repeated this test on active lice nor have we tested this treatment on nits. The results are simply of a very preliminary nature and should not be construed as solid evidence on which one would base treatment recommendations. It would be an error to extrapolate from data of such an informal test; therefore, we do not recommend the use of olive oil (or other such substances) as a treatment for head lice.

**Heat** The hot dry air produced by standard hand-held hair dryers may suffice to kill lice and their eggs on a person's hair. Use great care if you try this method, as the heated air from these devices can also easily scald the hair and the scalp. No precise values (treatment time, temperature, and distance from hair dryer) are available with which to base an objective treatment protocol. Heated curling irons, hair straighteners or similar devices may kill some lice and eggs, but may not safely be applied to hair nearest the skin where viable

eggs are most abundant. A clothes dryer set a high heat or a hot pressing iron may effectively kill any lice or their eggs on pillowcases, sheets, nightclothes, towels and similar items that will not be damaged by this process. Combs, brushes, hats and other hair accessories in contact with an infested person should be washed in hot water each day to dislodge any lice or nits.

**Freezing** Lice and their eggs on inanimate objects (e.g. toys) may be killed by freezing temperatures. Objects that cannot be heated in a clothes dryer may be placed in a freezer (or outdoors if sufficiently cold). This treatment may require several days to be effective, depending on the temperature and humidity. Such treatment would rarely (if ever) be required.

**Haircuts** Lice will find little to grasp on a bald or shaved head. Although competitive swimmers who shave their heads generally need not be concerned about head lice, many parents may find this old-fashioned method to be aesthetically unappealing. Short hair is more readily searched for lice and eggs, but does not make the child invulnerable to infestation.

All three types of human lice may occasionally be found on the eyelashes or other facial hair. These lice should be mechanically removed with great care so as not to injure the eye; insecticides should be kept well clear of the eyes as well. Cosmetology practices and regulations often dictate that infested individuals be sent away by the barber or beautician, and any implements that contacted that person be properly cleansed.

**Hair soaps, bleaches and dyes** Washing the hair each day may dislodge a few active lice; the remaining lice and eggs will be unaffected (but clean). Although hair bleaches and dyes are meant for use on the scalp, they can be caustic. Data is lacking to assess the efficacy of these products against lice. Thus, use of these products in attempts to ‘treat’ lice should probably not be considered. Assertions that dandruff shampoos are effective in removing lice are probably due to misidentification of dandruff as lice.

**Do dogs and cats serve to maintain or transfer head lice?** Pets are of no significance in maintaining or transmitting human lice, and should not be treated for head lice.

**Should I clean my house or car?** Head lice and their eggs soon perish if separated from their human host. Removed lice survive just a day or so, and the eggs generally lose viability within a week. The chances of a live head louse or egg becoming reunited with a person would seem remote exceptionally. Accordingly, Herculean steps to clean lice from the house or car by intensive washing or vacuuming will result in a cleaner space, but are unlikely to significantly facilitate the goal of eliminating the lice from those residing in the home. A child’s car seat cover may benefit from vacuuming, as a few errant lice or eggs may temporarily lodge there and survive for a day or so.

**What should be cleaned?** Washing and drying (with heat) the pillowcases, sheets, nightclothes, towels and stuffed animals may possibly eliminate lice and eggs that might

otherwise reinfest a family member. Combs, brushes, hats and other hair accessories in contact with an infested person should be washed in hot water each day to dislodge any lice and nits. Shared helmets and headphones in schools or recreational settings may rarely and transiently harbor an occasional louse or nit; the effort necessary to effectively inspect and clean these devices, however, is not likely warranted. Shared lockers or coat hooks probably pose even less risk as sources of contamination. Any lice or nits that might detach in a swimming pool would likely be removed by the pool filter or should otherwise perish before they have a chance to contact a person. Closing a swimming pool because of lice is a hysterical overreaction.

**Should I use insecticides in the house to rid it of lice?** Insecticidal treatments targeted at lice within the school or home, in vehicles, or to carpets and furniture are generally unwarranted, and unnecessarily expose occupants to insecticidal residues.

**Can anything be used to repel lice?** The application of any substance to the hair with an expectation of repelling lice is unwarranted and may neither be safe nor effective. Head lice do not seem to be readily acquired naturally, and they may pose less risk than any 'repellent' product.

**How can I have specimens evaluated?** Health care professionals and others may send us samples to confirm the identity of suspected lice and eggs. Patients are encouraged to first approach their doctor or nurse for assistance and to discuss treatment. Although we endeavor to reply to inquires, the volume of such requests may limit our ability to answer all requests. Submitted samples are considered for entomological identification, and are not considered as clinical laboratory specimens. A form is available for submitting samples for evaluation. Go to the [Specimen evaluation](#) form.

This document has been assembled to assist health workers and patients access information relevant to the diagnosis and treatment of head louse infestations. Brand names have not been mentioned, nor do we endorse any particular commercial product. This web site is intended for informational purposes and is not meant to substitute for the advice provided by a medical professional. Always consult a physician if you have personal health concerns.

Costs associated with assembling this information and responding to inquires are borne by our general laboratory funds. Please feel free to contact us if you found this information useful and are inclined to assist with support of our work. We encourage inquiries regarding the support of further research.

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of Public Health  
Laboratory of Public Health Entomology

**Specimen evaluation:** Without proper magnification, head lice and their eggs are often difficult to correctly identify. It is important to ensure that an infestation is active before considering treatment. Sample a few lice or hairs bearing louse eggs (select hairs with eggs closest to the scalp) and affix these under clear tape on the form below. Send the completed form with a **self-addressed stamped envelope** to the address listed at the bottom of this page. A donation of \$20 (payable to "The President and Fellows of Harvard College") is not required, but will assist with our research activities.

We will examine the sample and send you our reply indicating the identity of the specimen(s). Although we may use your samples for research and teaching purposes, we shall ensure that specific information submitted by you on this form will remain confidential.

Name of person with suspected infestation: \_\_\_\_\_

Date specimens were sampled: \_\_\_\_\_

Address: \_\_\_\_\_

Age: \_\_\_\_\_ Sex: (circle choice) Male Female

Who is submitting this form? Self Parent/guardian Nurse Physician Other \_\_\_\_\_

Who diagnosed the infestation? Self Parent/guardian Nurse Physician Other \_\_\_\_\_

How long has this person been infested? <1 1-6 >6 months

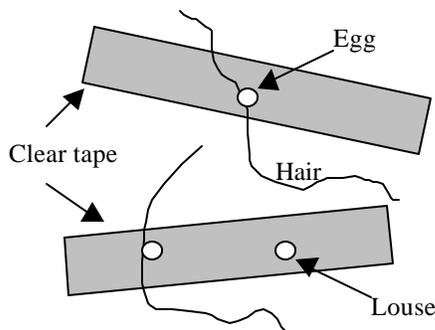
Does your school have a 'no nits' policy? Yes No Not applicable

How many days has this child been absent **BECAUSE** of this infestation? \_\_\_\_\_

Estimate the cost to treat THIS infestation (total of product cost, child care arrangements, doctor visits, lost work time) \$ \_\_\_\_\_

List which anti-lice treatments have been used on this person within the past **4 weeks**?  
\_\_\_\_\_

Use **clear** tape to affix your specimens to this page (see example below). Please cover each louse or nit with just **one** layer of tape.



Example

Affix specimens within this box

Mail form with  
self-addressed  
stamped envelope  
and donation to:



Richard Pollack, Ph.D.  
Laboratory of Public Health Entomology  
Harvard School of Public Health  
665 Huntington Ave.  
Boston, MA 02115

For more information on lice visit: <http://www.hsph.harvard.edu/headlice.html>

Images to assist in the identification of head lice and their eggs.

<http://www.hsph.harvard.edu/headlice.html>



Adult female louse  
on nit comb



Viable egg  
on hair  
~2 days old

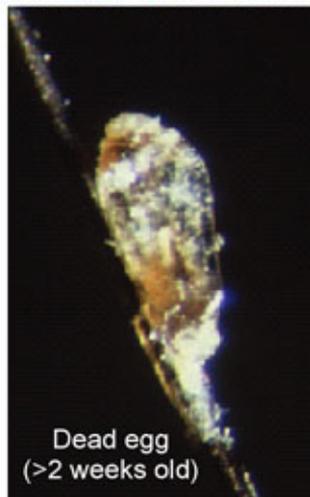


Viable egg  
~1 day before hatching

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Empty egg  
(hatched)



Dead egg  
(>2 weeks old)



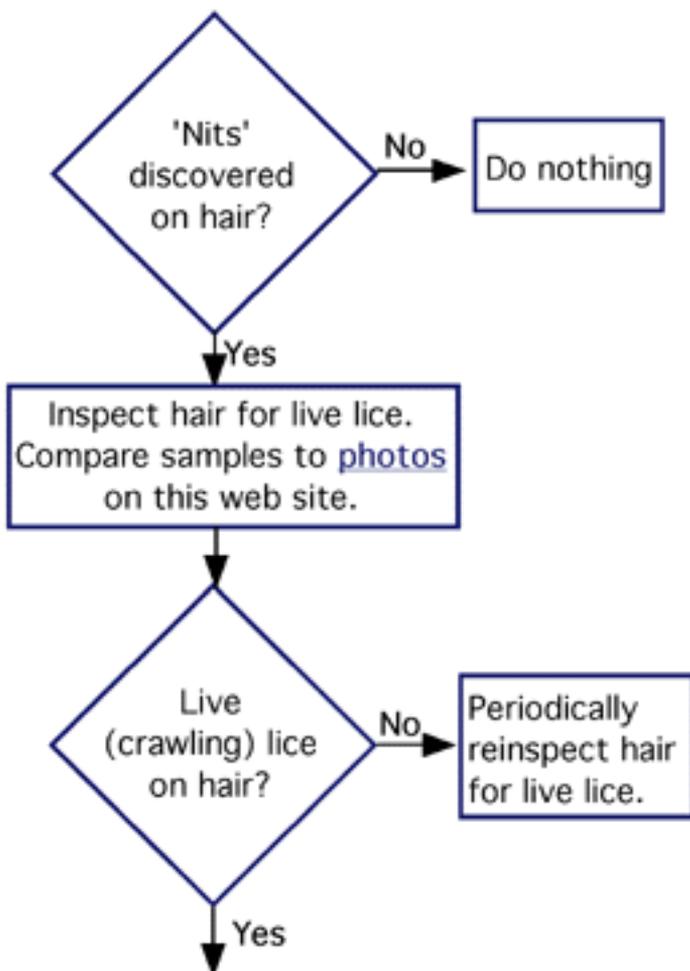
'Pseudo-nit'  
(Debris often confused  
as eggs)

[Return to text](#)

## Scheme for managing presumed head louse infestations in schools



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<http://www.hsph.harvard.edu/headlice.html>



### RECOMMENDED RESPONSES ✓

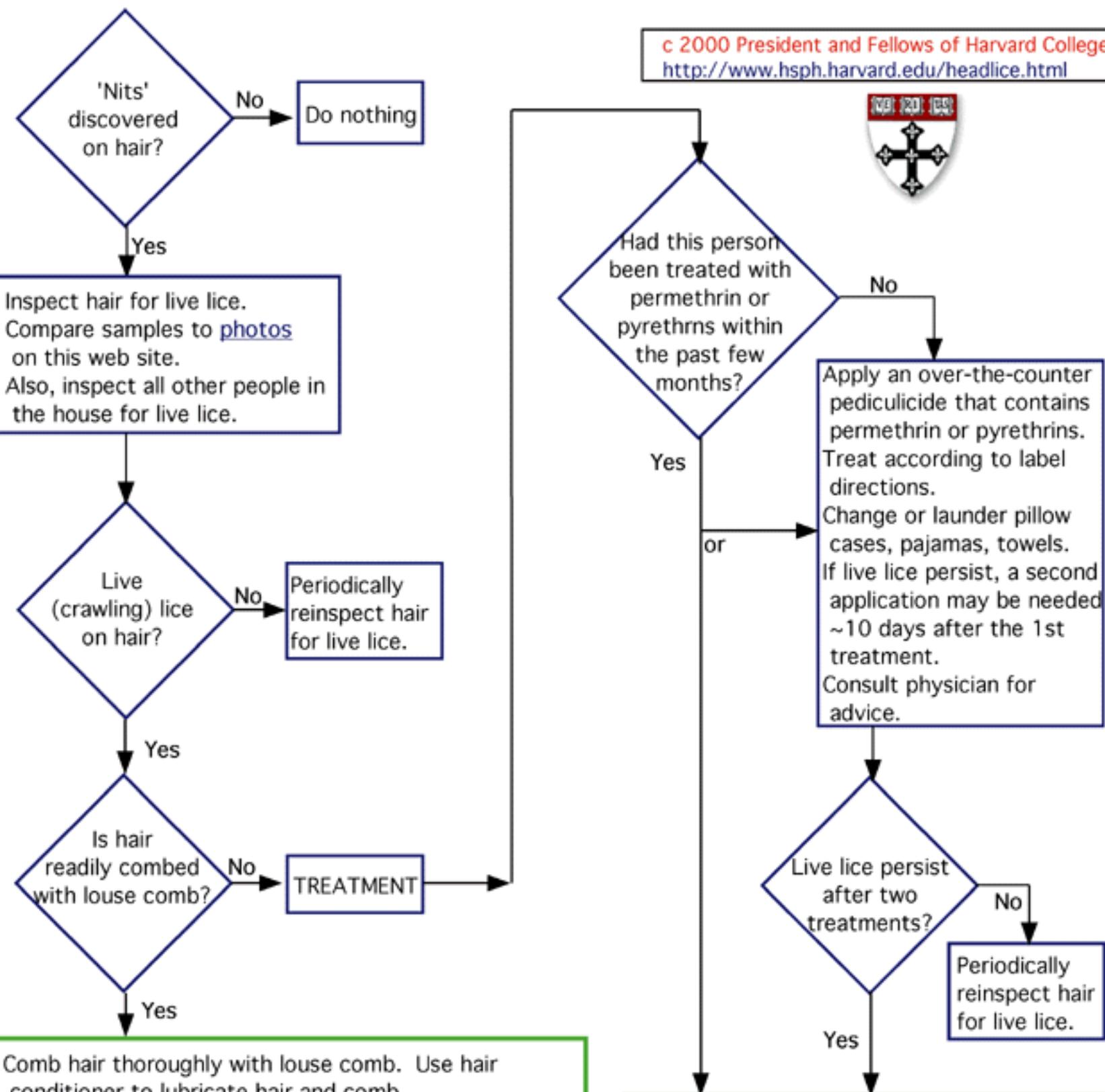
Notify parent/guardian at the end of the day of the suspected infestation.  
Provide information on the biology of head lice and methods to eliminate infestations.

### UNJUSTIFIED RESPONSES X

Exclusion or quarantine.  
Notification of classmates' parents.  
Mass screenings.  
Insecticide treatments to school environment.  
Reporting case to youth/social services.  
Bagging of clothes.  
Restricted use of headphones or athletic gear (helmets).

# Scheme for managing presumed head louse infestations

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<http://www.hsph.harvard.edu/headlice.html>



Comb hair thoroughly with louse comb. Use hair conditioner to lubricate hair and comb. Most lice should be removed during this first combing. Repeat every day or every few days. Each subsequent combing will remove a portion of the remaining lice and some that may have hatched in the interim. Continue daily combing until no live lice are discovered for about 1 1/2 weeks. Treatment with pediculicides may supplement or replace combing. Removal of remaining nits is a personal choice, as these are likely to be all dead or hatched. Change or launder pillow cases, pajamas, towels.

Consult physician. Consider prescription pediculicides (malathion or lindane). Obtain, read, understand and follow label directions. DO NOT OVERTREAT. Removal of remaining nits is a personal choice, as these are likely to be dead or hatched. Change or launder pillow cases, pajamas, towels.