

# American Academy of Pediatrics Guidelines for the Prevention and Treatment of Head Lice Infestation

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## Abstract

The American Academy of Pediatrics (AAP) established diagnosis and treatment guidelines for pediculosis in 2002. Ideally, diagnosis should be based on the observation of a live louse. The presence of nits is also used by many people to positively diagnose an infestation, although a nit located farther from the scalp than 1 cm is unlikely to be viable. Other material on the scalp may be mistaken for nits, leading to misdiagnosis.

Because lice are not associated with serious medical problems, the primary consideration of the AAP regarding treatment is the safety of pediculicides and other products used to treat head lice. From a pediatrician's perspective, no significant risk is acceptable. Over-the-counter (OTC) pyrethroid products (pyrethrin and permethrin) are commonly used by parents to treat their children and are generally considered safe for most people. Pyrethroids are not completely ovicidal, however, so a second application is required. Misuse and overuse of these products have contributed to the development of resistance. Prescription products include permethrin 5%, lindane, and malathion 0.5%. Resistance to permethrin 5% and lindane has been documented. In addition, lindane is associated with serious adverse events and should be used with caution only in a select population. Malathion 0.5% is about 98% ovicidal, and no resistance has been reported. Malathion is highly effective, but AAP guidelines note that the product is flammable and serious adverse effects can occur with ingestion. Very few cases of ingestion have occurred, and no reported cases of flammability, but children being treated with malathion should be carefully supervised, and this pediculicide should not be used unless treatment with OTC products has failed.

AAP guidelines also state that no-nit policies in schools are detrimental, causing lost time in the classroom, inappropriate allocation of the school nurse's time for lice screening, and a response to infestations that is out of proportion to their medical significance. Accurate diagnosis, safe treatment options, and a common-sense approach to managing infestations in schools are recommended.

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## Head Lice: Pediatrician's Perspective

Safety and efficacy are the key concerns of the American Academy of Pediatrics (AAP) when the organization establishes treatment guidelines. During the development of treatment guidelines for pediculosis, which has no significant associated morbidity and no mortality, the primary concern of the AAP was the safety of products used to treat infestations. Other information included in the guidelines describes social and economic consequences of lice infestation. Specifically, although head lice do not cause medical problems, infestations do cause significant embarrassment and social stigma, unnecessary days lost from school because of no-nit policies, and direct costs of treatment, as well as indirect costs from lost productivity. In consideration of these issues, the AAP published its clinical report on the management of head lice in 2002 in an attempt to clarify issues of diagnosis and treatment, and to make recommendations for managing head lice in the school setting.<sup>1</sup>

## Diagnosis

The first challenge in effectively managing head lice infestation is obtaining a correct diagnosis. Observing live lice is the gold standard of diagnosis, but lice are difficult to see, and they can crawl 6 to 30 cm per minute. Within a school setting, a nurse who has only a minute per child to screen may miss a louse that is well camouflaged or that has crawled to another part of the child's head during examination. Nits may be easier to spot because they are stationary and are generally laid within 1 cm of the scalp. The nape of the neck and behind the ears are good places to look for nits. Never-

theless, nits are small and difficult to see with the naked eye, especially if lighting is poor. It is important, also, to distinguish live nits from empty egg casings or other materials. Dandruff, hair casts, scabs, dirt, and other insects are sometimes mistaken for lice, even by physicians and nurses.<sup>1,2</sup>

General guidelines for assessing the viability of a nit include its location and appearance. Typically, a nit located farther from the scalp than 1 cm is unlikely to be viable, although lice in warmer climates may lay eggs farther down the hair shaft.<sup>3</sup> Also, a viable nit develops a circular, eyelike marking called an eyespot several days after being laid. An eyespot can be seen with a 10× hand-held magnifier or loop. Those responsible for diagnosing infestations should keep a few facts in mind about lice behavior and transmission. Although lice can crawl relatively quickly, they rarely travel far from a preferred habitat, such as the warmth of the scalp.<sup>2</sup> They do not hop or fly. Lice cling tightly to the hair, but they may attempt to flee a heavily infested head and can be found in the individual's collar, hats, or other clothing worn near the head and neck.<sup>1</sup> They are transferred to others primarily by head-to-head contact, although fomites may sometimes carry lice. Lice found in brushes and combs are usually injured or damaged and are less likely to infest another individual.<sup>4</sup> Children should be taught to not share combs, brushes, or other items that touch the head, such as scarves, hats, headphones, or helmets. However, it is very important that children always wear protective helmets when bicycling or playing sports, even if the helmet must be borrowed. The risk to a child from a potential head injury far outweighs any risk from head lice infestation. It is unlikely that an infestation can be prevented, but transmission can be minimized if adults know warning signs of infestation and ensure that children with lice are promptly treated.<sup>1</sup>

### Treatments

**OTC Preparations.** Lice cause no medical problem, so treatment must be as safe as possible. From a pediatrician's point of view, no amount of risk is acceptable. Treatment options include pyrethroids such as

pyrethrin and permethrin 1%. These products are available over-the-counter (OTC) and are most likely to be used by parents of children with lice. Available as shampoo or crème rinse preparations, pyrethroids have low mammalian toxicity and are generally considered safe for most people. Pyrethroids are not completely ovicidal, however, so a second application is necessary within 7 to 10 days.<sup>1</sup> Resistance to pyrethroid products has been documented and is discussed in greater detail in the article titled, "Clinical Update on Resistance and Treatment of *Pediculosis capitis*," found in this supplement.

**Prescription Products.** Permethrin 5%, a prescription product indicated for the treatment of scabies, is also used by some physicians to treat head lice. However, if permethrin 5% is prescribed because of a treatment failure of permethrin 1%, the child might have permethrin-resistant head lice, and the 5% preparation will be no more effective than the 1% product.<sup>5</sup>

Lindane is an organochloride that has recently garnered attention because of its poor safety profile. The Food and Drug Administration (FDA) has warned of potential central nervous system toxicity and increased risk for seizures and has recommended that lindane be used with caution only in a select population.<sup>6</sup> In addition to these safety concerns, widespread lindane resistance has been documented.<sup>7</sup>

Malathion 0.5% is an organophosphate that has been reintroduced in the United States. Unlike other pediculicides, both OTC and prescription, the prescription product malathion 0.5% is approximately 98% ovicidal, based on combined results of studies conducted over the last 20 years. Also, no resistance to malathion 0.5% has been reported to date.<sup>1,7</sup> (Other malathion products marketed outside the United States have lower ovicidal activity and are associated with some resistance, depending on geographical region.) Malathion is highly effective, but the AAP guidelines note that this product is a cholinesterase inhibitor, which is associated with potential respiratory depression if ingested. There are no reports in the medical literature of respiratory

depression or poisoning associated with topical malathion. Another concern about malathion is its flammable alcohol base.<sup>1</sup> Pediatricians worry about product labeling instructions to leave malathion on the hair for 8 to 12 hours, potentially prolonging risk for the patient. However, no cases of burns associated with malathion have been reported. Researchers have found that malathion may produce pediculicidal and ovicidal activity within minutes, so it may be possible to use this product effectively in less time, decreasing patient risk.<sup>7</sup> As with all products that have a potential for toxicity in humans, and because of its flammability, malathion should be used only under a physician's close supervision. The AAP guidelines suggest the use of malathion with extreme caution and only when OTC products such as pyrethroids have been ineffective.<sup>1,8</sup>

Other prescription products including the antibiotic cotrimoxazole and the anthelmintic agent ivermectin are prescribed for some cases of head lice infestation. These products are not approved as pediculicides by the FDA. Cotrimoxazole is associated with risk for developing Stevens-Johnson syndrome, and ivermectin should not be administered to children who weigh less than 15 kg.<sup>1</sup>

**Preventing Pediculicide Resistance.** Resistance has been reported with all topical pediculicides except malathion, significantly limiting treatment options. Contributors to increasing resistance include misdiagnosis and improper use of pediculicides. If a child is misdiagnosed as having lice, he or she will be exposed unnecessarily to a pediculicide, also potentially making the product less effective if an infestation does occur. Improper use of pediculicides includes excessive dilution if too much water is left in shampooed hair when the product is applied and overuse or prophylactic use. Diluted products are ineffective in killing lice and allow the parasite to develop resistance over time from repeated exposure to sublethal doses. Similarly, excessive use overexposes the product, making it less effective over time. An important question for pediatricians to ask when evaluating a seemingly intractable infestation is whether the patient

may be reinfesting by failing to remove lice or nits from the hair, clothing, or other items that touch the head. If reinfestation occurs, that doesn't mean that products that failed in a first attempt will not work in the future. Live lice should be removed, and nits should be removed if the treatment is not ovicidal. Pediculicide resistance should be confirmed before using a prescription product.<sup>1</sup>

**"Natural" Remedies.** Parents who believe that they can smother lice or otherwise disrupt the respiratory system of the louse often use occlusive agents. There is no scientific evidence to support the efficacy of occlusive agents. Similarly, manual removal of lice, in the absence of other treatment, is unlikely to be effective because lice may be difficult to find or may crawl away during the removal process.

#### School Control Measures

Routine screening for nits and lice is not an effective means of reducing the incidence of infestation.<sup>1</sup> Given the total amount of time required to perform screenings, it is not the best use of the school nurse's time. Other more important issues demand the nurse's attention, and the time children miss from class for screening is not justified by results. Considering the short amount of time most nurses have to screen each child, often only 1 minute, the screening process generally is not thorough enough to be accurate and can provide a false sense of security.

Many school districts and some consumer organizations, such as the National Pediculosis Association, promote no-nit policies. These policies generally call for dismissal of a child from school until all head lice, nits, and egg casings have been removed.<sup>9</sup> Often the child is sent home from school the day of diagnosis. Research suggests that a child with an active head lice infestation is likely to have had the infestation for at least a month by the time it is discovered and therefore poses no immediate risk on the day of diagnosis.<sup>1</sup> Despite the assertion of promoters of no-nit policies that a nit could hatch and spread to a child the same day it is discovered, hence the need to remove the child from school immediately, there is no medical evidence to support this position.

The AAP recommends using common sense to assess each case. For example, a child who has 2 live lice versus hundreds poses less risk. The child should be discouraged from close contact with other children, and parents should be notified and asked to promptly address the problem. In elementary schools, an affected child's classmates may be notified that an infestation has occurred, but the child's confidentiality should be protected.<sup>1</sup>

The AAP is working with school nurses to discourage no-nit policies. Unfortunately, school nurses often are pressured by school administrators and parents to control infestations. The no-nit policies may appeal to laypersons, and it is difficult to explain why they are not effective, particularly when some consumer organizations strongly support them. Nevertheless, there is no scientific basis to confirm the effectiveness of such programs, but there is research supporting the view that the presence of nits poses only a slight risk. In a 2001 study conducted in 2 metropolitan elementary schools, 1729 children were screened for head lice. A total of 28 children (1.6%) had lice, and 63 (3.6%) had nits with no lice. After 14 days, 18% of children with nits alone developed lice. Researchers concluded that having 5 or more nits within 1/4 inch of the scalp increased the risk of conversion, but most children with nits and no lice did not become infested. The study also concluded that exclusionary policies for children with nits alone are excessive.<sup>10</sup>

**Conclusion**

Safe treatment of children with head lice infestation is the primary objective of the AAP. Unfortunately, overuse and inappropriate use of pediculicides may expose children to unnecessary risk and contribute to resistance. Several pediculicides are available to treat head lice infestation, but resistance has been documented for all products except malathion. Prescription products should be

used conservatively and only under close supervision by a physician.

School measures that are designed to control infestations may in fact be detrimental. Specifically, no-nit policies result in lost time from school, inappropriate allocation of the school nurse's time for screening, which is often ineffective, and a response to infestations that is out of proportion to their medical significance. The AAP guidelines for control of head lice infestation include recommendations for accurate diagnosis, safe treatment options, and a common-sense approach to managing infestations in a school environment.

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