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The Nuisance Diseases: Pediculosis and Scabies

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Head lice (*Pediculus humanus capitis*) and scab or itch mites (*Sarcoptes scabiei*) appear to be making a comeback in the United States. Not since World War II have these ectoparasites been given so much attention. Although precise prevalence data are lacking, reports from local, county, and state health departments, as well as from private physicians, suggest that both head louse infestation (pediculosis) and itch mites infestation (scabies) are on the increase.

If you have not encountered a patient with one of these parasitic infestations in the past few years, consider yourself lucky. You have likely been spared:

- the anxiety of not knowing exactly what disease control measures are appropriate
- the disappointment of a literature review on the subject that yields little practical information
- the frustration of discovering that transmission to hospital staff occurred before suitable control measures could be identified and implemented.

More than anything else the paucity of current information has caused these ectoparasites to be regarded as nuisances. This article narrows the information gap on pediculosis and scabies and takes the nuisance out of the nuisance factor associated with them. First let's look at pediculosis, and then scabies, probing each for its biol-

ogy and symptoms, population at risk, modes of transmission, diagnosis, treatment, and methods of control in institutions. As a bonus three related case reports begin on page 6.

PEDICULOSIS

There are three types of lice that infest man: head lice (*Pediculus humanus capitis*), body lice (*Pediculus humanus humanus*), and pubic or crab lice (*Phthirus pubis*). Infestation with any one of these parasites is called pediculosis. Body lice and crab lice are not thought to be epidemic in the United States. They will be discussed only briefly following the discussion of head lice.

HEAD LICE

Biology and Symptoms

Head lice are blood-sucking insects that live on the scalp and hair of humans. Adult lice are approximately 1-2 mm long, while louse eggs, or "nits" are about half this length. After fertilization, adult females attach the nits firmly to the hair shaft with a cement-like substance, and the life cycle shown in Figure 1 begins. The entire cycle takes about three weeks to complete. Itching is the major symptom of pediculosis and is attributed to the blood-sucking activity of the parasite. Unlike body lice, head lice have not been shown to transmit louse-borne typhus, trench fever, or relapsing fever. But with

Figure 1. Life cycle of the head louse (*Pediculus humanus capitus*)

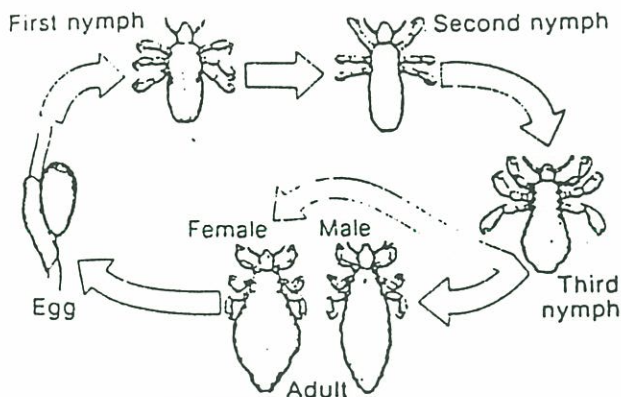
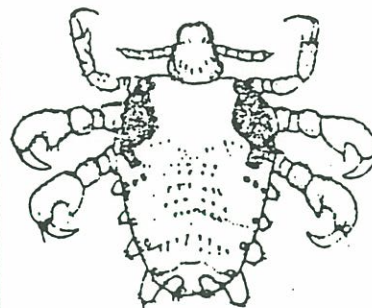


Figure 2. Pubic or crab louse (*Phthirus pubis*)



head lice secondary bacterial infection may occur after intense scratching.¹

Population at Risk

Who risks acquiring the disease? Traditionally, head lice have been associated with such wartime conditions as crowding, poor sanitation, and poverty. However, if these factors were ever true prerequisites for louse infestation, they seem to have little influence on the distribution of cases today. With the exception of blacks who are rarely infested, all members of society appear to be equally susceptible. Of course, the risk of infestation increases with any factor that brings a person into direct contact with an infested individual and his or her personal belongings.

Mode of Transmission

Perhaps the greatest confusion about head lice surrounds their modes of transmission. Individuals become infested by coming into close contact with an infested person, by wearing infested garments, by using infested combs and brushes, or by lying on infested carpets, beds, or upholstered furniture that have recently been used by an infested person. While fomites play an important role in transmitting head lice, there are limitations to this method of dissemination. For survival head lice require frequent meals of human blood and without such a meal lice that have fallen off or been

brushed off the host will die at room temperature (22°C) in approximately 48-55 hours.^{2,3} Thus, they can be transmitted by such objects as hair brushes, caps, scarves, and coats for only a short period of time.

Like fomites, fallen hairs with eggs attached have been implicated as a chief mode of transmission. However, recent data indicate that fewer than 10% of the eggs exposed to room temperature (22°C) for a period of six days will hatch even if the eggs are returned to their optimal incubation temperature of 30°C. In a single study of 309 eggs, only one hatched after being exposed to room temperature for nine days. A similar study has shown that eggs will not hatch at all if kept at 4°C for six days or longer.² These data indicate that general environmental contamination (indoors or out) with eggs is of little consequence in the transmission of head lice.

Another long-held concept — long hair predisposes to infestation and facilitates transmission of head lice — is also crumbling under the weight of new epidemiologic data. In three separate epidemiologic investigations conducted by CDC involving nearly 500 infested school children, louse infestations were as common in children with short hair as in those with long hair.⁴

Diagnosis

As with any contagious disease, early diagnosis is an essential step in limiting further spread. It is made by inspecting the hair and scalp for crawling nymphs and adults or for eggs. Parasites and eggs are most commonly found at the nape of the neck and behind the ears. Since patients rarely have more than ten crawling lice at any one time, the diagnosis is most often made by finding eggs. However, inspectors should be careful not to confuse hairspray globules or other extraneous debris with eggs.

If the diagnosis is made solely on the presence of eggs, health personnel must determine whether the eggs are hatched or unhatched. The presence of only hatched eggs (lice not observed) indicates past infestation and does not constitute grounds for treatment, retreatment, or in the case of children, suspension from or refused admission to school. On the other hand, the presence of unhatched eggs indicates an active infestation that requires treatment. Since head lice attach their eggs to the hair shaft very close to the scalp, unhatched eggs will normally be within 1/4 inch of the scalp's surface; hatched eggs will be 1/2 inch or more from the scalp. The safest method for determining whether or not the eggs have hatched is to examine them through a hand lens or under a dissecting microscope. If the egg