



## When the Treatment is Toxic: Pesticides in Head Lice Prescriptions

Lindane is a hazardous insecticide used to treat head lice and scabies. Despite the established health and environmental dangers of lindane use and production—and the existence of alternatives—the chemical is still sold in most of the United States as a prescription drug. The Environmental Protection Agency has banned lindane for agricultural use because of concerns about its serious effects on the environment, and California has banned lindane in pharmaceuticals. Because the Food and Drug Administration has refused to remove it from the market, states should adopt bans on lindane to protect people and the environment.

### Lindane Can Be Toxic to Humans

Lindane, also known as  $\gamma$ -hexachlorocyclohexane ( $\gamma$ -HCH), is commonly used in shampoos and other topical treatments for head lice and scabies.<sup>1</sup> Lindane has a number of side effects, most commonly skin irritation, numbness, dizziness, headaches, diarrhea, nausea, and vomiting. More severe side effects, such as seizures and death, also have been reported. Deaths have occurred when lindane was improperly used,<sup>2</sup> but children and elderly patients remain particularly susceptible to lindane toxicity even when used as directed. The FDA has announced that lindane should not be used as the first-line treatment for head lice or scabies, should not be given to anyone with a seizure disorder, and should be used with caution in anyone weighing under 110 pounds, the elderly, or anyone with a skin condition because of the risk of serious neurotoxicity.

### Production and Use of Lindane Puts People and the Environment at Risk

The entire cycle of lindane's wasteful production and use contributes to the contamination of people, water, land, and wildlife all over the world. Lindane composes less than 20 percent of the raw hexachlorocyclohexane (HCH) mixture needed for its production; the remaining 80 percent is waste, much of which is accumulating in the backyards of some of the world's poorest people.

Disposal of this enormous volume of waste is a global pollution issue because HCH is a persistent organic pollutant (POP). Like other POPs, lindane and other HCH isomers are capable of long-range transport on air currents, persist in the environment, and bioaccumulate in wildlife and humans. HCH isomers are abundant in the Arctic and have been found in the bodies of humans—including breast milk—and in wildlife

For more information,  
please contact  
**Sarah Janssen,**  
(415) 875-6100

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### Avoid Lindane Exposure: Treating Head Lice without Using Chemicals

**1. Establish whether you are dealing with head lice.** To the untrained eye, nits associated with head lice are hard to recognize. If you aren't sure, seek the advice of a healthcare professional.

**2. With a bright light, carefully inspect the scalp and the entire length of the hair.** Nits will stick to dry hair, and are normally found within a quarter inch of the scalp (although they can be found farther down the hair shaft). If what you see can easily be removed, it is not a nit.

**3. Wash the hair with hot water and regular shampoo;** condition and detangle with a regular comb if needed.

**4. Comb the wet hair with a fine-toothed lice comb.** Pass the comb through one-inch sections of hair. After each pass, dip the comb in a dish of warm, soapy water to remove the nits. You must remove all of the nits to eliminate lice.

**5. Clothing, bedding, towels, and other washable items must be machine-washed** with hot water and dried for at least 30 minutes using high heat.

**6. For the next three weeks, plan on a daily shampoo, combing, and hand removal of nits.** Each morning, place the pillowcase and any stuffed animals that were in the bed into the dryer for 30 minutes on high heat.

<sup>1</sup> We use the word lindane throughout to refer to the generic chemical gamma-HCH, not to refer to any particular brand name or product.

<sup>2</sup> U.S. Food and Drug Administration (FDA), Center for Drug Evaluation and Research, Public Health Advisory: Safety of Topical Lindane Products for the Treatment of Scabies and Lice (2003), <http://www.fda.gov/cder/drug/infopage/lindane/lindanePHA.htm>.

<sup>3</sup> Humphreys, E., S. Janssen, A. Heil, P. Hiatt, G. Solomon, and M. Miller. Outcomes of the California Ban on Pharmaceutical Lindane: Clinical, Ecologic, and Human Health Impacts. *Environ Health Perspect* 116:297-302 (2008). doi:10.1289/ehp.10668 available via <http://dx.doi.org/>.

<sup>4</sup> VONA Report Generator, Verispan, Inc. Data retrieved on October 23, 2007.

all over the world. In animals, lindane and other HCH isomers are suspected endocrine disruptors and have been associated with increased cancer risk, reproductive harm, and immune suppression.

In addition to global contamination from the production of lindane, pharmaceutical use of lindane results in contamination of wastewater and potential drinking water sources. Water treatment engineers in Los Angeles calculated that a single treatment for head lice, when rinsed down the drain, contributes enough lindane to bring 6 million gallons of water over certain regulatory standards in California.

### California Sets an Example

In 2002, Los Angeles discovered that lindane was contaminating wastewater above an established safety standard of 19 parts-per-trillion (ppt). Following a public education campaign that did not decrease lindane levels enough to bring them into compliance with the water standard, the California assembly banned the sale of all pharmaceutical lindane in the state. By 2003, the first year following the ban, the average amount of lindane in wastewater had been reduced to near zero; levels have remained low ever since.

In addition to greatly reducing the problem of lindane in wastewater, the ban also resulted in a dramatic drop in unintentional exposures and poisonings by lindane, and changed the types of drugs prescribed by physicians treating cases of head lice or scabies.<sup>3</sup> Phone calls to the California Poison Control hotline about lindane dropped from 270 in 1998 to just three to four per year after 2004. Furthermore, a survey of California pediatricians uncovered few reports of problems complying with the ban or using alternative treatments.

### Keep Lindane Out of Our Bodies and the Environment

If a doctor recommends that you or someone in your family use lindane to treat head lice or scabies, request a safer alternative. Although nationwide prescriptions for lindane have decreased over the past 10 years, in 2006 there were still more than 180,000 prescriptions for lindane in the United States outside of California.<sup>4</sup> You can take action by writing to your state legislators to ask that they follow California's successful example by adopting a ban on lindane.

### Lindane Concentrations in California Wastewater Before and After Enactment of Statewide Lindane Ban

