



House Dust and Biological Contaminants

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For most people, dust is merely an annoying fact of life. But when it carries toxic chemicals, bacteria, viruses or allergy-causing materials, dust can cause a variety of health problems. A breath or a swallow could carry contaminants clinging to dust particles into your body. For a list of some dust contaminants, see the boxed information below.

Beginning with the energy crisis in the 1970's, house dust and biological contaminants have become more of a health problem as builders construct tighter homes to conserve energy. Tighter homes mean less fresh air in the home and more opportunities for chemical contaminants to accumulate and biological contaminants to grow. Although we don't fully understand the relationship between home tightness and the health effects of contaminated dust, future research will give us a better idea of the balance between increasing home energy efficiency and minimizing health risks.

This fact sheet helps identify the sources of dust and air contaminants, describes the symptoms typically associated with contaminants, and explains how to minimize house dust.

Indoor and outdoor sources of biological and dust contaminants include:

algae	insect parts, homes
animal dander and secretions	and feces
bacteria	mites
dust produced or circulated during home cleaning, hobby and maintenance activities	pesticides
	pollens
	protozoans
	viruses
fungi	

House Dust: Unsightly or Unhealthy?

How can you tell if house dust is causing health problems? While reactions may vary from person to person, if you have persistent health symptoms which go away shortly after leaving home, you may have reason to suspect contaminated house dust. If you need more information about a health problem you are experiencing which may be related to dust contaminants, complete the *Indoor Air Quality Assessment Checklist* (Extension publication #B3439) and forward results to your local or county health department for advice.

There are two categories of dust contaminants—biological and chemical. Both can have short-term and long-term health effects depending on the type of contaminant.

Biological contaminants such as house mites, bacteria, pollens or molds generally only cause illness symptoms or disease in people who are sensitive to them. Even disease-causing microorganisms are usually only able to infect people who are susceptible. That is, people under stress, elderly, children, etc. Some illness symptoms are caused by an allergic reaction to a biological contaminant. Allergic reactions include “hay fever” type symptoms, asthma or any other allergic reactions affecting the respiratory system and recurring flu-like symptoms such as muscle aches. The type of health problems generally caused by biological contaminants are known as acute or short-term effects and occur soon after exposure to the organism. Actual symptoms of exposure can vary with the type of organism.

A less familiar health problem is the result of toxins produced by molds and other fungi grown under optimum conditions. These toxins can cause acute effects, such as allergic reactions or *chronic* (long-term) effects such as lung disease. Some toxins suppress the immune system while others may affect the digestive system, liver, reproductive system or central nervous system. For instance, one toxin called trichocene mycotoxin has been identified as one of the culprits in “Sick Building Syndrome.” A building is described as “sick” when many occupants complain of symptoms including headaches, dizziness, nausea and difficulty concentrating.

While biological contaminants typically only affect people who are sensitive to them, chemical contaminants, such as a pesticide or fumes from paint thinner, can affect anybody. Indoor exposure to chemical contaminants may produce short-term health symptoms such as drowsiness, fatigue, general discomfort, headache, and irritation of eyes, nose, mouth and lungs. Exposure to certain chemicals may make your body more likely to react to other contaminants.

Some contaminants on dust may cause permanent health problems from long-term exposure. For example, repeated exposure to lead dust can damage the nervous system causing memory loss, behavior changes and other problems. Repeated exposure to some pesticides attached to dust particles can contribute to cancers or birth defects.

Since it is often impossible to cure health problems caused by long-term exposure to a contaminant, your best defense against them is to recognize sources of these contaminants and practice control procedures to reduce their presence.

Contamination From Outside

Outdoor contaminants can enter the home in many ways. Pollen, fungi, mites, viruses, bacteria, and pesticides are a few of the many hitchhikers on dust. And it's hard to prevent them from entering your home. However, as long as you control dust accumulation and limit the opportunity for organisms to grow, there is no need to be concerned. Keeping the landscape around your home and outdoor pet facilities cleaned up can reduce the amount of outdoor contaminants entering your home.

People living on or near farms or other businesses using pesticides should be particularly careful about dust accumulation in the home. Dust from these environments may be laden with farm chemicals. Movement of chemicals on dust was shown in a 1972 study that found higher concentrations of DDT in house dust than in the soils of the surrounding area.

Air conditioning can reduce the amount of pollen entering the home during the growing season. But inadequate care of air conditioners can increase problems associated with indoor air contaminants. Electronic air cleaners, also called electrostatic air filters, can be attached to forced-air heating and cooling systems to reduce the amount of mold spore infiltration. A heating and cooling contractor can provide you with additional information about the availability and installation of this type of equipment.

Contamination From Within

As homes and buildings are constructed more “tightly” and are more energy efficient, the rate that indoor air is exchanged with outdoor air is decreased. Indoor air is more likely to be recirculated, increasing the concentration of contaminants. Any home using major appliances which collect water, such as clothes dryers and humidifiers, may experience additional air quality problems through the circulation of microorganisms and other contaminants on airborne water droplets. For these reasons—higher concentrations of contaminants and air recirculation—it is especially important to minimize house dust accumulation.

When dust accumulates, contaminants can collect and grow. However, biological contaminants are a problem on more than just house dust.

Microorganisms, molds and fungi can grow on virtually any interior surface. This includes linoleum, wallboard and tile, but organic surfaces, such as unfinished wood, are especially vulnerable. Many places in the home, such as bathrooms, humidifier water trays and windows or areas where repeated water damage is present, supply the high surface humidity (as low as 60%) and warmth needed for microorganism growth.

Most home activities stir-up dust, chemical and biological contaminants. Stirring up dust increases your chances of breathing the contaminants that ride on the dust. Vacuuming, carpentry, making up beds, children playing and pet care are only a few ways of scattering dust. Susceptible people should not be present during vigorous cleaning activities.

Pesticides, used indoors or out, can cling to dust particles or move through the air in their powder, liquid or spray product form. You can be exposed to pesticide contaminants during application or during movement of the pesticide through the home on air currents. To minimize exposure, only use pesticides as a last resort to control pests and stay away from the application area as long as required by the directions.

If your home has paint on the walls dating from before 1970, lead-based paint dust may be a problem, particularly if dust comes off on your finger when you touch the paint. Young children are especially susceptible because they are likely to pick up dust on their hands and eat or breathe it. Removing or cleaning lead-based paint in older homes may increase lead levels in house dust. For information about minimizing these hazards, call your county health departments, extension agent or see the extension bulletin, *Lead Paint Hazards in the Home*, available in late 1989.

Many cleaning, hobby and maintenance *products*, such as air fresheners and paint thinners, contain ingredients which can contribute to indoor air quality problems. However, with the exception of pesticides, airborne ingredients from these products generally do not become attached to dust particles. Information about sources of chemical contaminants and health hazards associated with the use of home chemical products is available in the *Indoor Air Quality* fact sheet series under the titles *Air Quality Issues in the Home* (B3438), *Chemical Hazards in Your Home* (G3026, G3027, G3028), *Formaldehyde in The Home* (B3441).

Controlling House Dust

There are several things you can do to lower health risk problems from biological contaminants. When deciding how often and how thoroughly to apply the following recommended control practices, keep in mind that some family members are more likely to be exposed to or are more sensitive to house dust than others. Young children, for example, spend much of their time on the floor. People who spend much of their time indoors due to illness or age may also be more vulnerable.

1. Control humidity. Keep your home at a level that won't support growth of fungi, molds and dust mites. Generally this means 50% relative humidity in the room or below.
2. Periodically clean all places where water is likely to collect. This includes humidifier and refrigerator drip pans and around toilets.
3. Clean filters on furnaces, air conditioners and cold air return registers.
4. Clean all carpets and fabrics regularly. Since this raises a lot of dust, wait until particularly sensitive people are out of the house.
5. Exterminate household insect pests. However, in order to avoid air quality problems related to pesticides, only use pesticides as a last resort to control pests. When you use pesticides, use only the amount recommended on the label. In this case especially, more is not better.
6. Control or eliminate prolonged or repeated water damage to organic materials in the home, such as unfinished wood, jute carpet backing, window frames, wallboard and wicker baskets.
7. Do not use warm air from the clothes dryer to heat the home. This heating technique is discouraged for several reasons. First, it does not necessarily save energy. Second, it increases humidity. And finally, the humid exhaust spreads bacteria and mold spores growing in the dryer throughout the home.
8. Reduce excessive shading of the roof and other parts of the house caused by placing landscape plantings too near the home.
9. Keep organic debris, like animal droppings and fallen leaves, picked up from the yard.

References and Further Information

Chemical Hazards in the Home. A series of 3 brochures written by Elaine Andrews. 1988. G3028, *Household Cleaners and Polishes* G3027, *Solvents*; G3026, *Pesticides*.

Indoor Air and Human Health, edited by Richard B. Gammage and Stephan V. Kayes (especially chapters by P. Morey, H. Burge, P. Kozak et al.) Lewis Publishers, Inc., 1987.

EPA Indoor Air Quality Implementation Plan Appendix A: Preliminary Indoor Air Pollution Information Assessment. June 1987. EPA-600/8-87-014. Reproduced by National Technical Information Service, U.W. Department of Commerce, Springfield, VA 22161 (PB87-210738).

UWEX University of Wisconsin-Extension, Cooperative Extension, in cooperation with the U.S. Department of Agriculture and Wisconsin counties, publishes this information to further the purpose of the May 8 and June 30, 1914 Acts of Congress; and provides equal opportunities in employment and programming including Title IX requirements.

Produced by the Department of Agricultural Journalism, University of Wisconsin-Madison.

G3462 House Dust and
Biological Contaminants

This publication is available from your Wisconsin county Extension office or from:

Agricultural Bulletin, Rm. 245

30 N. Murray St.

Madison, WI 53715

(608) 262-3346



Editors, before publicizing, contact Agricultural Bulletin to determine availability.

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I-06-89-2.5M-20-E