



FACT SHEET: Flood Cleanup - Avoiding Indoor Air Quality Problems

Office of Radiation and Indoor Air (6609J)
EPA Publication No. 402-F-93-005
Revised October 2003

Introduction

During a flood cleanup, the indoor air quality in your home or office may appear to be the least of your problems. However, failure to remove contaminated materials and to reduce moisture and humidity can present serious long-term health risks. Standing water and wet materials are a breeding ground for microorganisms, such as viruses, bacteria, and mold. They can cause disease, trigger allergic reactions, and continue to damage materials long after the flood.

This fact sheet discusses problems caused by microbial growth, as well as other potential effects of flooding, on long-term indoor air quality and the steps you can take to lessen these effects. Although the information contained here emphasizes residential flood cleanup, it is also applicable to other types of buildings.

Prepare for Cleanup

Read ***Repairing Your Flooded Home*** www.redcross.org/services/disaster/0,1082,0_570_00.html prepared by the Federal Emergency Management Agency and the American Red Cross. The booklet discusses flood safety issues and can save your life. The booklet also contains detailed information on proper methods for cleaning up your home. You should also consult the wealth of information on the FEMA and American Red Cross sites on the subject, which are listed below:

- FEMA web site on floods/flooding - www.fema.gov/hazards/floods/
- American Lung Association's Fact Sheet on Flood Clean-up - www.lungusa.org/air/flood_factsheet99.html

This EPA fact sheet provides additional information not covered in the original FEMA/American Red Cross booklet on indoor air quality concerns related to flooding (however, because this fact sheet was prepared in 1993, it is more than likely that FEMA and the Red Cross and the American Lung Association do have more up-to-date information and resources available which you should consult). Many of the methods used for general cleanup, as detailed in the booklet, are the same as those used to avoid problems with indoor air quality. For brevity, we have not provided detail on the general methods used for cleanup here. This fact sheet is intended to be used in conjunction with the FEMA/American Red Cross booklet and resources.

Avoid Problems from Microbial Growth

Remove Standing Water

Standing water is a breeding ground for microorganisms, which can become airborne and be inhaled. Where floodwater contains sewage or decaying animal carcasses, infectious disease is of concern. Even when flooding is due to rain water, the growth of microorganisms can cause allergic reactions in sensitive individuals. For these health reasons, and to lessen structural damage, all standing water should be removed as quickly as possible.

Dry Out Your Home

Excess moisture in the home is an indoor air quality concern for three reasons:

1. Microorganisms brought into the home during flooding may present a health hazard. These organisms can penetrate deep into soaked, porous materials and later be released into air or water. Coming in contact with air or water that contains these organisms can make you sick.
2. High humidity and moist materials provide ideal environments for the excessive growth of microorganisms that are always present in the home. This may result in additional health concerns such as allergic reactions.
3. Long term increases in humidity in the home can also foster the growth of dust mites. Dust mites are a major cause of allergic reactions and asthma.

See Step 4, Dry Out Your Home, of the American Red Cross/FEMA booklet, [Repairing Your Flooded Home](#), on steps that should be taken to open up and dry out ceilings, walls, and floors in the home.

Be patient. The drying out process could take several weeks, and growth of microorganisms will continue as long as humidity is high. If the house is not dried out properly, a musty odor, signifying growth of microorganisms, can remain long after the flood.

Remove Wet Materials

It can be difficult to throw away items in a home, particularly those with sentimental value. However, keeping certain items that were soaked by water may be unhealthy. Some materials tend to absorb and keep water more than others. In general, materials that are wet and cannot be thoroughly cleaned and dried within 24-48 hours should be discarded, as they can remain a source of microbial growth.

Information on the types of water-damaged materials that should be discarded are provided in Step 4, Dry Out Your Home, of the American Red Cross/FEMA booklet, [Repairing Your Flooded Home](#).

The booklet suggests that you may be able to dry out and save certain building materials (for example, wallboard, fiberglass insulation, and wall-to-wall carpeting that were soaked only with clean rain water). You may, however, want to consider removing and replacing them to avoid indoor air quality problems. Because they take a long time to dry, they may be a source of microbial growth. For information on mold prevention and cleanup, visit www.epa.gov/iaq/molds or call IAQINFO at 800-438-4318.

In addition, fiberboard, fibrous insulation, and disposable filters should be replaced, if they are present in your heating and air conditioning system and have contacted water. (If a filter was designed to be cleaned with water and was in contact with clean rain water only, ensure that it is thoroughly cleaned before reinstalling.)

Avoid Problems from the Use of Cleaners and Disinfectants

The cleanup process involves thorough washing and disinfecting of the walls, floors, closets, shelves, and contents of the house. In most cases, common household cleaning products and disinfectants are used for this task. FEMA also suggests the use of disinfectants and sanitizers on the duct work for the heating and air conditioning system, if it has been flooded.

Disinfectants and sanitizers contain toxic substances. The ability of chemicals in other household products used for cleaning to cause health effects varies greatly, from those with no known health effect to those that are highly toxic. Read and follow label instructions carefully, and provide fresh air by opening windows and doors. If it is safe for you to use electricity and the home is dry, use fans both during and after the use of disinfecting, cleaning, and sanitizing products.

Be careful about mixing household cleaners and disinfectants together. Check labels for cautions on this. Mixing certain types of products can produce toxic fumes and result in injury and even death.

Avoid Carbon Monoxide Poisoning

[Carbon monoxide](#) (CO) is a colorless, odorless gas that can be lethal at high levels. Carbon monoxide levels can build up rapidly if certain types of combustion devices (for example, gasoline-powered generators, camp stoves and lanterns, or charcoal-burning devices) are used indoors. Do not use combustion devices designed for outdoor use indoors.

Avoid Problems from Airborne Asbestos and Lead Dust

Elevated concentrations of airborne asbestos can occur if asbestos-containing materials present in the home are disturbed. Airborne [asbestos](#) can cause lung cancer and mesothelioma, a cancer of the chest and abdominal linings. If you know or suspect that your home contains asbestos, contact the EPA TSCA Assistance Information Service at (202) 554-1404 for information on steps you should take to avoid exposure.

[Lead](#) is a highly toxic metal which produces a range of adverse health effects, particularly in young children. Disturbance or removal of materials containing lead-based paint may result in elevated concentration of lead dust in the air. If you know or suspect that your home contains lead-based paint, contact the National Lead Information Center to receive a general information packet, to order other documents, or for detailed information or questions. Call and speak with a specialist Monday through Friday, 8:00 am to 6:00 pm eastern time (except Federal holidays) at **1(800) 424-LEAD [5323]**.

Copies of this fact sheet, and other information on indoor air quality, are available from:

Indoor Air Quality Information Clearinghouse [IAQ INFO]

P.O. Box 37133
Washington, DC 20013-7133
Phone: 800 438-4318 or (703) 356-4020
(fax) (703) 356-5386 or e-mail at: iaqinfo@aol.com

Links to Additional Information

The Federal Emergency Management Agency's Flood website - www.fema.gov/hazards/floods/ Publications are available from:

[FEMA](#)

Publication Storage and Distribution
P.O. Box 2012
8241 Sandy Court, Suite A
Jessup, MD 20794-2012
Phone: 800-480-2520
Fax: 301-362-5335

American Lung Association's **Fact Sheet on Flood Clean-up** - www.lungusa.org/air/flood_factsheet99.html

Centers for Disease Control (CDC) - **Key Facts About Hurricane Recovery** - www.bt.cdc.gov/hurricanes/index.asp