

- **Animal and insect related hazards – Look carefully before entering** a building to determine if there are displaced animals in the building such as dogs and cats, raccoons and rodents. Watch out for snakes and insects such as wasps, fire ants, and mosquitoes.
- **Injuries** - Falling objects, broken or damaged building components and slick surfaces can cause injuries, broken bones, and cuts. Lifting heavy objects can cause back injuries and muscle strains (see “Stay safe while you work.”).
- **Biological hazards** - Bacteria, viruses, fungi, (mold and mildew) and other microorganisms can cause illness when you breathe them in, take them into your body through your mouth, or take them in through non-intact skin. **Bacteria, viruses and other microorganisms** may be left indoors by floodwater, while **mold and mildew** may grow indoors after the floodwater has receded.
 - ▲ **Bacteria and Viruses and other microorganisms** - If you accidentally get floodwater or the dirt it leaves behind into your mouth, you might develop gastrointestinal (digestive tract) illness.
 - ▲ **Mold and Mildew (Fungi)** – Mold will grow on many building materials such as, furniture, carpet and other items that stay wet for more than 24 hours. Mold colonies are the fuzzy or patchy white, green, brown or black growths that you will see on wallboard, wood furniture and cabinets, clothing, wall studs, and almost any other surface. Molds releases tiny particles into the air that can cause allergic illnesses like hay fever (coughing, sneezing, eye irritation), asthma symptoms, or other respiratory illness that can be serious. Some molds may also produce toxins that could cause other illnesses. We are exposed to mold every day, indoors and out, but mold contamination can be quite severe in a water-damaged building. Health risks are greater for people with allergies or asthma, people with compromised immune systems and for the very old or very young.

Stay safe while you work:

- **Wear a hard hat and safety goggles** when there is a danger of falling materials.
- **Wear leather work gloves** to protect your hands from cuts, or rubber gloves to prevent exposure to hazardous chemicals.
- **Wear rubber boots or hard-soled boots**, preferably with steel toes, when working and lifting.
- **Wear a facemask.** When you enter a flooded building, wear a dust mask or respirator to reduce your exposure to mold. At hardware or

home supply stores, look for a mask with “NIOSH” approval and an N-95 rating. Both of these marks should be on the respirator and the container. Read and follow the instructions on the mask package. Remember that dust masks will only provide protection against solid materials such as dusts and liquids. Dust masks provide no protection against gases and vapors. Dust masks are disposable and should be thrown away at the end of the day.

- **Stay alert.** Accidents happen when people are tired. Take the breaks you need, and drink plenty of fluids (bottled water, juice, soft drinks) to avoid dehydration. **Never drink alcohol when you are working in a flooded building.**
- **Stay alert** for misplaced animals, snakes and biting or stinging insects.
- **Protect yourself from bacteria, viruses and other microorganisms.** To keep from getting sick, wear rubber gloves while working; do not eat, drink, or smoke in the house; wash your hands frequently with soap and rinse with clean water.
- **Wet down mold.** Before you touch, move, or clean moldy or mildewed materials, **wet the mold** with a soapy solution from a spray bottle to prevent the mold from getting into the air. Do this even if the material is already wet because the mold probably won't be wet. Remember that mold can still make you sick even after you have sprayed disinfectants (“mold/mildew killer”) to kill it.
- **Be careful lifting.** To avoid back injuries when lifting or handling heavy and bulky loads like furniture or carpet, avoid lifting loads of more than 50 pounds per person.
- **Get help.** Before you disturb or remove materials that may be hazardous, take precautions to prevent exposure. If there is a noticeable chemical odor and/or a spilled container of a hazardous material in the building, ask your local health department or fire department for help. If there is asbestos or lead paint in the building, call NC Health Hazards Control at (919) 707-5950.
- **Be prepared.** If you get a cut or a puncture wound that is exposed to floodwater or the dirt it leaves behind, see a doctor. Make sure your tetanus immunization is up-to-date before you work on the house. Once immunized, adults should have a routine “booster” every ten years.

Take these steps:

If a flooded building is to be safely reoccupied, it must be completely dry. Dirt and trash left by the flood must be removed from building materials and furnishings. Moldy or mildewed items must be completely cleaned and disinfected or must be thrown away. If not, mold and mildew will

return and possibly cause health problems for you and your family in the future.

Before going back to live in your home, take the following steps:

- **Get the mess out.** Remove all floodwater, dirt, and debris left behind by the floodwater.
- **Remove mold and mildew.** Any materials or furnishings that soaked up water should be removed from the building. Other moldy or mildewed building materials should be thoroughly cleaned and dried or removed and replaced.
- **Check out the floors.** Carpet and padding cannot be cleaned well enough to prevent mold and mildew from growing. **Throw them away.** Take out the flooring and sub-flooring if they cannot be completely cleaned and dried or if they have started to deteriorate. The remaining floor and/or sub-floor must be dried out completely and disinfected. Make sure no moisture is trapped in or on the sub-floor. Sub-flooring made of particleboard or plywood should be removed and replaced because it can't be completely dried and disinfected. Crawl spaces should also be cleaned out and dried.
- **Dry out walls.** Walls that were wet should be stripped to the studs and the insulation removed. Walls must remain open to allow them to completely dry. Other wall cavities should be inspected for visible mold growth. Any area inside a wall cavity with visible mold growth should be opened, cleaned, decontaminated and dried. The exterior of each building (siding, etc.) will need to be evaluated to see if any or all of the exterior materials should be removed. Plaster, brick and concrete block walls can probably be cleaned, disinfected and completely dried.
- **Check Heating Ventilation and Air-Conditioning Systems (HVAC).** If the HVAC system or air ducts were flooded, use special care. The inside parts of heating and air-conditioning systems that contacted floodwater are hiding places for mold. If mold grows in the system, mold particles may get into the air and make people sick. The interior components (furnace, air-conditioner cooling coils, and fans) will need to be inspected, cleaned and decontaminated by professionals. Air registers (vents) and diffusers should be removed, cleaned, disinfected and reinstalled. Replace lined air ducts and ductboard that got wet. Bare sheet metal ductwork can be taken apart, washed, disinfected, dried, and put back together. Air duct cleaning services are not very effective in cleaning flooded air ducts and are only useful on bare sheet-metal ducts.

- **Salvage what you can.** Personal property and furnishings that are moist or wet 24 hours after floodwater recedes will have mold growing in or on them. Clothing and linens may be salvaged by washing with chlorine bleach and detergent, or sent to commercial laundries or dry cleaners. Upholstered furniture, mattresses, and furniture made of particleboard or wafer board should be thrown away. Get information on saving valuable papers, books, and photographs from the American Red Cross.
- **Remove contaminants.** Make sure that any chemical contamination and hazardous materials have been removed from the building. For proper disposal, contact your local waste disposal service.
- **Make sure that all parts of the building are dry before rebuilding or repairing.** Mold will grow on replacement materials if the studs, subfloor or other building parts are not completely dry. The structure should be tested with a moisture meter before you start replacing the damaged parts of your home.

Clean and dry the right way:

Nonporous materials (materials that don't soak up water) and furnishings and other surfaces should be thoroughly cleaned, disinfected and allowed to dry completely. First, scrub all surfaces with detergent and water and rinse well. (Scrubbing removes mold, mold spores, and the dirt that mold and mildew can grow on.) Then, disinfect everything. Liquid chlorine bleach should be used to disinfect and kill any remaining mold and mildew. Follow the instructions on the label and let the bleach solution remain on the surface for at least 15 minutes before rinsing and drying. After cleaning and disinfecting, you must **completely dry** each item or mold and mildew will return. To speed drying, keep fresh air circulating.

In conclusion, the most important thing you can do to protect yourself is to use common sense and be aware of safety and health risks. Do not enter a building that is clearly unsafe. If you have questions or need assistance, contact your local health department or building inspections office.

Other useful information for flood cleanup and health and safety issues can be found at the following web sites:

NIOSH: www.cdc.gov/niosh/flood.html
 CDC: www.bt.cdc.gov/disasters/hurricanes/index.asp
 American Red Cross: <http://redcross.org>
 AIA: www.aia.org/liv_disaster_floodproc
 EPA: <http://epa.gov/iaq/molds/moldguide.html>

N.C. Department of Health and Human Services
 Division of Public Health - Occupational and Environmental
 Epidemiology
 (919) 707-5900 | www.epi.state.nc.us/epi/oii/mold

N.C. Department of Crime Control and Public Safety
 Division of Emergency Management
 (919) 733-3867 • www.ncem.org

AFTER THE FLOOD... getting back into your home safely

A building that has been flooded can be a dangerous place. This brochure will help you understand and protect you and your family from the hazards of flooded buildings. It will also provide you information about cleaning up and making your home safe to live in again.

Watch out for these dangers:

Never assume that a water-damaged house is safe. Going into a building that has been flooded, even after the water is gone, can present a wide variety of hazards that can cause injury, illness or even death. **Do not allow children in the home** after the flood or while it is being inspected, cleaned or repaired.

- **Electrical hazards - Do not enter** a flooded or wet building if the power is on. If any electrical circuits have gotten wet, turn off the power at the main breaker or fuse box and leave it off until the electrical wiring or equipment has been inspected and repaired by a licensed electrician and approved by your local building inspector.
- **Structural damage - Do not enter** a building if the framing or foundation is damaged. Look carefully before you enter. Leave immediately if shifting or unusual noises signal a possible collapse of the building. Contact your local building inspector for a safety inspection.
- **Hazardous materials - Dangerous materials** found in flooded homes may include pesticides, fuel oil, gasoline, chemicals and other substances that might have been brought in or spilled by flood waters. Damaged buildings may also contain asbestos and lead-based paint, which can cause health problems during cleanup. Practically any building material that is not obviously solid wood, metal, or glass could contain asbestos. Lead-based paint can be found pre-1978 housing and is still used in commercial and industrial buildings.



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Division of Public Health
 Occupational and Environmental
 Epidemiology Branch
 (919) 707-5900
www.epi.state.nc.us/epi/oii/mold

North Carolina Department of Crime Control
 and Public Safety
 Division of Emergency Management
 (919) 733-3867 • www.ncem.org
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