

## Carpeting and Children's Health: How Flooring Decisions Can Affect Your Home's Indoor Air Quality

**T**he image of a baby crawling across carpeting is a familiar one for most of us with children. Carpet provides a soft, warm surface for small children to play on. But there is a downside as well.

Carpet can harbor a number of pollutants that pose risks to children and people with asthma or allergies. Dust mites, heavy metals, pesticides, and other persistent chemicals can all be found in household dust. New carpeting can emit volatile chemicals into the air and many have complained of health effects. Dust accumulates in carpets and is difficult to remove.

Small body size and undeveloped immune systems make children more vulnerable to harm from toxic carpet emissions than adults. Extra time spent in contact with floor surfaces and normal hand-to-mouth contact increases a child's exposure to carpet dust.

### Toxic Emissions

In the last several years, there have been hundreds, perhaps thousands, of instances in which people became ill after new carpeting was installed in their homes, workplaces, or schools. Commonly reported symptoms include eye, nose, and throat irritation, rashes, and fatigue. There were so many cases that the Consumer Products Safety Commission (CPSC) established a hotline to handle consumer complaints and to try to understand what was going on. To date, neither CPSC nor any other agency has been able to establish a connection between these health effects and any specific chemicals.

However, there is no reason to believe that a single chemical is at fault. Some new carpets emit a stew of chemicals, perhaps hundreds of different chemicals. Chemicals are used for producing synthetic fibers, gluing them to the backing, dyeing, fireproofing, mothproofing, stainproofing, and in many cases gluing the carpet to the floor. A 1994 study conducted by the Environmental Protection Agency showed that some of the chemicals emitted from new carpets include toluene and xylene, both neurotoxins, benzene, a human carcinogen, and styrene, an irritant and suspected carcinogen.

Nevertheless, the chemical usually given most of the credit for "new carpet smell" is a compound called 4-phenyl cyclohexene (4-PC). 4-PC is a mucous membrane

and eye irritant, and it can cause skin rashes and respiratory symptoms. It is a by-product of the styrene butadiene rubber (SBR) used in the backing material of most carpeting.

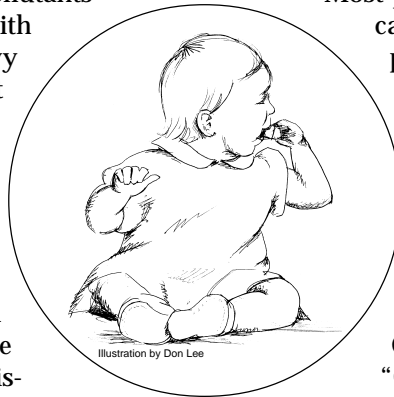
Most people do not seem to react to most new carpeting, and it is not clear why some people do. Those who do are not only allergy sufferers or chemically hypersensitive. About half of those reporting adverse effects to CPSC's hotline had never experienced allergies before.

Given the health complaints associated with new carpet, you might wonder what safeguards are in place to protect children and other consumers. The Carpet and Rug Institute (CRI) now has a "Green Label" on carpets that have been tested for emissions and found to meet certain standards. Unfortunately, the testing program includes standards for only a handful of chemicals and only a few carpet samples are tested. Nevertheless, the carpet industry says that emissions are coming down. CRI also has guidelines for carpet cushions and adhesives. Still, a "Green Label" is not a guarantee that a carpet will not cause health problems, according to CPSC.

### Dust

Scientific research by Seattle's John Roberts and others have found lead, pesticides, and combustion byproducts to be common components of house dust, with high levels found in some homes. Roberts has also found levels of some persistent bioaccumulative toxic chemicals (PBTs) to be at higher levels inside household dust than in the surrounding outdoor soil. A 1997 study examined the transport of 2,4-D and dicamba, two common lawn herbicides both associated with long-term human health effects, from the outdoor lawn to the indoor environment. Measurable quantities of both pesticides were detected in carpet samples.

An important control measure is the use of high quality doormats. The 1997 pesticide tracking study showed that the use of entryway mats could reduce the level of pesticide residue on carpets by 25 percent and total carpet dust residues by 33 percent. Other studies show that houses where shoes are removed at the door have ten times less dust than houses where shoes are worn. According to Roberts, effective cleaning and the use of door-



mats may reduce an infant's dust exposure by 90 to 98 percent.

Most carpets accumulate dust even if they receive regular vacuuming. One way to monitor dust levels in your carpet is to use a vacuum with a dirt finder. These vacuums have a red light to show where dust is located. A green light indicates that the carpet is clean.

Carpets and the dust they contain have been associated with "sick building syndrome" in schools and office buildings. Symptoms of sick building syndrome include headache, fatigue, respiratory complaints, dizziness, and the inability to concentrate. Improved cleaning of carpets and other surfaces has reduced these complaints. Many schools and offices are reassessing their flooring needs and, in many cases, choosing tile or other hard surfaces.

### Dust Mites

Dust mites thrive in carpet when humidity is high, causing annoying allergy problems for many people. About 8 to 12 percent of Americans suffer from allergies. In addition, dust mite allergen triggers asthma attacks and is thought to have a role in causing asthma. (Asthma rates have increased 60 percent since 1980 and now affect 10 million children in the United States. Asthma is the leading cause of children's absences from school.) Vacuuming is important to remove dust mites allergens, but it is more effective if there is no carpet. The National Asthma Education Program Expert Panel recommends removing carpeting from a child's bedroom as a desirable control measure in managing asthma.

### Alternative Floor Choices

Many experts feel that the best floors, from a health standpoint, are wood, tile, or other hard surfaces. If you want some areas covered, choose area rugs that can be removed from time to time for a thorough cleaning. Bare floors should be vacuumed and damp mopped frequently to prevent dust buildup. Dust on bare floors is easily removed but if left in place becomes airborne with activity in the room and is inhaled.

Some tiles and carpets contain vinyl (PVC), and there are environmental concerns about this material's production, use, and disposal. WTC supports the phaseout of the use of vinyl.

### Choosing Carpet

An excellent choice is wool carpet, stitched rather than glued to its backing and not treated with stain guard, though it is likely to be mothproofed. If possible, the carpet should not be glued to the floor. Hook and loop installation (physical fastening strips) can be used in place of glue. If glue is the only option, ask for a dry or low-

emitting adhesive. Avoid laying carpet on basement slab floors because they tend to become damp and may get moldy. Regardless of what type of carpet you purchase, request emission test results from the retailer or manufacturer for both the carpet and the cushion. Some manufacturers hold their carpet to a higher standard than the "Green Label."

The highest carpet emissions occur during the first few days after installation. Ask the manufacturer or store to unroll and air out the carpet for 72 hours prior to shipping. It can also help to ventilate the house thoroughly during and after installation.

### Keeping it as Clean as Possible

To reduce dust, place mats at each entrance of the house and remove shoes as often as possible when entering from the outdoors. Vacuum weekly with an efficient powerhead vacuum, preferably one with a dirt sensor light and high efficiency filter. Occasional steam cleaning by a professional will kill fleas, dust mites, and odor-causing bacteria. If you are chemically sensitive or have allergies, you can request that your laundry detergent be used as a substitute for harsh shampoos that may contain solvents or fragrances. Stains can be treated with a mild carpet shampoo and baking soda can be sprinkled over an entire rug as a deodorizer, then vacuum later. ❖

#### For More Information

Environmental Protection Agency, Indoor Air Quality Information, 800-438-4318 or [www.epa.gov/iaq](http://www.epa.gov/iaq)

Consumer Product Safety Commission, 800-638-2072 or [www.cpsc.gov](http://www.cpsc.gov)

Carpet and Rug Institute, 800-882-8846 or [www.carpet-rug.com](http://www.carpet-rug.com)

Leclair, K. and D. Rousseau. *Environmental by Design*. H & M Publishers, Vancouver, BC, 1992.

#### To Report Adverse Reactions

State Attorney General's Office, in Washington at 800-551-4636

Disability Rights Education and Defense Fund, funded by the U.S. Justice Department, nationally at 800-466-4ADA

#### Carpet Testing

Blue Sky Labs, in Seattle at 206-721-2583

AmTest, in the Seattle area at 425-885-1664

Anderson Labs, nationally at 617-364-7357 (\$380)

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The Washington Toxics Coalition is a non-profit organization dedicated to protecting public health and the environment by identifying and promoting alternatives to toxic chemicals. Write or phone for information: WTC, 4649 Sunnyside Ave N, Suite 540, Seattle, WA 98103. 206-632-1545. Visit our Internet Web site at [www.watoxics.org](http://www.watoxics.org).