

## Primary Sources of Indoor Air Toxins and Allergens

Household ventilation is for more than comfort. It can save your life.

By Joseph Grove  
Contributing writer,  
ProudGreenHome.com

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Pity the poor bathroom fan.

Infrequently the concern of most homeowners. Seldom the recipient of adequate investment by builders. In most dwellings, it's not uncommon for the vents to be furred with dust.

Yet it can dramatically improve the comfort of a home or apartment's atmosphere, and in some cases even help the occupants live longer and better. In fact, some experts on the subject leave theirs running constantly in certain seasons.

This white paper will address several sources of indoor air contamination, some of which are well known. Others will be less so. For example, few people realize that one of the most common comes right from their stovetops: Spaghetti.

### COOKING

It's amusing but overly simple to pin the growth of mold and mildew on pasta. But heating starches to a boil and other kinds of cooking can contribute

meaningfully to the three prerequisites of life for the allergens: Temperature, moisture (steam) and food (the carbohydrates and other nutrients in the airborne food molecules).



When the enriched water droplets cool and liquefy on solid surfaces, they provide an ideal primordial soup for growth.

Few people employ the ventilation power of their range hoods, using them mostly when a food burns and creates smoke. The units are ideally suited, however, to removing moisture, and should be used for such to help prevent the development of mold and mildew.

## AIR FRESHENERS

Lack of proper ventilation can lead not only to the accumulation of airborne chemicals that are harmful, but also those that have an unpleasant smell. Rather than exchange the offending air with more pleasant air from outside, many residents will stock up on air fresheners.

In fact, data show that more than 74 percent of U.S. households sweeten the air with the fresheners, contributing to \$1.7 billion in annual sales for the category. The sales figure has more than doubled since 2003, when the value of the segment was a comparatively small \$600 million.

While the products may help your home smell good, they will not necessarily help the occupants feel good.

In 2007, the National Resource Defense Council put 14 air fresheners sold at a Walgreens under the microscope. The organization found many chemicals that in industrial settings would give OSHA cause for concern, including:

- Di-ethyl Phthalate (DEP): Associated with changes in hormone levels and genital development in humans.
- Di-n-butyl Phthalate (DBP): Recognized as a reproductive toxicant by the National Toxicology Program and the State of California. It can lead to changes in genital development.
- Di-isobutyl Phthalate (DIBP): Associated with changes in male genital development.
- Di-methyl Phthalate (DMP): Inconclusive evidence has shown

reproductive toxicity in animal studies.

- Di-isoheptyl Phthalate (DIHP): Limited toxicity testing has shown that DIHP is probably a developmental and reproductive toxicant.

Homeowners may want to take steps other than setting out sources of pollutants that contribute 24 hours a day to the degradation of indoor air, such as increasing ventilation and considering more natural air fresheners. One example is essential oils that can be dispersed actively from spray bottles or passively from soaked cotton balls.

## ATTACHED GARAGES

According to the EPA, attached garages provide one of the largest sources of indoor air pollution. The culprit, however, is not what most people might first guess: carbon monoxide from the vehicles that pull in and out. It's benzene, a toxin found mixed with the other gasses flowing from the tailpipe.



Studies suggest that benzene is a significant trigger of leukemia for workers in certain industrial facilities. A 1948 report by the American Petroleum Institute concluded that “the only

absolutely safe concentration of benzene is zero.”

In addition, often garages are the storage location of choice for gas-powered yard equipment, insecticides, partially used paint cans and automotive oil—all with the potential to shed harmful fumes. In addition to minimizing the number of such products in the garage and parking outside, home owners should consider installing a ventilation fan in the garage itself.

## CARPET

The dirty word here is “phthalate.”

Carpets alone are bad enough. They trap all sorts of allergens, including dust and pet dander. Dirt from outside becomes temporarily trapped, only to rise again in clouds of harmful specks. Insects die among its fibers, with the remains contributing to the airborne morass.

More homes would be healthier homes if they were fitted with wood floors. That’s especially true when it comes to phthalates. They are a group of chemicals used to make plastics more flexible and harder to break. They are often called plasticizers. In addition to being an off-gas of many carpets, they are used as solvents (dissolving agents) for other materials.

An article published by Appalachian State University cites these ills:

- Can block male hormones and can interfere with normal genitalia development.
- Can cause sluggish sperm, and low androgen and testosterone levels in adult males.

- Disrupt endocrines, meaning they interfere with normal brain function.
- Send signals in the body that could result in Autism, breast cancer and testicular cancer.

Most vulnerable are infants and toddlers, who tend to spend more time crawling or playing on the carpets or mouthing plastic products that also can be a source of phthalates.



To dispense of these chemicals and the other airborne toxins, one ASHRAE expert calls for a 7.5 CFM (cubic feet per minute) air change per human in the household, with an additional 35 cfm per dog and 45 cfm per cat.

Merely opening the windows from time to time isn’t enough. That form of passive ventilation can’t be relied upon to provide the recommended levels of air change. Rather, ventilation should be active, which is to say, uneventful and predictable. Only then can residents breathe easier.