

# KILLER carpets

*If you thought your home was a haven from life's hazards, think again. Rebecca Renner sneaks a look at the toxic substances lurking in your carpet*

It is playtime at Emma's house. Children seem to be everywhere - under the dining room table, playing with toys, hugging the dog - in constant motion. Oops, Emma's eating chips off the carpet and James is licking the coffee table. James, who is two, may put 76 things in his mouth in the course of an hour - toys, his fingers, someone else's fingers - a recent study discovered. Emma, who is four, has more self-control, but she may still put 38 things in her mouth every hour. Their parents might not stop to think about it, but Emma and James, like all kids, are little guinea pigs testing the toxicity of whatever pollutants are in their home.

And they are more common than you'd think. Our exposure to most toxic pollutants is between 10 and 50 times higher in indoor environments than it is outdoors. For many contaminants, levels in house dust are so high that they would trigger a clean-up operation if they were found outside. A typical sample of household carpet dust sent to an environmental lab would ring regulatory alarm bells for high concentrations of heavy metals such as lead, cadmium and mercury, polycyclic aromatic hydrocarbons (PAHs), pesticides and polychlorinated biphenols (PCBs), says environmental engineer, John Roberts.

Children are more at risk than adults, because they have a higher metabolic rate and their organs are still developing. Kilogram for kilogram, for example, Emma and James inhale 23 times as much air as their parents. And even relatively low levels of the poisons in dust could irritate their lungs, damage their developing nervous systems, retard their growth and hearing, or lead to cancer. For example, researchers estimate that every day the average infant under the age of two ingests 110 nanograms of the most toxic PAH, benzo(a)pyrene, which is found in tobacco smoke and cooking fumes. That's the equivalent of smoking three cigarettes a day. But even though the problem may be far more extensive than people think, fortunately there is an easy—if tedious—remedy close at hand.

Carpets are one of the biggest sources of toxic substances, the latest research shows. Normal vacuuming leaves in more dust than it picks up so that, over time, dust accumulates in carpets. "The carpet is the largest reservoir of dust in a house, so that a house with bare floors and a few area rugs will have about one-tenth of the dust found in a house with wall-to-wall carpet, all other things being equal," says Roberts.

By now, most of the children are playing under the table. James, who has been licking his hand, is rubbing it on the carpet. A rub like that transfers about 1 per cent of the surface contamination to the hand. Many of these contaminants come from the vast array of indoor chemicals that Emma's parents take for granted, such as cleaning products, solvents, deodorisers and air fresheners. Then there's the residues left on dry-cleaned clothes. Even cooking fumes are loaded with toxins. When Emma's



**Dustmite lives and breeds in carpet. It's a major trigger of asthma attacks, thriving in warm, humid environments, particularly in coastal regions**

mother grilled meat last night, for example, some of the PAHs in the smoke found their way into the living room carpet. Cigarette smoke, pet hair, dust mites and mould add to the load of indoor pollutants.

And there's plenty of opportunity for busy little hands to pick all this up during the course of a day. Researchers at Stanford University videotaped 80 children at normal play for up to eight hours each, then painstakingly noted every move they made. The kids' hands touched something 340 times per hour on average, and they were in contact with some surface 65 per cent of the time.

The back door flies open. Emma's older brother and sister burst in with Cappy, their dog. Cappy is a big, lively golden retriever who loves to run and play with the children in the garden. The kids grab some food and all three go into the living room to watch some TV. In the process, they bring in some of the pesticides that Emma's dad sprayed on the lawn a few weeks ago. Cappy's paws also contribute—pesticide residues on dog paws are between 55 and 250 times the background concentration, according to a study published in *New Scientist*.

Like 80 to 90 per cent of households, Emma's family uses three or four different pesticide products, either indoors or outdoors, each year. Pesticides that cling to shoes and pets' paws get rubbed off on carpeting inside the home and can raise indoor pesticide levels far above background levels. Another study found that shoes and paws increased the pesticide loads in carpet dust as much as 400-fold. Families with energetic children and energetic dogs racked up the biggest increase.

Even worse, pesticides, PAHs and other semi-volatile compounds don't stay put once they are in the carpet. They evaporate, drift from place to place and then precipitate back onto the carpet, toys or other household objects, where the cycle starts again. This "grasshopper effect" means that people who use pesticides indoors may inadvertently expose

small children to significant contamination, even if they're careful to keep kids and chemicals apart. For children mouthing the toys, or touching the toys and then mouthing their hands, the dose could be

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Roberts measured the lead levels in the carpet at 7,800 micrograms per square metre, far above the EPA's safety threshold of 434 g/m<sup>2</sup>.

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# MESSAGE FROM THE AUSTRALIAN TILE COUNCIL

## GLAZED CERAMIC TILES, ALLERGENS & ASTHMA

Glazed ceramic tiles are made or sold by members of the AUSTRALIAN TILE COUNCIL.

The Australian Tile Council membership includes manufacturers, importers, merchants and tile fixers of quality glaze ceramic tiles in all states and territories of Australia.

Ceramic tiles are made from clay and other earth products hardened through intense heat. They are ideal barriers against dust mites which can trigger an asthma attack or other health problems related to the presence of allergens. Easy to clean and low maintenance tiles require little more than dusting and an occasional damp mopping to keep them looking like new.

Although ceramic tiles have been around for thousands of years, they are just as fresh, imaginative and beautiful as they ever were, and they will stay that way for a prolonged period of time. The range of sizes, shapes, colours and textures available allows designers to make full use of their creative talents.

Ceramic tiles are an ideal covering because of their design flexibility. Long life, ease of maintenance and the potential for use with under-floor heating systems which do not use a fan, allow dust to build up in a heater, or use oxygen within the living area to operate; are some of the plusses associated with use of tile.

If you are planning a new home, renovating or specifying product for commercial projects, take advantage of the benefits of ceramic tiles and reduce the presence of allergens which can cause asthma or other health problems.

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significant and the potential for exposure would persist for many days after the application. Fuzzy toys are ideal for picking up and accumulating pesticides.

As if all that weren't enough, pesticides persist for years indoors because they are sheltered from sun, rain and other forces that quickly degrade them outdoors. This is why long-banned pesticides such as DDT are often present in carpet dust, says EPA senior researcher Robert Lewis. He commissioned a study designed to find out just how much pesticide lurks in fitted carpets. Researchers took old plush carpets, between 10 and 33 years old, and cut them up. They found plenty of pesticide deep within the carpets—in one case, a square metre of carpet contained more than a gram of permethrin, an ingredient in some household insect sprays. It was also not uncommon to find two to five different pesticides at concentrations of between 10 and 100 milligrams per square metre, or many times the amount applied in a single application.

It is not clear what the high levels of pesticides in these carpets portend, says Lewis. Most of the residues were not at the surface of the carpet, but deep among the fibres and the backing, and in the foam padding underneath. The residues can't be vacuumed up, so they are largely unavailable for human exposure. However, as carpets age, their fibres break down and may release some of these pesticide residues back into the air.

Playtime is almost over. The big kids rush off to the back yard, and Emma's mother begins to get the little ones' supper on the table. All seems well in this healthy family. But in developed countries, the incidence of children's diseases that have a significant environmental component, including asthma, allergies and even cancer, continues to rise and our dirty carpets may be a significant contributor.

The health risks for infants and toddlers posed by house dust in carpets are high and the cost of control is low, says environmental engineer John Roberts. Here's his prescription for ridding your house of dust.

- Become compulsive about vacuuming your carpets. Each week make 25 passes over the area of the rug within 1.2 metres of the main entrance doors, 16 passes over areas that receive a lot of foot traffic, and eight passes over the rest of the carpet. After a few weeks, you'll be sick of vacuuming but you will have removed a good portion of the deep dust in your carpets. From that time, careful weekly vacuuming using half the passes mentioned above should keep carpet dust levels low.
- Use a vacuum with a power head, which picks up three to six times as much dust as one without power brushes.
- Put a high-quality doormat at each of the entrances to your home and wipe your feet twice before entering. Standard mats are not very effective at stopping tracked-in pollution. Buy the thickest mat you can find. Better yet, have everyone leave their shoes at the door.

When Roberts's daughter and her husband moved into an apartment that had old carpets, Roberts measured the lead levels in the carpet at 7,800 micrograms per square metre, far above the EPA's safety threshold of 434 g/m<sup>2</sup>. To address the problem, the couple, who were planning to have children, put in a high-quality doormat, began taking off their shoes at the door and used a standard power-head vacuum cleaner twice a week. After six months, lead levels were down to 160 g/m<sup>2</sup>, and in 14 months had dwindled to just 32 g/m<sup>2</sup>.

*This is an edited version  
of an article that first  
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