Version 2.2

April 23, 2009

These are steps to reduce household hazards. People are not born knowing that they must brush their teeth to prevent decay, they must learn it. So with household hazards, they must learn how to take care of themselves. Occupants know things about the building and themselves that can be learned nowhere else. Start with the people.

The second step is to keep the household in a certain condition:

- limit moisture related problems,
- limit dust and allergens,
- limit pest borne disease,
- provide local exhaust ventilation and general dilution ventilation to control unavoidable air contaminants,
- provide a comfortable space by limiting hazards like slips, falls, electric shock, drowning and poisons.

Third, limit sources of contaminants like lead, asbestos, combustion fumes, VOCs (Volatile organic compounds) and radon.

Fourth, maintain the house so it continues to provide dry, clean, comfortable and safe conditions.

Can you really keep a home contaminant-free? Perhaps not, but you can make significant progress by evaluating carefully your buying decisions. You may be intentionally bringing in contaminants because of the function that the contaminant provides. Or the contaminant made be along for the ride.

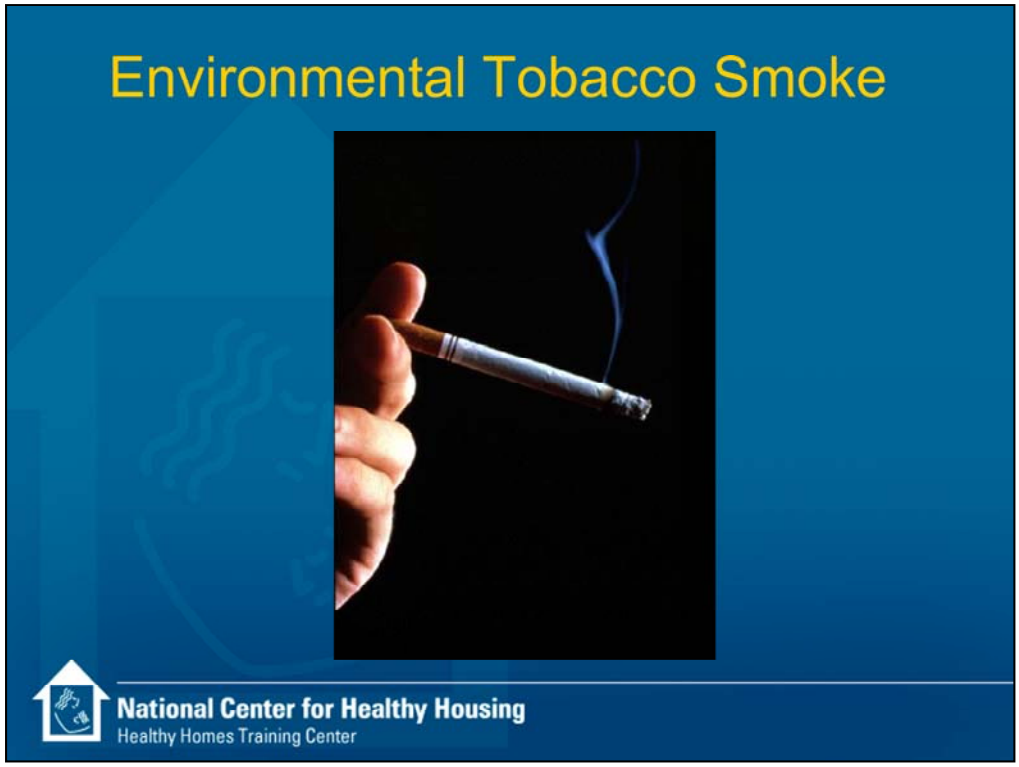
In this module, we will be focusing on those buying decisions. We have already talked about pests and pesticides in Keep It Pest-Free. We will talk about Asbestos, Lead and Mercury in the next section – Keep It Maintained – because we need to focus on maintenance for their biggest sources. That leaves us with

-Tobacco Smoke

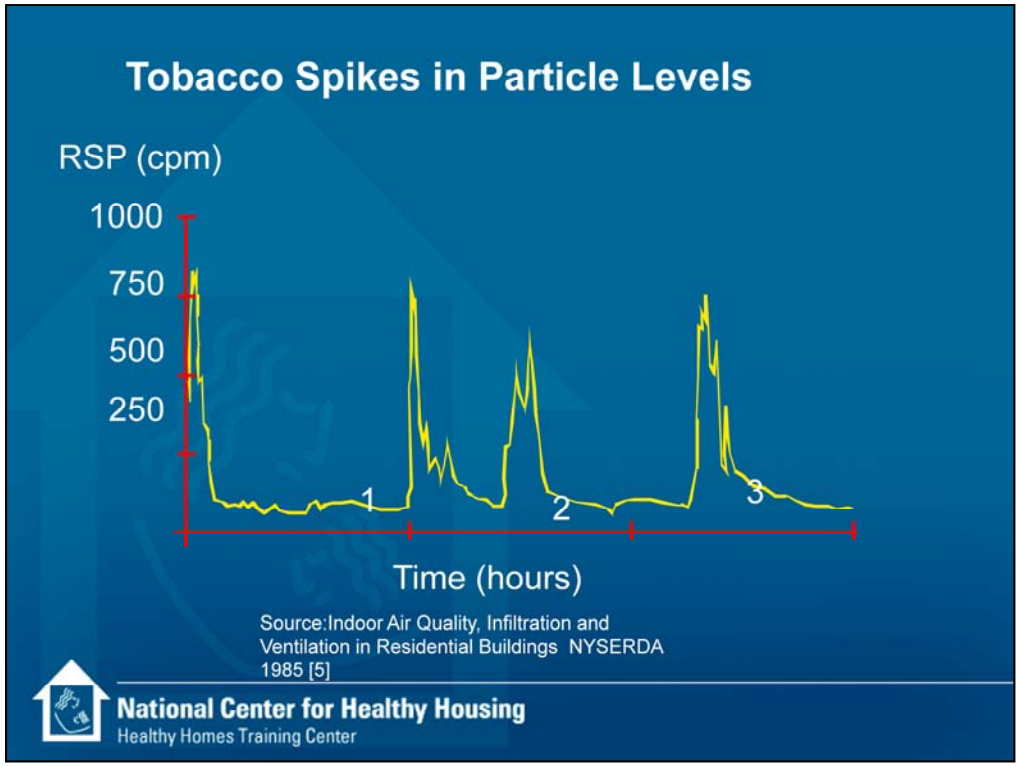
-Volatile Organic Compounds

-Formaldehyde

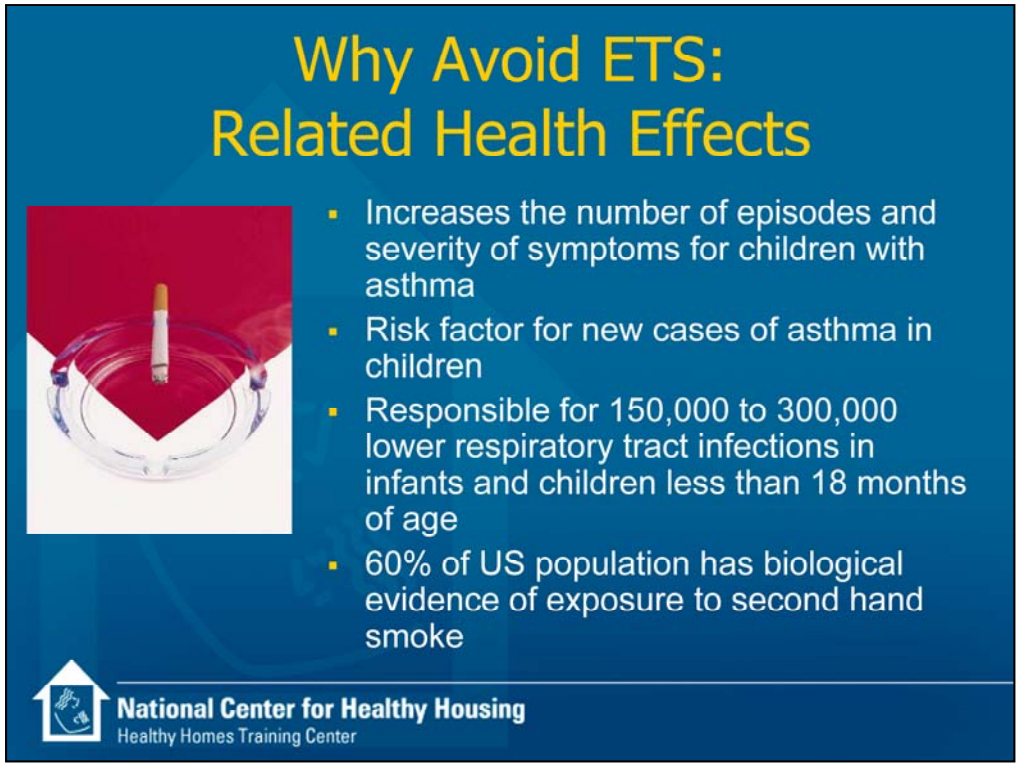
To discuss in this module.



Tobacco smoke is an important contaminant source in indoor air. From the Harvard 24 cities project, we know that children who have a smoking parent are three times more likely to have respiratory symptoms than children who live with non-smoking parents. [4]

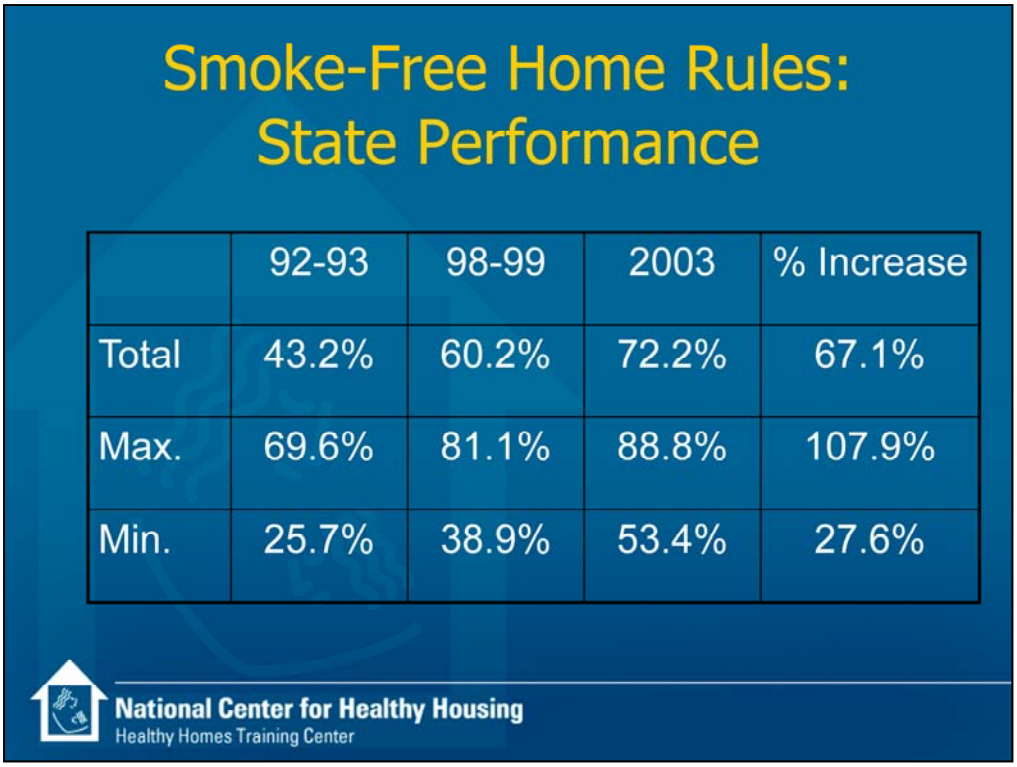


Every spike in this time series of air borne particles in a house, is one person smoking a cigarette. Tobacco smoke is a complex mixture of gases and solid and liquid particles.



These are some interesting statistics, from the American Lung Association, that focus on problems related to second hand smoke. [6]

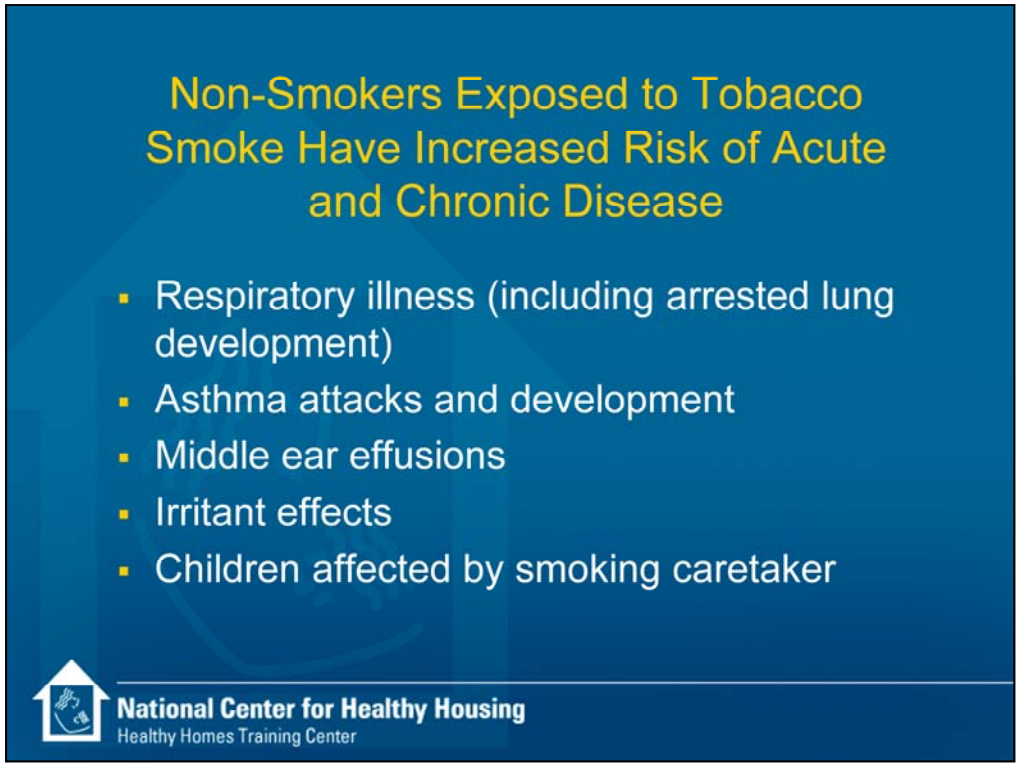
Second hand smoke causes an estimated **3,000** lung cancer deaths in **non-smokers** each year.



It is interesting how the percentage of children exposed to second hand smoke varies greatly between states. [7]

On average, 22% of US children under the age of 18 are exposed to ETS at home.

- 11.7% of children in Utah
- 17.7% of children in Washington State
- 20.1% of children in Maryland
- 29.8% of children in Ohio
- 34.2% of children in Kentucky


Non-Smokers Exposed to Tobacco Smoke Have Increased Risk of Acute and Chronic Disease
Respiratory illness (including arrested lung development)
Asthma attacks and development
Middle ear effusions
Irritant effects
Children affected by smoking caretaker
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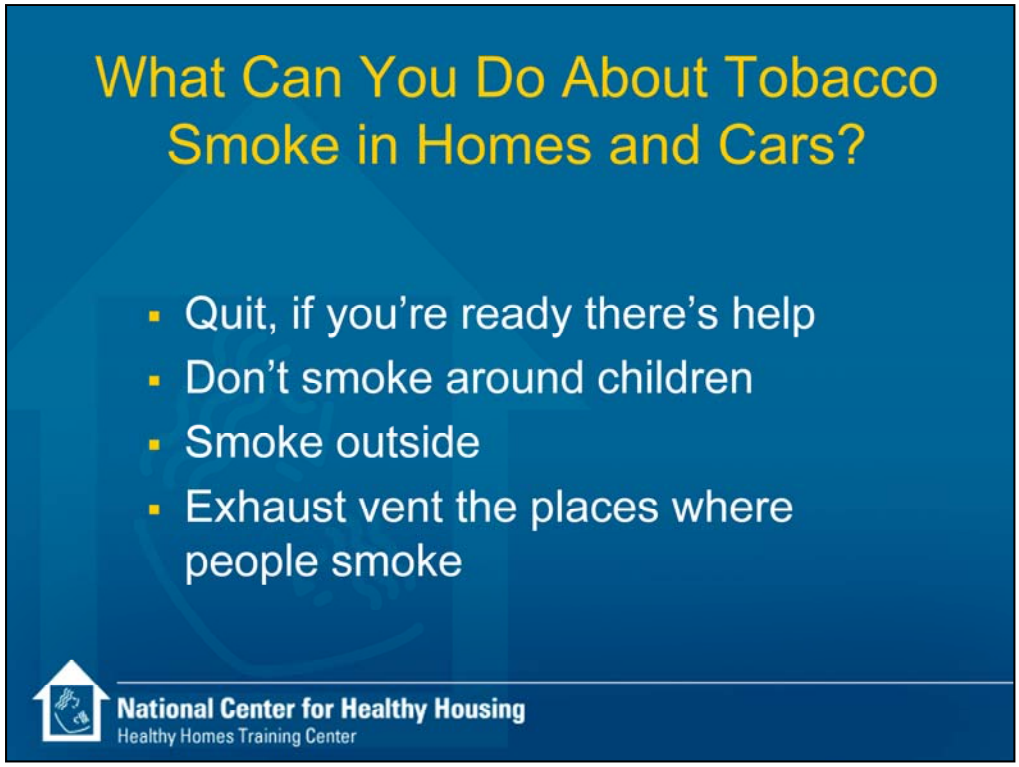
What Can You Do About Tobacco Smoke in Homes and Cars?
Quit, if you're ready there's help
Don't smoke around children
Smoke outside
Exhaust vent the places where people smoke
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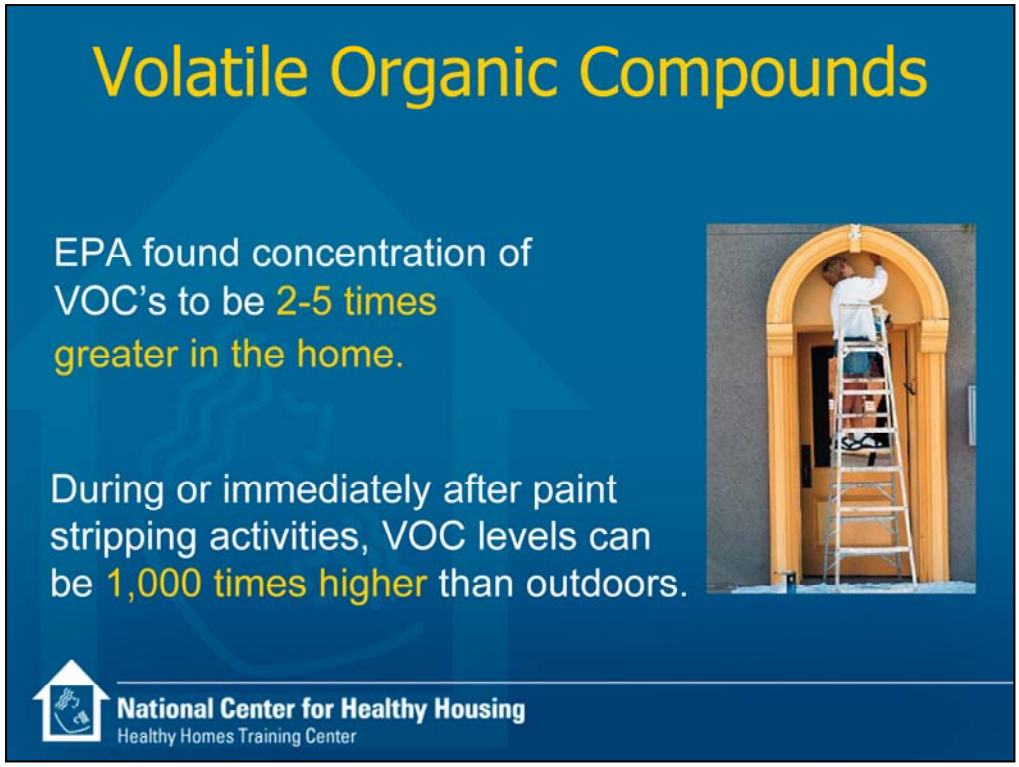
Volatile Organic Compounds (VOCs) is a broad class of chemicals that we breath inside our homes. It is tough to make broad generalizations – other than to say that less exposure is better.

If you want to understand whether the chemical is dangerous you need to understand the chemical's hazards much better and the exposures involved. The risk is the exposure times the hazard.

The list above is a start on the more significant VOCs. Ask the students to identify others.



Here is some information from the EPA's Office of Indoor Air Quality about volatile organic compounds (VOCs). [10] Notice that levels of these contaminants are often found at much higher levels indoors than outdoors.

We treat VOCs s a group since there may be cumulative or synergistic effects from breathing a combination of them.

Paints, varnishes and glues may contain a variety of materials with potential health or nuisance effects. Use low VOC paints but with caution or use traditional paints with lots of ventilation. [9]

Select durable, easy to clean paints that meet these standards:

- Contrast ratio greater than 0.95 on ASTM D2805 (hiding power).
- Number of cycles greater than 1000 on ASTM D2486 (scrubbing durability).
- Greater than 50% stain removal on ASTM D3450 (washability).

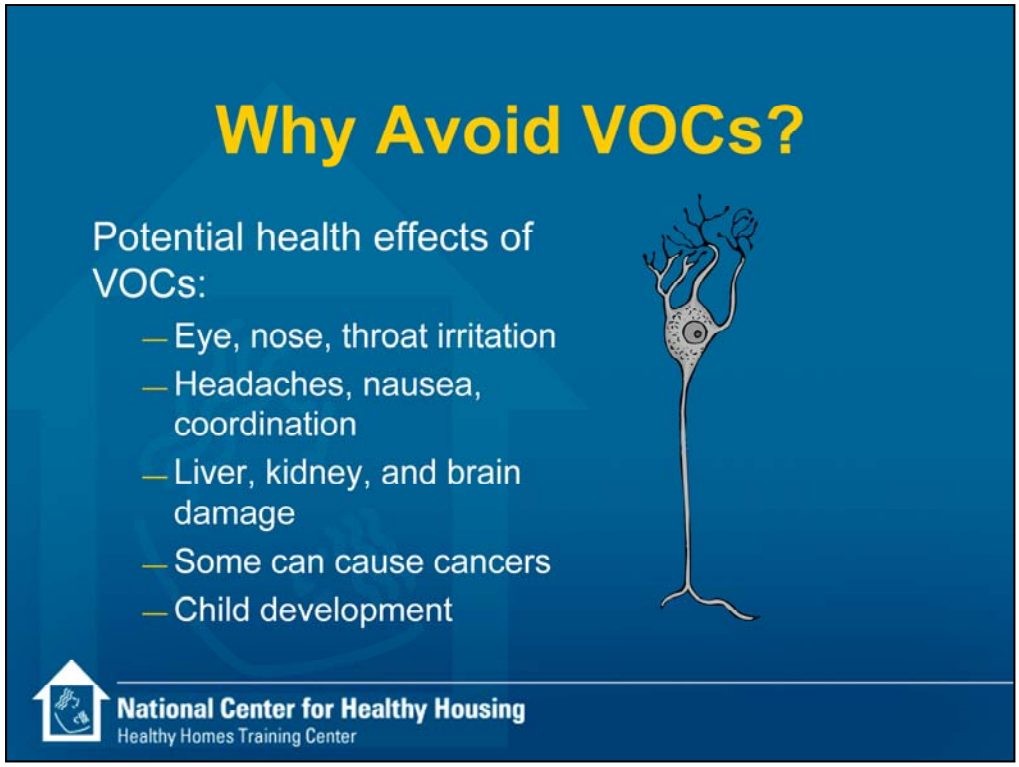
Acquire and review information on potential contaminants including Material Safety Data Sheets (MSDS), emission data and any other information available.

Avoid

- Terpenes
- Linseed oil.
- Paints containing ethylene glycol (paints with no glycol are preferable but paints containing propylene glycol are acceptable).
- Acid cured polyurethane finishes.

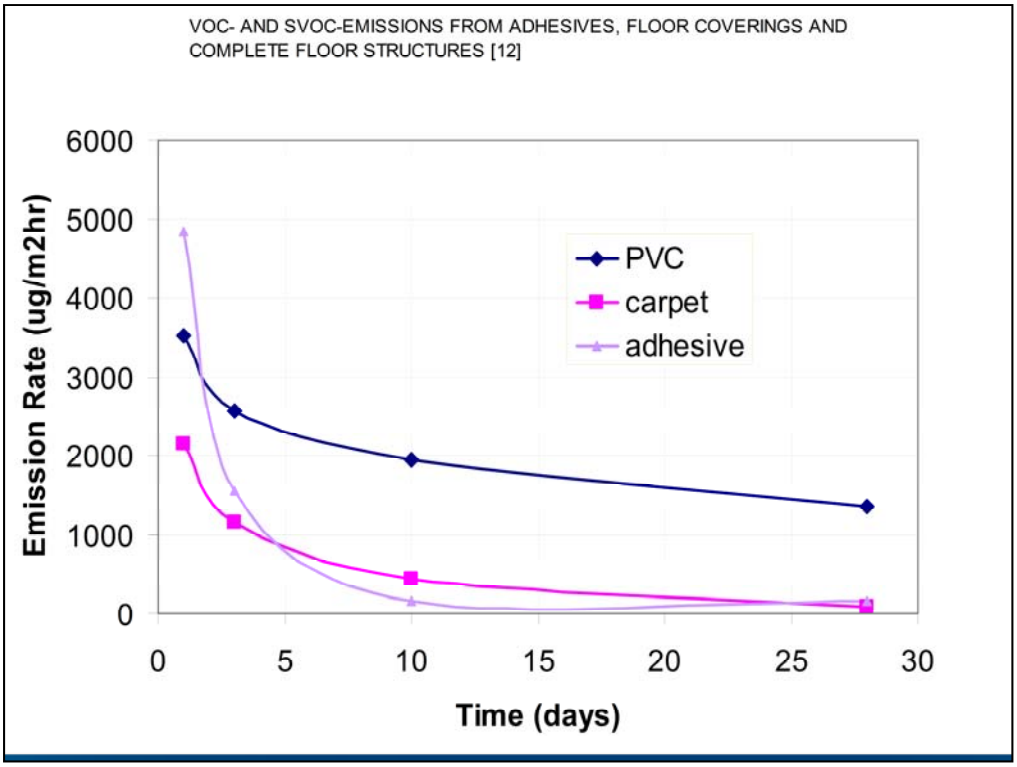
Follow this outdoor air ventilation guidance for paints, varnishes, adhesives and carpeting:

•Provide 2 – 5 ach (air changes/hour) fan powered ventilation during application and for two days afterwards.

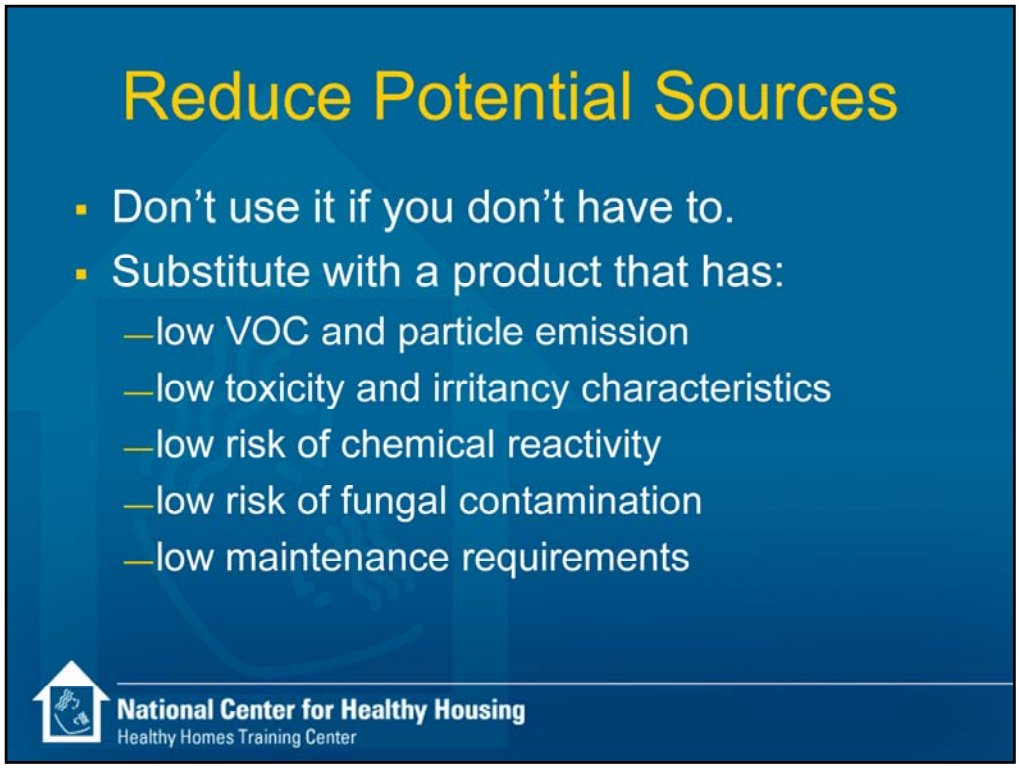


There are several health effects associated with VOCs. These include headaches, nausea, certain types of cancers, and damage to different systems of the body. Again, it varies with each chemical.

The picture represents a neuron. Damage to neurons caused by VOCs can affect the functioning of the central nervous system.



These are three different building materials that release gases but at different rates. Wet applied products often start with high emissions but emit very quickly, while solid products take longer.



The same principles that were applied to the management of pests, dirt and moisture can be applied to other sources as well. First, keep it out - Don't use it at all. Second, substitute something less likely to cause problems. Consider the risks for contaminants released by the product itself, the use and maintenance of the product, and how badly can things go wrong in the event of an accident.

Steps to Control VOCs

- Control the source
  - —Avoid using products that contain VOCs
  - —Use lower VOC options (i.e. paints)
  - —Keep containers sealed
  - —Store away from air intake
  - —Remove unwanted products from home
- Ventilate
  - — Open doors and windows

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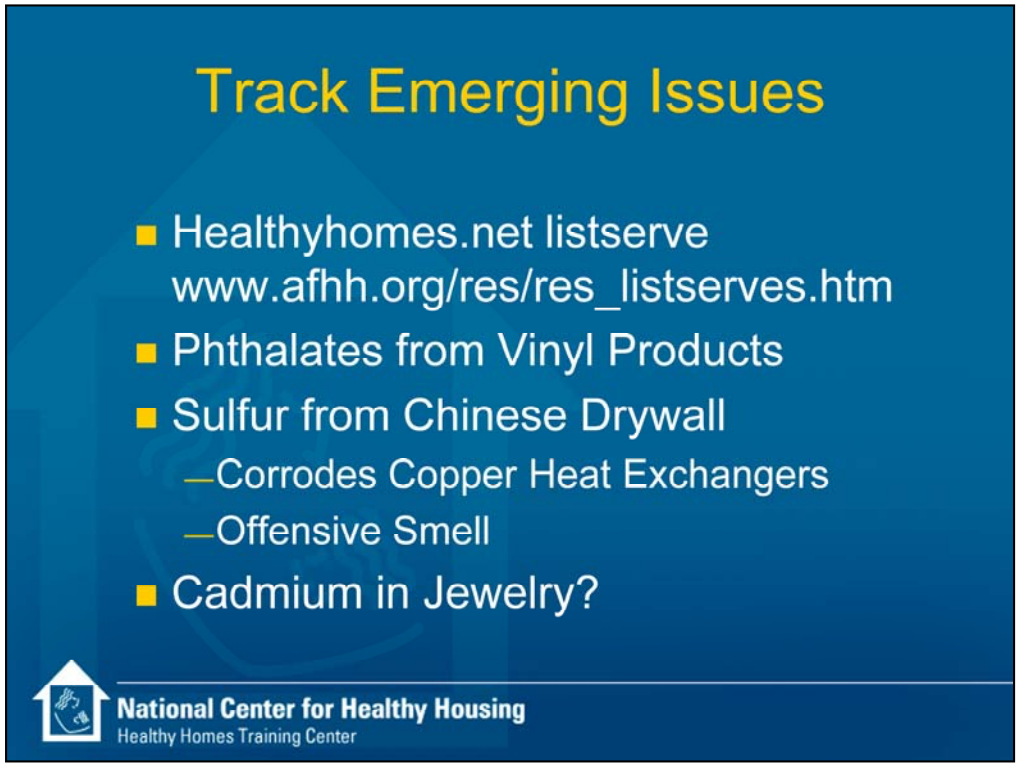
There are various third-party organizations that evaluate products for the health, energy efficiency and sustainability.

For buildings, there are four national programs mentioned in the Overview module. See NCHH's comparison of the programs on page 38 in the Reference Tab Code Section.

For products and, to some extent, services, there are three main programs. Each have their merits. You should check them all. There are also some programs for specific products such as GreenShield for pest management.

Many industries have adopted environmental stewardship programs for their members. There are various third-party organizations that evaluate products for the health, energy efficiency and sustainability.

There are valuable programs to bring about positive change in the industry but be cautious since there have different motivations. Before recommending, check them out.



Healthyhomes.net is the best way to stay current on emerging issues. Follow the link to sign up.

Three examples of emerging issues are phthalates from vinyl products, Chinese drywall and cadmium in jewelry.

-Phthalates are used in making vinyl products such as flooring and windows – typically to make the plastic more flexible. The chemicals may be released from the product as it is initially used and when it eventually degrades. There are concerns about the impacts of these chemicals on the body especially reproductive effects.

-Apparently drywall imported from China has been releasing a chemical – most likely sulfur dioxide – in the moisture of an air conditioning heat exchanger, the sulfur dioxide converts to sulfuric acid and quickly corrodes the copper. The smell can be offensive. Unsure of health effects. Florida Department of Health is lead on this issue.

-There are a few reports of cadmium showing up in jewelry possibly from nickel cadmium recycling. Cadmium may be a low value metal replacing lead. Cadmium has serious health effects impacting the kidney.

And then we have meth labs . . .

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HEET

What are the health & safety hazards?

- Explosive
  - Lithium metal, sodium, ether
- Flammable
  - Acetone, ethyl alcohol, solvents of all kinds
- Toxic
  - Iodine, red phosphorus, phosphine gas, anhydrous ammonia, methamphetamine,
- Caustic
  - Sodium hydroxide, hydrochloric acid, muriatic acid

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MASON JAR


FUEL
COLEMAN
Prestone
STARTING FLUID
IGLO
Starting Fluid
Acetone
CAMP FUEL
FLAMMABLE
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Key Messages

- It is easier to prevent exposure to contaminants then it is to remove them and treat their effects.
- Should contamination occur: control, contain, and clean-up.
- Contaminants are not always detectable by our senses.

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