

Healthy Retrofits Project: Early Findings regarding Indoor Air Quality

November 18, 2010
Sarnia, Ontario

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Overview of CPCHE/CELA Healthy Retrofits Project

- CPCHE project, with CELA as lead partner, funded by Ontario Trillium Foundation
- Emphasis on the needs of low income residents
- Objective: Prevent health risks to children by working with various professionals in the energy efficiency sector to promote awareness of, and foster preventive measures to address, potential toxic chemicals and indoor air quality risks associated with building retrofits and home renovations.

Why focus on preventing toxic exposures during childhood?

- Environmental exposures are among the factors (including genetics, socio-economic status, etc) that determine health and well being throughout life.
- Early environmental exposures (ie preconception, fetal and childhood) often have greatest potential for harm
- Environmental exposures are largely preventable.



What makes the fetus and child more vulnerable?

- Higher levels of exposure (eat, drink, breathe more than adults per unit of body weight; behaviours increase exposures)
- Greater susceptibility to harm (“windows of vulnerability”; immune and detoxification systems are immature)
- Socio-economic factors place children at ever greater risk
- Environmental exposures linked to increased risk of:
 - Asthma and respiratory problems
 - Impacts on brain development and brain functioning
 - Cancer
 - Impacts on reproduction
 - Impacts on endocrine and immune systems

Phases of the Project

- Phase 1: Prepare baseline report
 - Literature website scan
 - On line survey
 - Key informant interviews
- Phase 2: Develop outreach materials
- Phase 3: Promote uptake/adoption of project outputs



Potential Impacts on Children During and After Retrofits (Early Findings)

- Indoor environmental air quality is critical to children's health
- Low income circumstances can create even greater exposures and vulnerability
- Four areas from which exposures can arise:
 - Legacy chemicals
 - Tightening from the building envelope
 - Choice of materials
 - Activities after the energy efficiency

Legacy Chemicals: Lead

Lead is of particular concern in older homes (pre 1978)

- Higher blood lead levels in low income children
- About 75% of lowest income group in Canada live in pre-1980 housing
- No safe exposure level
- Distruption of old paint can create very high levels of lead in dust
- Lead is at its highest levels on high traffic surfaces – window and door trim for ex.
- In US, there is some guidance with respect to lead and renovations, however, in Canada there are no requirements for training or certification to address lead exposures

Legacy Chemicals: Asbestos, PCBs, Particulate Matter, and Dust

Asbestos: carcinogen with no safe level

- Many applications (ex. In tile, flooring, shingles, paints, insulation)
- Very low exposure unless disturbed
- Regulation related to occupational exposures but does not apply to private homes or owner occupied buildings with four units or less

PCBs: Carcinogenic and likely toxic to reproduction, nervous system and endocrine system

Particulate Matter and Dust: During retrofit work in older homes, particulate matter can contain very high levels of toxic substances

Tighter Buildings Can Increase Exposure

Mould: when excess moisture meets a food source

- Most common indoor air quality issue. May cause and can worsen asthma
- Due to lack of ventilation, damp basements, poor cleaning (which can often be worse in low income circumstances)

Radon: Carcinogenic (link to lung cancer) with children more vulnerable

- Site specific (Cdn Shield, deposits of shale, phosphates) and indoor levels increase when building is tightened. All homes should be tested.

Carbon monoxide: High hazard/lethal.

Tobacco Smoke: Multiple carcinogens.

Choice of Building Materials

Volatile Organic Compounds: diverse compounds, some highly toxic. Pose asthma risk in children.

- Gaseous at room temperature. In many renovation products (caulking, glues, paints, varnishes, insulation materials)
- Levels can be 5 – 10 times higher indoors than outdoors
- When ventilation reduced, levels can increase

Insulation Products: diverse projects and range of toxicity concerns. Worker exposures during application, off gassing and or contribution to house dust during product lifetime

- Eg. polystyrene is a combination of highly toxic substances: ethylbenzene and benzene and flame retardants

Greener Material Choices

Growing demand and challenges: diverse products and parameters to consider

- Eg. sustainability of source materials, energy inputs during manufacturing, potential for release of toxic substances during and after installation

Pharos Project: Established by US Healthy Building Network

- One example of guidance system to screen and rank materials based on environmental and health impacts.
- Provides approved lists of products and excludes any containing substances of concern

Activities After the EE Work is Completed

- Tighter building envelope: Activities and product choices can contribute to indoor air quality concerns and dust contamination
- Exposures of concern: pesticides, chemicals in household cleaners, air fresheners, personal care products, chemicals released during off gassing or to house dust from house furnishings, electronics, etc
- Greater risks exist for children. Strong evidence of associations between household use of pesticides and childhood cancers
- Can be benefits, esp for low income housing: energy efficiency retrofits can reduce the need for pesticide use when holes, cracks, etc are sealed.

Conclusions

- Energy efficiency retrofits can have an untended impact upon indoor air quality
- This impact can be even greater for children
- Awareness of these risks is important in order to put appropriate safety measures in place
- Baseline report should be available by the end of 2011

