

Avoid risking children's health during home energy retrofits, renovations, experts urge

EurekAlert

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Home energy retrofits tackle climate change and when done right they should make homes healthier, while aiding families struggling with utility bills.

Without adequate training and precaution, however, renovators, energy retrofitters and do-it-yourselfers who disturb lead-based paint, asbestos insulation and other toxic materials in older buildings put the health of all -- especially children -- living there at risk of serious health impacts.

Lead exposure can potentially lead to lowered intelligence and worse; asbestos exposure can potentially lead to debilitating long term illness, and certain materials used in renovation can increase other health risks, experts warn in a new report by the Canadian Environmental Law Association (CELA).

CELA and fellow members of the Canadian Partnership for Children's Health and Environment (CPCHE) have launched a multi-year project to promote healthier home energy retrofits. They strongly encourage retrofits to reduce greenhouse gas emissions and home energy costs but urge government co-operation to ensure such work is done without damaging the vulnerable health of children.

"Many families in Canada struggle with high energy costs and retrofits help ease the financial burden while aiding the fight against climate change," says CELA Executive Director Theresa McClenaghan. "Retrofits, done right, will also make these families' homes healthier and prevent health problems known to result from mould or inadequate heating and ventilation. Unless care is taken to avoid the release of toxic chemicals and ensure proper ventilation, however, such renovations can create serious health risks, especially for children."

Adds Erica Phipps, CPCHE Partnership Director: "The goal here is a 'win-win' situation: homes that are more energy and cost efficient and healthier for children and their families."

The report, "Healthy Retrofits: The Case for Better Integration of Children's Environmental Health Protection into Energy Efficiency Programs," offers a suite of recommendations for improvement in several areas, including the coverage and design of government energy efficiency incentive programs and policies, the training of energy auditors, the education of contractors and public awareness of the issues.

Among the biggest concerns is lead, which can pose a risk inside any home built

prior to 1978. Until 1977, lead was often added to interior paint to make it more brilliant, durable and moisture-resistant. It can be present at exceptionally high levels in paints used before the 1960s. It was also added at high levels to outdoor paint until 1992.

Homes first built in the 1930s and earlier may have accumulated over 200 kilograms of lead, which poses little threat if undisturbed. However, replacing old windows or drilling into walls to blow in insulation, for example, can contaminate the house with lead dust, which is especially dangerous for babies and young children, who tend to crawl on the floor and put their hands and other objects in their mouths.

Surprisingly, according to a survey of Canadian auditors and renovators and contractors done for the report, while 93% talk about some environmental health issues with their clients, just one in six (16%) raise lead as a concern.



And, even though the Canadian federal government's public information urges homeowners to be careful, potential exposure to lead from paint is not covered in federal training of energy auditors, who are unlikely to point it out. Only 7.1% of energy professionals surveyed report screening or testing for lead.

The US Environmental Protection Agency, on the other hand, requires contractors to be lead-safe certified if they are doing renovation, repair or painting in pre-1978 homes, child care facilities and schools. The US and France are among very few countries known by medical experts to have created mandatory precautions or other legal requirements related to old lead paint.

"There is no safe level of lead exposure," stresses Simon Fraser University professor Bruce Lanphear, MD, a world-leading expert on children's environmental health who served as a report advisor. "Exposure to lead at a young age can permanently alter the pre-frontal cortex of a child's brain."

The report cites studies documenting lead levels of just 1 to 10 micrograms per

deciliter of blood causing IQ scores 6 points lower than children with lead-free blood. Average Canadian children have levels of 1 to 3 micrograms of lead per deciliter ($\mu\text{g}/\text{dL}$) of blood, meaning there is no safety margin for any additional exposures.

Long-term effects may include slow development, learning disabilities, hearing loss and reduced height. And there is a correlation between children with Attention Deficit Hyperactivity Disorder (ADHD) and presence of lead in their bodies, even at levels officially considered safe, he adds.

Children with moderate to high lead exposure may suffer neurological and behavioural changes, including a far greater likelihood of committing crimes as adults, according to recent US studies by Dr. Lanphear and others.

A 2009 US study by the Economic Policy Institute in Washington, D.C., found that every dollar invested in controlling the hazard of lead paint returned between \$17 and \$221 in health benefits. These benefits included higher IQs, lifetime earnings and tax revenue, reduced spending on special education and reduced criminal activity. Total savings from the US investments were estimated at \$181 to 269 billion.

Other major health concerns include asbestos, a known carcinogen for which, like lead, there is no safe exposure level. Asbestos was widely used in Canadian homes and buildings from the 1930s until the mid-1980s.

It is difficult to estimate how many buildings in Canada contain asbestos. However, it is known that asbestos-containing insulation was used in as many as 300,000 to 400,000 Canadian homes as loose fill in attics until 1990 when it was removed from the market.

Canada Mortgage and Housing Corporation (CMHC) describes many ways in which asbestos can become a risk - disturbing loose-fill insulation, removing roof shingles or siding, tampering with roofing felt, ripping away asbestos insulation from a hot water tank, sanding or scraping asbestos floor tiles, breaking apart acoustical ceiling tiles, and sanding plaster or coatings such as roofing compounds, sealants, paint, putty caulking or drywall containing asbestos.

Disturbing asbestos-containing materials can release microscopic fibres into the air.

While there are regulations governing asbestos removal, private homes or residential buildings with four units or less are exempt. If homeowners suspect asbestos is present and may be disturbed during renovations, they are advised to consult an expert in asbestos abatement and removal.

Buildings constructed or renovated in Canada between 1950 and 1978 may also have Polychlorinated biphenyls (PCBs)-contaminated caulk around windows and door frames, between masonry columns and in other masonry building materials. PCBs were added to caulk to increase its flexibility. PCBs cause cancer in animals, and their use in caulking was discontinued in 1978. Dust created during

renovations can be contaminated with PCBs from this older caulking.

Choosing healthy building materials

The report notes that sealing and tightening a building to improve energy efficiency can reduce air exchange, resulting in more concentrated levels of indoor pollutants and potential health troubles.

And new building materials such as such as caulking, sealants, glues and insulation that contain volatile organic compounds can off-gas or release toxic chemicals such as benzene, toluene and formaldehyde.

Recent studies have shown that the risk of asthma and respiratory diseases increases in infants or children exposed to formaldehyde or particleboard with formaldehyde-based glues, phthalates or plastic materials and paint fumes.

Polystyrene insulation material also carries potential health risks. It is manufactured by combining two carcinogens, ethylene and benzene, to produce ethylbenzene, which then forms styrene. Polystyrene often contains the flame retardant, hexabromocyclododecane (HBCD), a long-lasting compound associated with decreased fertility and effects on the thyroid gland.

Says CELA researcher Kathleen Cooper: "Retrofits can greatly benefit the environment and the estimated 1 million lower-income Canadian families who spend more than 10% of family income on energy costs. Often, however, those families live in older buildings where lead, asbestos and other hazards may be present, putting a premium on doing retrofits safely."

She notes that about half of Canada's current housing stock was built before 1980, and that, according to Statistics Canada, about 75% of the lowest income group in Canada live in these buildings. The Ontario government is embarking on a large province-wide program to retrofit low-income housing, she adds.

"There is very little awareness in Canada of these issues," says Ms. Cooper. "We need measures in place to ensure that renovations and retrofits are done in a way that minimizes potential health problems. Implementing our recommendations would help ensure that retrofits also create indoor environmental health benefits."

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