

It seems to us that the same "panic button" that circulated the unscientific, unproven idea that arsenic is so dangerous is the same "panic button" that the media circulated that playgrounds are so dangerous.

CCA Pressure-Treated Wood and Playground Structures

An Overview of the Scientific Information on Health Risks.

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Abstract

CCA (Chromated Copper Arsenate) pressure-treated wood has been extensively used in North America for over seventy years. Over this time period, no adverse health effects associated with the proper use of this product have been identified.

Health Canada, the United States Environmental Protection Agency (EPA) and the United States Consumer Product Safety Commission (CPSC), all major health and safety organizations which regulate pressure-treated wood, have not identified any cause for health concerns associated with the normal use of pressure-treated wood products, including playground structures.

Numerous academics and scientific groups including experts from the University of Toronto, the American Council on Science and Health, the Hazardous Substance and Waste Management Research, Inc. (Tallahassee, Florida), Gradient Corporation (Cambridge, MA) and the Physician's Arsenic Work Group of Florida have concluded that CCA pressure-treated wood used in children's playground structures are safe. Canadian health authorities do not automatically go to the zero risk approach. The reasoned approach of using a risk assessment along with risk management options for a health assessment is the Canadian approach to determining acceptable risk for the Canadian population.

Even at that, the Canadian government errs on the side of safety when calculating the possible health risks for Canadians. In the end, the final choice of accepting a level of risk and therefore using or not using a product always falls to the consumer. This choice should be based on solid scientific evidence and not on reports that appear to be focused on inducing fear.

Unfortunately there have been media articles based on less than scientifically responsible reports that have raised questions of safety of this product. The basic premise of many of these reports is that only zero health risk is acceptable for the Canadian population. The Canadian public should be concerned with the tendency of our society, reacting to a media report or anecdotal scientific evidence, to put tremendous money and time into chasing minimal health risks.

The weight of scientific evidence shows that CCA treated wood poses no unreasonable health risks to Canadians.

Relative Health Risks

Arsenic, one of the chemicals used in this CCA formulation, is considered an essential element at low exposure levels for our growth and development. Arsenic is a natural chemical constituent of the Earth's crust and it occurs naturally in soil and rocks, water, air, and plants and animals. In the natural environment, arsenic usually binds to other molecules, such as those found in soils, and does not travel very far. The average concentration of arsenic in soil varies considerably in North America.

Toxicity and exposure to a chemical are the two main factors considered when estimating the potential health risks that a chemical may pose. Therefore any risk of toxic effects from a chemical depends on the inherent toxicity of the chemical and the exposure level which a person experiences.

The U.S. Environmental Protection Agency scientific findings to date support extensive studies conducted both in Canada and the U.S. by individual researchers and organizations to assess the health risk and

dislodgeability. The evidence collected and analysed on the commercially available treatments using CCA show no adverse health hazards, even with very high wood contact estimates. In a study using the high dislodgeability values, the skin cancer risk for arsenic exposure was estimated at 9 in one million. General risk of skin cancer from the sun and other sources is 8600 in one million, some 950 times higher than any risk from treated wood.

To put the health risk of one in a million in relative terms, this is the same relative amount as one cent to \$10,000.00 or one minute in two years.

Recent scientific reviews in 2003 by Dr. Ed Calabrese and Dr. Linda Baldwin of the University of Massachusetts published in the journal "Nature" outline a new concept in evaluating the toxicity of chemicals. They say that people should first assume small amounts of a chemical are beneficial until they are proven harmful. This idea is called hormesis and it says that small doses of chemicals or radiation are beneficial from a health or growth point of view for plants, animals and people. For instance, many studies today show that a glass or two of wine per day improves cardiovascular health. Low exposure levels of chemicals such as cadmium, dioxin, saccharin and various polycyclic hydrocarbons reduce cancerous tumours in some animal species. As for radiation, small amounts of radiation from the sun are necessary for growing children or people who suffer from seasonal affective disorder. The first scientific papers written about this hormetic effect were published in 1865 and concerned the enhanced growth of plants exposed to small amounts of chemical.

Public health agencies and health regulatory organizations in many countries around the world have put the concept to the public that there may be no safe level of exposure to toxic chemicals such as carcinogens. In this process many people have become frightened of chemicals.

Health risks of chemicals are unknown risks to most people. Individuals are generally more comfortable with the health risks of products or actions they know. For instance, most parents are comfortable to allow their children to go to playgrounds as this is something they consider they know in terms of risks.

Yet, every year, ten thousand of these Canadian children will be injured and a small number will die through playground accidents. Some of key advice points are that adults should always supervise these children; never tamper with the ropes on the equipment; children should avoid wearing clothing with drawstrings; and children should take off helmets before playing on this equipment as their heads could get stuck and result in strangulation. Further information on playground safety is available at

www.safekidscanada.ca.

Scientific Studies and Risk Assessments from Governmental Organizations

Health Canada toxicologists state that there is no evidence the level of arsenic found in playground equipment poses a danger to children. Health Canada has also stated that the recent report commissioned by Environmental Defence Canada, a not-for-profit environmental group, is flawed in that only single samples of arsenic near playground equipment were taken at each site examined and that the report omits the fact children would have to ingest sand or wood containing arsenic for it to be harmful.

The Health Canada Pest Management Regulatory Agency (PMRA) has been actively involved with the U.S. EPA on a risk assessment or re-evaluation of CCA. A prior re-evaluation of CCA was conducted from 1978 to 1986 as part of the registration of this product. For the current re-evaluation, which is a regular part of the registration process and is ongoing, both the PMRA and the U.S. EPA have not concluded that an unacceptable health risk or risk to the environment exists when pressure treated wood is properly handled, used or disposed of. The current joint re-evaluation is targeted to be completed in 2003. At this time neither PMRA nor the U.S. EPA is recommending that existing structures including decks or playground equipment made of CCA pressure treated wood be removed or replaced.

In 1990, Dr. Dieter Reidel of Health Canada published a study that looked at the amount of arsenic leached from outdoor structures constructed of CCA treated wood. The study concluded that these outdoor structures released small but measurable amounts of arsenic and that the results did not indicate a clear correlation between the age of the structure and the amount of the arsenic in the soil. In April 2000, Dr. Reidel's study was used by the Hazardous Substance and Waste Management Research Inc. who, in turn, produced a report indicating that health effects from direct exposure to deck or playground treated surfaces are unlikely.

The U.S. CPSC conducted studies in 1990, which estimated the risk of skin cancer from dislodgeable arsenic on pressure treated wood playground equipment. They concluded that the estimated risk of skin cancer for five out of seven samples from manufacturers were below the level of one part in a million. Two other samples had an estimated risk of three to four in a million. A further comparison sample of rough-cut lumber showed a risk estimate of eight to nine in a million. This data was used in a subsequent U.S.EPA

risk assessment (2002) which has not concluded that an unacceptable health risk or risk to the environment exists when pressure treated wood is properly handled, used or disposed of. Mr. John Preston of the CPSC Division of Mechanical Engineering concluded from this study that "the amounts were much below the level that makes a difference to health. I have no problems with telling consumers that it is appropriate for playground use".

In a 1990 CPSC study entitled "Estimate of Risk of Skin Cancer from Dislodgeable Arsenic on Pressure-Treated Wood Playground Equipment" there was a review of three epidemiological studies conducted on the health status of wood-treatment plant workers and carpenters and the results showed that there was no increased risk of cancer or any other health problems due to that high level of exposure. Recently, (Feb. 2003) the CPSC released a staff briefing on CCA treated wood in playground equipment. Unfortunately this briefing is premature and could cause needless confusion among parents and consumers as the most recent U.S. EPA re-evaluation is currently underway and expected this year.

Scientific Studies and Risk Assessments from scientific consulting companies and academics

The weight of scientific evidence from all these studies indicates that CCA treated wood does not pose any unreasonable risk to the public or the environment.

An independent panel of eminent physicians (the Physician's Arsenic Work Group of Florida) appointed by the Florida State Department concluded in July 2002 that CCA-treated wood is safe for use in playgrounds and recreational facilities after a year-long scientific review of this issue. The purpose of their extensive review of the medical and scientific literature was to evaluate the risk of clinical disease associated with the use of CCA treated wood for the construction of playground equipment and recreational facilities. They concluded that the available data have not demonstrated any clinical disease associated with arsenic exposure from this use of CCA treated wood. In addition, they concluded that there have been no reported clinical cases of arsenic-induced manifestations that would be concordant with an excessive exposure to arsenic contaminated soil resulting from the use of CCA treated wood for the construction of playground equipment and recreational facilities. They also concluded that the bioaccessibility (accessible by the oral, dermal or inhalation route for a person) and bioavailability (the degree to which a substance becomes available to the tissues) of arsenic from soil and CCA treated wood as would occur in playgrounds and recreational facilities, is low.

The Physician's Arsenic Work Group of Florida agrees with and supports the U.S. EPA report of February 12, 2002 which, in turn, states that the EPA does not recommend consumers replace or remove existing structures made with CCA treated wood or the soil surrounding those structures.

A recent review conducted by Dr. Paul Cooper on the potential dangers posed by pressure treated wood for use in playground equipment, patio decks and other residential applications concluded that such concerns are unfounded. Dr. Cooper, a Professor of Forestry at the University of Toronto, conducted the review based on a world review of toxicity testing on this product. He stated that treated wood is safe to use and safe for children's playground equipment. He also commented that misinformation about pressure treated wood has caused a lot of needless worry for Canadians.

Dr. Christopher Teaf conducted three studies in 2000 and 2001 to determine the safe levels of arsenic exposure from CCA treated wood in decks, playgrounds and the soil beneath them. Dr. Teaf found that the levels of arsenic generally reported were well within the zone of safety.

Dr. Barbara Beck, a toxicologist and principal of Gradient Corporation, using conservative assumptions and parameters to evaluate exposures, conducted a human health risk assessment in 2001, which included the potential for dermal contact with and ingestion of arsenic from the playground structures and nearby soil.

Dr. Beck concluded from her study, which included both adults and children, that both the cancer and non-cancer health risks from exposure to arsenic in CCA treated wood fall within the U.S. EPA acceptable health risk limits.

In December 2000 Hazardous Substance and Waste Management Research Inc. conducted a study on health considerations related to arsenic in soil under playground equipment constructed of CCA-treated wood. They developed proposed protective ranges of values for arsenic in soil under playground equipment that is constructed of CCA treated wood based on children playing, or based on an aggregate adolescent/adult person. These values were 260 mg/kg and 90 mg/kg , respectively. This evaluation is consistent with the U.S. EPA review in 1997, which, in turn, had stated that CCA does not pose a short-term or long-term toxic hazard to children or adults.

The same study was also conducted to test the soil under decks constructed with CCA-treated wood. The proposed protective ranges of values for arsenic in soil under a deck that is constructed of CCA-treated wood based on children playing, or based on an aggregate visitor scenario and these ranges were

390mg/kg and 170 mg/kg respectively. The calculated concentration of arsenic in soil under a deck constructed of CCA treated wood which would pose no significant carcinogenic risk on the aggregate visitor scenario is approximately 170 mg/kg. All of this data was concluded to be in agreement with the reviews of the U.S. EPA in 1997 that, in turn, had stated that CCA does not pose a short-term or long-term toxic hazard to children or adults. The intake of arsenic from soil under playground equipment is from 10 (a child visitor) to 2,700 times (adult: aggregate visitor) lower than the intake of arsenic from the consumption of water at the current MCL (maximum contaminant level) of 50 ug/liter. Therefore the additional arsenic intake from soil near playground equipment is only a very small contribution to the total daily intake of arsenic.

In April 2001, Hazardous Substance and Waste Management Research Inc. produced a study whose purpose was to determine a target quantity of arsenic in association with residues on the surface of the wood that would pose no significant risk of adverse health effects to humans who may frequently come in contact with wood that has been treated with CCA. The report showed that the calculated systemic and carcinogenic effects (Wood Surface Target Quantity) values are in the range of the identified dislodgeable arsenic levels from many of the available studies, indicating that health effects from direct exposure to deck or playground treated surfaces are unlikely.

A study conducted by the American Council on Science and Health (ACSH) , an independent consumer education consortium of 250 scientists and physicians, found no cause for health, safety or environmental concerns in CCA pressure treated wood.

A study entitled "Evaluation of Risk to Children using Arsenic-treated Playground Equipment", and prepared in 1984 by Consultants in Epidemiology and Occupational Health for the California State Department of Health Services, found that there is negligible risk to children from exposure to CCA-preserved materials.

A small study conducted in 1983 by the California State Department of Health Services entitled "Comtu-tox Issue Review: Toxicity and Epidemiology Reviewed" showed no evidence of arsenic absorption by man, even if the hands are licked directly after handling CCA-C treated lumber.

Conclusion

In my opinion, the weight of scientific evidence is clear that CCA treated wood poses no unreasonable health risks.

Studies show that wood treatment workers and carpenters who would have relatively high exposures to CCA treated wood do not have increased health risks. No evidence exists that indicates that a child has developed skin diseases or cancer from CCA treated wood.

I would therefore not worry about the perceived dangers from pressure treated wood. What I would worry about is my children getting an overdose of the sun or being left unattended at a playground.

As parents we have to put all these health risks in perspective and realize that many of the health risks that we are familiar with such as smoking are the ones for which we should reduce expose or eliminate.

Further Information

For more information about treated wood, contact The Canadian Institute of Treated Wood at Email address protected by JavaScript.

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