



Healthy Schools Network, Inc.

Playgrounds & Toxic Threats

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Environmental Health Hazards in the Playground?

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Neighborhood and school playgrounds are places that kids play, get fit and make friends. We expect playgrounds to be safe and clean environments for children to play in. However, too many playgrounds across America have unsafe play equipment and are not well-maintained. Some may pose environmental health hazards such as the ones discussed in this guide.

Children are more vulnerable to environmental health hazards because their bodies are still growing. Proportionally, they eat, drink, and breathe more per pound of body weight than adults. Children like to explore, which can expose them to more environmental threats than adults. But, they also do not know how to identify and protect themselves from these hazards.



Children should be supervised at playgrounds

Special Topics:

- What Parents & Schools Can Do
- Current federal & state laws governing toxic playground materials
- Health concerns associated with each type of risk

What Schools Can Do:

Make sure every child has a healthy and safe recess!

There are four main things to consider when measuring how safe a playground is:

- 1) It is important that the playground equipment is **age appropriate**. Consider the size and difficulty of certain playground equipment. Young children have different physical abilities than older children and should not be playing on equipment that is meant for older children.
- 2) Look at the **surfacing** in the playground. The surface should break falls. Loose-fill or synthetic material such as wood chips is preferred.

- 3) Playgrounds should always be **supervised**. Children should not be permitted to play on the equipment without an adult to monitor their activities.

- 4) Take a visual survey of the playground and look at how **well maintained** it is. Look to see if there is any broken equipment, how close the playground is to traffic, if there is any trash on the premises, and for **toxic threats** described in this guide.



Chromated Copper Arsenate (CCA) in Wooden Play Equipment

What is Chromated Copper Arsenate?

Chromated Copper Arsenate, or CCA, is a toxic heavy metal compound used to treat and preserve wood. **Copper** acts as a fungicide, **chromium** binds the wood, and **arsenic**, which the US Environmental Protection Agency (EPA) and the World Health Organization (WHO) have classified as a known human carcinogen (cancer-causing substance) is an insecticide. The CCA treated wood has a greenish tint and has been used in thousands of play sets, railings, decks, and picnic tables.



Federal and State Laws Concerning CCA

In 2001, the Consumer Product Safety Commission (CPSC) petitioned the US Environmental Protection Agency (EPA) to ban the use of CCA wood in playground equipment. Makers of CCA wood agreed to put an end to the sale of CCA wood for most consumer products by December 2003. CCA wood is no longer being produced for residential settings, including decks and play sets. CCA laws and regulations vary between states.

Although its use has been phased out in the US since 2003, structures built with CCA wood can continue to cause environmental and health problems due to **toxic chemicals seeping into surrounding areas**.

Call your state environmental health agency to see what laws govern the sealing or removal of existing CCA - treated wood structures.

“The most common form of CCA exposure for children is skin contact... Chromium and arsenic seep out of the wood and can stick to children’s clothing and hands.”



CCA Health Concerns

Children can be exposed to CCA treated wooden outdoor equipment—like public and backyard **play sets, railings, decks, and picnic tables**. The most common cause of CCA exposure for children is **skin contact**, but inhalation and ingestion can also be hazardous. Chromium and arsenic seep out of the wood and can stick to children’s clothing and hands. Because children frequently put their hands in their mouths they can accidentally swallow CCA.

Short and long term health effects after CCA exposure may include:

- ◆ **Chromium:** skin irritation and ulcers; irritation of mucous membranes; sensitive skin; lung irritation; lung cancer
- ◆ **Copper:** common cold symptoms, including congestion and fever; lung damage; liver damage and cancer
- ◆ **Arsenic:** eyes and skin irritation, rashes, and lesions; darkening of skin; breakdown of the peripheral nervous system; liver damage; abnormal heart function; hearing loss; suppressed immune system.

What Parents & Schools Can Do

Check if the wood has been treated with CCA:

- ◆ A greenish tint indicates that it should be tested for CCA
- ◆ Order a test kit from the Environmental Working Group (See Resources). The test kit will determine how much CCA is in the wood.
- ◆ If you know the wood contains CCA, take this guide to the school’s principal or the playground administrator.
- ◆ Ask that the CCA treated wood be sealed or removed.

If you are not satisfied with the actions taken you can contact your local state environmental or health agency.

If your neighborhood or child’s school is planning a playground renovation project, here are some alternatives to CCA-Treated Wood:

- ◆ **Plastic & Rubber Lumber:** Non-hazardous, often made from recycled materials, low maintenance, non-toxic
- ◆ **Composite Lumber:** Made from plastic and wood, high resistance, low maintenance, made from recycled materials
- ◆ **Rot-Resistant Wood:** Cedar, redwood, cypress, mahogany, and ironwoods are naturally resistant to decay and insects; very durable. Look for Forest Stewardship Council (FSC)-certified wood.
- ◆ **Arsenic-free wood:** Alkaline copper quaternary (ACQ), borates, copper azole, cyproconazole, propiconazole

Lead in Playground Equipment Paint & Surrounding Soil

Lead is a blue-gray metal found naturally in our environment. Exposure is mainly through lead-based paints, contaminated soil, dust and drinking water (lead pipes, soldered pipes). Although **deteriorating paint in homes/schools is the leading cause of lead poisoning in children**, playgrounds may add to the risk. Because of weathering and time, old lead paint on playground equipment can deteriorate into chips and dust that contain lead.

Federal Laws Concerning Lead Paints

In 1978, the Consumer Product Safety Commission (CPSC) **banned the sale of lead paint** for consumer use. In 1992, Congress enacted the *Residential Lead-Based Paint Hazard Reduction Act* that defined lead paint as 0.5% lead by weight. This lead level in paint may still be a hazard if breathed in or swallowed. However, paint containing lead is still available for commercial and other uses and could have been applied on playground equipment. Some playground equipment may have been repainted a few times. Some older layers of paint may contain lead.

The bare soil surrounding the playground equipment may also be contaminated with lead from deteriorating lead-based paint from the equipment or from **unrelated sources such as nearby highway, steel structures, local sources of lead or previous industrial use of the property**. In 2008, EPA issued the **Lead Renovation Rule**. Contractors doing renovation projects that disturb lead-based paint in homes, child care facilities and schools built before 1978, have to be certified and follow specific work practices to prevent lead contamination. This rule is in full effect as of April 22, 2010.



“There is no safe level of lead exposure without adverse health effects.” - CDC

Health Concerns with Lead

Children are more at risk to the health effects of lead. Symptoms of lead poisoning in children can vary depending on the level of lead in a child’s blood and other factors such as nutrition. Ingestion of lead adds up in the body and many seemingly unrelated forms of lead exposure may add up to intensify the overall risk of lead poisoning. Common symptoms include behavioral problems, learning disabilities, hearing problems and growth retardation. The Center for Disease Control set the blood lead level of concern for children at 10 mg/dl, but also states that adverse health effects exist at all levels.



Effects of Lead Poisoning

“Get the Lead out!”

- **Screen your child for lead poisoning:** Blood tests measure how much lead is in your blood to estimate the amount of your most recent exposure.
- To reduce your child’s risk of lead exposure, **wash their hands and faces often** to remove dusts and soils. Regularly clean the house of dust and tracked-in soil (using soap and water is adequate).
- **Child-proof lead-based painted surfaces** like windows and window sills, doors and door frames, etc.

Ask school/playground officials to conduct indoor and outdoor **lead hazard assessments**. This includes a visual inspection of the playground equipment, paint testing/sampling, characterization of the hazard and development of control measures. **Deteriorating paint** that contains lead levels equal to or above 0.5% should be given priority when implementing lead hazard control measures. Officials and playground maintenance managers may want to consider long-term control measures for playground equipment coated with paint which contains lesser amounts of lead (between 0.06% and 0.5%). **Bare soil** surrounding play equipment should also be tested to see if lead contamination has accumulated there.



Artificial Turf Toxins

Artificial or synthetic turf is currently used in many day care, school and public playing fields. Newer fields were developed to simulate natural grass by using infill material to make the fields softer. Infill material is made from recycled ground-up tires, called **crumb rubber**. Up to **40,000** tires may be used to make a field so a **wide variety of toxins can be found on each field**. Crumb rubber can contain carcinogens, toxic metals like lead, zinc, arsenic, cadmium, and chromium, and chemicals that have damaging effects on the lungs, kidneys, reproductive organs, and liver, such as acetone and polycyclic aromatic hydrocarbons (PAH). Possible routes of exposure for these chemicals are inhalation, ingestion, or through the skin. Kids may eat the crumb rubber. They can also breathe in the dust and vapors from the turf.



Health Advisory/Laws Concerning Lead in Artificial Turf

In June 2008, the federal Centers for Disease Control issued a national Health Advisory to lead dust exposure caused by the weathering of nylon turf. As of July 2010, California reached a settlement that requires two of the nation's largest makers and installers of artificial turf to eliminate nearly all lead (must be less than 50 parts per million) from their products.

In June 2010, NYC Mayor Bloomberg signed a bill that requires parks and health departments to work together to ensure a thorough review of materials going into future playing fields. It also establishes an advisory committee, which will review the type of material proposed for any playing field and make suggestions for alternate materials.

“Further studies will be conducted to determine how much of a public health hazard exposure to synthetic turf chemicals pose.”

Health Concerns with Artificial Turf Toxins

Health Concern	Current Findings
Heat Stress*	Surface temperatures on crumb rubber can rise to almost double the air temperature. For example, a Penn State University study recorded air temperatures of 79°, 78° and 85°; corresponding surface temperatures of the turf were 120°, 130° and 146°. This can cause discomfort, dehydration, and heat stress. Turf chemicals can also outgas at a much faster rate when they are heated.
Injury	Overall, studies have found no consistent differences in injury rates between natural and crumb-rubber infilled synthetic turf.
Infection	Users of nylon turf may be more exposed to certain infections, including Methicillin-resistant Staphylococcus aureus (MRSA). Skin scrapes or turf burns received while playing on turf could be responsible for transferring infections to individuals.
Chemical Exposure	Further studies are being conducted to determine how much of a public health hazard exposure to synthetic turf chemicals pose. Please see resources section for more information and the latest updates.



Tips for Safer Use of Artificial Turf Fields

- Do not use turf fields on extremely hot days. Watering the turf may very briefly reduce surface temperatures.
- Skin cuts and abrasions from turf fields are susceptible to infection. Be sure to clean, monitor and bandage any "turf burns".
- Remove all pellets from shoes and clothes before leaving the turf fields.
- At home, shake out your children's equipment, clothes, shoes and socks in the garage or over the garbage.
- Have your child shower and wash thoroughly after playing on the field.

Maintenance of Synthetic Turf Fields:

The maintenance of synthetic turf will vary depending on the field's use and design. It typically requires replacing infill materials, repairing seams and removing weeds and moss and/or the application of disinfectants. Special equipment is required for these activities.

Playground Threats

Carcinogens in Play Sand: Crystalline Silica & Tremolite Asbestos

The sand used in children's playground sand boxes may not be natural beach or river sand. Many times play sand is made of crushed rock or **crystalline silica**. The silica is made from quartz stone and is a known carcinogen.

Tremolite, a form of asbestos, another recognized carcinogen, can also be found in some brands of play sand. Dust from play sand can contain these hazardous substances, and weathering and repeated use will lead to further separation of the fibers, producing more asbestos dust.

Relevant Laws & Regulations

California's Proposition 65 requires the labeling of carcinogens in products for sale in that state. Play sand sold there containing crystalline silica have warning labels stating that it is known to cause "cancer, birth defects and reproductive harm." The Occupational Safety and Health Administration (OSHA) is conducting a program for employers and employees on the hazards of crystalline silica and ways to reduce exposure to



the dust. Twenty years ago, the Health Research Group (the health and safety research division of the consumer advocacy group, Public Citizen) raised an alarm about sand safety after a geologist found play sand contained traces of tremolite asbestos. The Consumer Product Safety Commission (CPSC) has no standards or labeling requirements regarding the source or content of sand.

"The Consumer Product Safety Commission has no standards or labeling requirements regarding the source or content of play sand."

Health Concerns with Play Sand Carcinogens

The risk of crystalline silica and asbestos exposure is greatest to workers who handle the material everyday—far more intense and prolonged than the exposure of a child in the sandbox. But, children breathe proportionately more air than adults, and they play close to the ground, where airborne particles swirl about.

Inhaling crystalline silica can cause the lung disease **silicosis**, which inflames the

lungs and prevents the sufferer from getting enough oxygen. More advanced lung and heart disease may result.

Malignant **mesothelioma**—a lung cancer caused almost exclusively by asbestos—is extremely sensitive to limited exposure. Even very small doses of asbestos exposure can increase the risk for four to six decades.



A standard warning label found on a bag of children's play sand

Promoting Safe Play in Sandboxes

When shopping for play sand, look for river or beach sand, usually found at landscape and gardening stores. There is a company called Safe Sand (www.safesand.com) that sells sand without tremolite and crystalline silica. In the very least, avoid very fine sand that gives off easily ingested dust.

Here are some tips for safe play in sandboxes:

- When not in use, sandboxes should be kept covered to prevent animals from using it.
- Repair or replace cracked covers to keep animals and moisture out. Sand should be kept dry to keep bacteria and mold from breeding.

- Because sandboxes may attract animals, infections are possible, especially from E. coli bacteria; keep cuts and scrapes well bandaged.
- Sand should be periodically replaced—every year or two—to ensure that it is clean.
- Occasionally sift the sand and get rid of clumped sand or pea gravel that can injure a child. Wash sandbox toys frequently.



Keep sandboxes covered when not in use



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For More Information

Chromated Copper Arsenate (CCA) Resources:

- Consumer Product Safety Commission CCA Fact Sheet - www.cpsc.gov/phth/ccafact.html
- Environment Working Group - All Hands on Deck: Arsenic Treated Lumber Safety (www.ewg.org/node/8288) Arsenic test kits can be ordered from Amazon.com (\$15-\$20)
- Ban CCA - The comprehensive online reference for consumers and end users of CCA Pressure Treated Wood: Health Hazards (www.bancca.org/Health_Hazards/CCA_Health_Hazards2.htm)

Resources on Lead Paint & Playground Equipment:

- Consumer Product Safety Commission Q & A's: Lead Paint on Public Playground Equipment: www.cpsc.gov/cpsc/pub/pubs/lead/6007.html
- National Lead Information Center Hotline 1-800-424-LEAD
- Environmental Protection Agency (EPA)
 - *EPA recognized Lead Paint Test Kits- (www.epa.gov/lead/pubs/testkit.htm)
 - *EPA Lead Renovation Rule - (www.epa.gov/lead/pubs/renovation.htm)

Resources about Artificial Turfs:

- Official CDC Advisory - Potential exposure to lead in Artificial Turf: Public Health Issues, Actions, and Recommendations (<http://www2a.cdc.gov/HAN/ArchiveSys/ViewMsgV.asp?AlertNum=00275>)
- Environment and Human Health, Inc. - A report on the health effects of Artificial Turf: Exposures to Ground Up Rubber Tires—Athletic Fields, Playgrounds, Garden Mulch (www.ehhi.org/turf/index.shtml)
- New York State Department of Health Fact Sheet: Crumb-Rubber Infilled Synthetic Turf Athletic Fields - (www.health.state.ny.us/environmental/outdoors/synthetic_turf/crumb-rubber_infilled/docs/fact_sheet.pdf)
- Rochesterians Against the Misuse of Pesticides (RAMP)- summary of screening chemical analyses of some infill products (www.albany.edu/ihe/SyntheticTurfChemicals.htm)
- Artificial Turf Makers Agree to Reduce Lead Content - California settlement aims to reduce children's lead exposure in schools, playgrounds, day care (www.consumeraffairs.com/news04/2010/07/ca_turf.html)

Resources for safe play sand:

- EPA's asbestos info line: 202-554-1404 - Test your local playground's sand for asbestos
- National Resource Center for Health and Safety in Child Care (NRC) - National Health & Safety Performance Standards for Sandboxes/Sand Play Areas: www.socalrubbermulch.com/pdf/PlaygroundSand.pdf
- To purchase safe sand and learn more about health effects of crystalline silica: www.safesand.com/information.htm

General Resources:



To learn more about risks to child health and safety, the **Healthy Schools Network** provides other guides, reports, resources, and links to partner groups on the state and national levels (www.HealthySchools.org) Sign up to download guides and reports; subscribe to our online Newsletter (*NewsSlice*)

Consumer Product Safety Commission (CPSC) is an independent U.S. government agency created through the 1972 Consumer Product Safety Act to protect against "unreasonable risks of injuries associated with consumer products" (www.cpsc.gov)
Toll-free Consumer Hotline: 800-638-2772 (TTY 301-595-7054)

For a list of citations and other research articles about each of these topics, please visit the Healthy Schools Network Clearinghouse (www.healthyschools.org/clearinghouse.html)