



ARTIFICIAL TURF AND CHILDREN'S HEALTH

Written Testimony to the Environment Committee re Proposed Bill No. 924

Submitted by

The Center for Excellence in Children's Environmental Health

at the Mount Sinai School of Medicine

March 2, 2009

Philip Landrigan, MD, MSc, FAAP

Joel Forman, MD, MPH, FAAP

Maida Galvez, MD, MPH, FAAP

Damiris Perez, MPA

Protecting Children Against Environmental Threats to Health

Over the past five years, several hundred artificial turf fields have been installed on the East Coast. Cities, towns and school districts installed these fields to improve the quality of playing fields and accommodate sports programs. The newest generation of these fields have been constructed of a material termed “crumb rubber”, which is made from ground up car and truck tires.

The Clinical Center of Excellence in Children’s Environmental Health at Mount Sinai School of Medicine has received numerous phone calls from concerned parents and physicians regarding the wide scale use of artificial turf fields on school grounds and in parks properties. This has prompted the Center to undertake a detailed assessment of the risks and benefits of artificial fields. The findings we present today are the result of this evaluation.

Our first finding, perhaps the most important, was that decisions to install synthetic turf fields were for the most part made without due diligence - without any analysis of potential negative consequences of turf fields. A number of these very expensive fields were installed with little or no consideration of possible negative effects. Now, we are suddenly, and belatedly, beginning to realize that synthetic turf fields may, in fact, be associated with health problems in children. The most important of these hazards that we identified through our study are:

1. Extreme heat. On hot summer days, temperatures of over 130 degrees Fahrenheit have been recorded a few feet above the surface of synthetic turf fields – precisely at the altitude where children play. Vigorous play in these conditions conveys a very real risk of heat stress or heat stroke.

2. MRSA skin infections. Outbreaks of skin infections caused by methicillin-resistant *Staphylococcus aureus* (MRSA) have been documented in children who play on synthetic turf fields (reported in the *New England Journal of Medicine*, February 2005).

3. Inhalation and ingestion of toxic and carcinogenic chemicals. The major chemical components of crumb rubber are styrene and butadiene, the principal ingredients of the synthetic rubber used for tires in the United States. Styrene is neurotoxic. Butadiene is a proven human carcinogen. It has been shown to cause leukemia and lymphoma. The crumb rubber pellets that go into synthetic turf fields also contain lead, cadmium and other metals. Some of these metals are included in tires during manufacture, and others picked up by tires as they roll down the nation’s streets and highways. There is a potential for all of these toxins to be inhaled, absorbed through the skin and even swallowed by children who play on synthetic turf fields.

Lead was recently found in synthetic turf fields in New Jersey at levels so high that several fields were closed by the state Health Department. This is extremely alarming since lead is a highly toxic chemical and brain injury is the most serious consequence of pediatric lead poisoning. Young children are especially vulnerable to lead because their brains are rapidly growing and developing, and because their normal hand-to-mouth behavior increases the risk that they will take lead into their bodies from the environment. Even low-dose exposure to lead can possibly cause loss of IQ, shortening of attention span and disruption of behavior as well as increased risk of dyslexia and school failure.

4. Transportation home of crumb rubber pellets. Crumb rubber pellets do not remain on the artificial turf fields. These pellets are picked on children’s shoes, clothing and skin. They are then tracked into children’s homes and cars, and they are carried into the places where children live, play, eat and sleep. Thus exposure can continue for many hours beyond the time that a child spends in play on the synthetic turf field.

5. Escape of chemical hazards from fields to the environment. A number of the toxic and chemical components of the crumb rubber that is installed in synthetic fields are soluble in water. When rain and snow fall on synthetic fields, these materials can leach from the fields to contaminate ground water and soil.

6. Disposal. A further unresolved issue is what to do with the toxic components of synthetic turf fields 10 or 20 years from now when the fields reach the end of their usable life-span and need to be dismantled. Will the crumb rubber need to be dealt with as hazardous waste, since it contains toxins and carcinogens? Will it need to be placed in a hazardous waste landfill? What will disposal cost? Who will pay? None of those questions have been properly considered.

The potential long-term consequences of exposures to synthetic turf fields have not been carefully assessed by independent third parties before synthetic turf fields were installed. Citizens and school boards should question the wisdom of installing synthetic turf until a credible independent study has been conducted and published.

For these reasons, we recommend that Hartford, Connecticut carefully weigh the risks and benefits of artificial turf prior to wide scale implementation. We must protect, increase and upgrade the limited number of natural grass fields currently available to our children. This is critical for the health of Hartford, Connecticut children and ultimately good for the environment as well.

Thank you for the opportunity to submit testimony at this important hearing. We would be more than happy to answer any questions that you might have.

Children's Environmental Health Center • info@cehcenter.org • (212) 824-7125

What to Know About Turf Fields

Which turf fields are of concern?

Not all turf fields are constructed the same way. Second generation turf fields are layered synthetic surfaces. Of concern are the “infilled” fields, which consist of blades of plastic green grass infilled with a mixture of crumb rubber pellets and sand or just crumb rubber.

What is infill crumb rubber?

Infill crumb rubber consists of tiny black pellets or granules, approximately 1 mm in diameter. The granules are often made from recycled tires and are spread two to three inches thick over the field surface. Note that each company has its own installation method and source for crumb rubber, so there will be variation from field to field. The rubber may be ethylene propylene diene monomer rubber (EPDM), Block copolymers based on styrene and butadiene (TPE-S) or styrene butadiene rubber (SBR).

What are the main prove concerns?

Proven hazards to children’s health are two: (1) Heat and (2) “turf burns” or abrasions. Temperatures on these fields have been shown to get as high as 160° F. It is unsafe for children to be playing on surfaces when temperatures are this high. Athletes playing on turf fields have been shown to have more abrasions or “turf burns,” which in turn can harbor infection.

What chemicals can be released by the infill rubber?

Recycled tires are known to contain a mix of chemicals, some of which are cancer-causing, others that are known to cause birth defects These chemicals include rubber chemicals, polycyclic aromatic hydrocarbons (PAHs) and heavy metals - lead and cadmium, What is not yet known is the extent to which these chemicals may get in to the bodies of children playing on turf fields, their associated health risks, or the extent to which they may leach from the fields into the surrounding environment, soil and groundwater.

How can people be exposed to these chemicals?

The main routes of exposure are through inhalation and ingestion. Athletes are expected to have the greatest exposure level due to high ventilation rates associated with exercise and the possibility of inhaling dust particles kicked up by their play. People on the sidelines will have lower exposures, however young children should be monitored to prevent ingestion of the rubber pellets. It is also possible for the pellets to be tracked off the fields and into homes and washer and dryers.

Tips for safer use of turf fields:

- Do not use the turf fields on extremely hot days.
- Be sure to clean and monitor any “turf burns” obtained while playing.
- Attempt to remove all pellets from shoes and clothes prior to leaving the fields.
- At home, shake out your children’s equipment and clothes in the garage or over the garbage.
- Have your child shower and wash thoroughly after playing on the field.