



Artificial Turf Fields: Not So Green and Not So Safe (Part 1)



Dr. Kate Thomsen and Silky

Artificial turf fields are springing up everywhere – high schools, universities, parks... Synthetic turf has become a way to increase access to fitness opportunities for students, athletes, and the public. Compared to natural grass turf fields, it has been touted as being safer, less costly and more environmentally friendly. Fewer injuries are expected with its even surface and there are no pesticides, herbicides, mowing or watering costs. Some components of the field are made of recycled materials. The synthetic turf industry and its marketing arms have made these fields look like the answer to every athlete, parent, school board and environmentalist's prayer. However, the real safety of these fields is beginning to come into question.

First generation fields (e.g., AstroTurf), developed in the 1960s, were more carpet-like with "grass" that was made of nylon fibers. As these fields have been exposed to heat and UV light over the years, the nylon fibers have broken down to a fine dust that contains lead at unacceptable levels. Many of them are being carted away as toxic waste now (including the ones at TCNJ) and replaced with second generation fields.

Second generation fields were developed in the mid 1990s. They have a bottom layer drainage system designed to move water quickly off the surface. The "grass" is backed with rubber for shock absorbance and the grass fibers are made of polyethylene. There is an "infill" strewn over the grass at a level of about 2-3 inches in height which increases shock absorption, holds the turf down, and keeps the blades of grass erect. This infill is typically crumb

rubber. This is recycled car and truck tires ground into 3 mm sized pellets (vastly increasing the surface area of exposure to these recycled tires).

This crumb rubber infill has not been sufficiently studied and, to our shame, our children are the experimental guinea pigs. Recycled automobile and truck tires contain chemicals of potential concern to human health due to the rubber (both natural and synthetic styrene-butadiene rubber), their manufacture, and what gets bound to them from road use. These chemicals are classified as: Polycyclic Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs), and Semi Volatile Organic Compounds (SVOCs). These chemicals are both airborne and in particulate form (2.5 – 10 microns in size) from crumb rubber dust. Each of these categories contains known irritants, carcinogens, and hazardous chemicals. Certain metals have also been found in crumb rubber (barium, chromium, copper, iron, lead, manganese and zinc). Phthalates, alkyl phenols and benzene have also been identified. Research studies have shown that these chemicals can be released from crumb rubber but the studies are inconsistent in their methodologies and so conclusions cannot yet be drawn about real human exposure risks. Review papers consistently identify gaps in our knowledge and the need for more study. Potential for exposure to these chemicals would occur through inhalation, by inadvertent ingestion, and through skin absorption. Crumbs and dust from these fields can coat the skin of the athletes and be brought home on their clothes and shoes.

Issues of toxicity are perplexing because 1) people equate harm with acute, usually occupational exposures, not small doses over time; 2) people assume the government has only allowed safe products to be on the market. However, in the US, a chemical is considered safe until usage or research has shown that it is harmful. This is how we

get Love Canal, Camp Lejeune, carcinogens in plastic baby bottles and other travesties. 3) Testing for toxicity is done for individual chemicals and cannot take into account the synergistic effects of mixtures of potentially toxic chemicals. 4) Toxicological assessments are mathematical guessing. Every authoritative report on the safety of these artificial turf fields that I have read has stated that there are substantial data gaps in our knowledge regarding its impact on human health, particularly of exposure in real use conditions. In my community, rainwater "filtered" through polyethylene fibers and crumb rubber will be returning to the groundwater and entering our wells. Since most artificial turf fields are installed in communities supplied with treated city water, I have thus far found no information regarding the impact of artificial turf fields on well water and the distance such an "unknown" exposure source needs to be from adjacent wells.

There is growing concern and increasing scrutiny of these fields and decision making bodies have both approved and denied their use across the country. You may hear that the Consumer Protection Safety Commission has deemed these fields safe – however, they were only evaluating the safety of the newer polyethylene fibers with regard to lead exposure. They did not report on the safety or toxicity of crumb rubber.

In toxicology, there is a saying, "It's the dose that makes the poison." We know that water, in large enough quantities, is toxic. We also know that minute amounts of synthetic chemicals can cause adverse health effects over time. Since WWII, 75 – 80,000 new chemicals have been released into the . Less than 50% of these have been tested for potential toxicity in humans. The CDC's Fourth National Report on Human Exposure to Environmental Chemicals tested for 212 chemicals. They found ALL to be in blood and urine of most Americans. These chemicals included flame retardants, Tef-

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WOMEN'S HEALTH AND WELLNESS

Pennington, NJ

Poisoning Ourselves ?

- * The incidence of childhood leukemia has risen 62% from 1973 - 1999
- * The incidence of childhood brain cancer has increased 40% from 1973 - 1994
- * The prevalence of Autism and autistic spectrum disorders has increased from 4-5 per 10,000 children to 1 in 150 children since the early 1980s
- * Childhood asthma has doubled from 1982 - 1993
- * The rate of preterm birth has increased 23% from the mid 1980s to 2002
- * Infertility affects 5-10% of all couples
- * Birth defects are seen in 3-5% of all babies
- * Sperm counts have decreased at a rate of 1% yearly from 1934 - 1996

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lon, bisphenol A, gasoline additives and mercury – all probable health hazards. At the same time that these new-to-nature molecules have become ubiquitous in our environment over 2 generations, we have witnessed the skyrocketing of chronic disease – especially in children in industrialized countries (see side bar).

My father worked in a chemical factory in Fords NJ. Many days he came home in his work suit reeking of synthetic chemicals. We had a special covered barrel in the basement where he had to put these clothes to contain the smell. But obviously we were all exposed – in small doses over a long period of time. My father died of kidney cancer. The kidney, like the liver, plays a major role in attempting to rid the body of toxins. My mother had colon cancer, I had invasive breast cancer and my brother had a malignant brain tumor. Just sayin'.

Yes, my father should have showered and changed at the factory – but this was the 1950s and 1960s. We didn't know then about long term exposures to minute amounts of

chemicals. Just like we didn't know that the first generation artificial turf fields would disintegrate into a lead containing dust. Shame on us for accepting the risks to our children and communities without adequate information and study. At this point, we don't even know what we don't know about the second generation fields made with recycled car and truck tire crumbs. We do know that every batch of crumb rubber differs in composition from other batches and a "test of a sample product" is meaningless. The good news is – there are both natural grass and artificial turf alternatives to the current second generation artificial turf fields and we need to advocate for them. Until we do, shame on us. I'll discuss the safer alternatives in the next article.

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