

## Turf Fields: Playing with Kids' Health

By Tom Sciacca and Guive Mirfendereski

Thu May 14, 2009, 08:44 AM EDT

SUDBURY - You're a little dumber than you ought to be. Me, too.

Why? Because we all have lead in our bodies.

Lead is an incredibly pervasive and widespread poison, and there is no known safe level. A few years ago it was even more ubiquitous when it was used as a gasoline additive, paint component and pesticide.

According to estimates made by Dr. Philip Landrigan, a leading expert at Mt. Sinai Medical Center, we all lost an average of five IQ points if we grew up in postwar America before lead was removed from gasoline. That's a huge number. And because IQ follows a normal distribution curve, if you look at the very bright cohort above 130 or the challenged cohort below 70, they are decreased and increased by about 50 percent, respectively. This is such a huge effect it could well account for any loss of American competitiveness in the last 50 years. And the rise in special education needs. Or, if you are on the bright side of the curve, it could account for your failure to win that Nobel prize.

This is not a possible, or a future, or a potential effect. It is measurable right here and now. And the effects are permanent. Once poisoned, always dumber. No wonder the federal regulators make such a big deal of it.

And there is lead in most artificial turf athletic fields. It's been confirmed by private citizens and The Boston Globe in Sudbury and Wayland, along with a number of other towns.

Turf field lead is found unpredictably mostly in the colored plastic strands used to simulate grass, but also sometimes in the ground-up used tires that constitute the real playing surface. It is difficult to predict where it will pop up because **the supposed field "manufacturers" are actually only marketers**; the actual manufacture of the various components of these products is subcontracted out to firms all over the world. Every part of a field in one town may have been manufactured by different firms than the parts of the field in the next town. **The ground-up tire "crumbs" are even more unpredictable, because they come out of the waste stream. Every tire model has a different composition, and tires also pick up additional contaminants from rolling down the road. So the tire composition of every turf field is unique.**

High levels of lead were initially discovered by chance in two older "Astroturf" fields in New Jersey, where they had quietly poisoned players and downstream wetlands for decades. Astroturf is an older technology consisting basically of a plastic carpet laid on concrete. The marketers of the newer generation of "infill" artificial turf immediately claimed there was no problem with their product. Testing all over the country proved otherwise. Lead may be catastrophically toxic, but it is also a very useful industrial tool for brightening and fixing colors in plastic. Many of the suppliers to the turf marketers apparently thought so, anyway, as the **metal was found unpredictably in different colors on different fields. In at least one case, in Concord, it is the green strands covering most of the field that are contaminated.**

Once it was proven there was in fact lead in the newer fields, the marketers switched strategies from complete denial to a claim there was too little to matter and/or it can't be absorbed by people using the fields. They cited measurements of the concentrations in many fields as being below "safe" levels. But **no researcher has ever established a safe level for lead.** In fact, the lower the levels, the larger the proportional effect seems to be. So half the lead will drop your IQ by

somewhat more than half as much. And researchers in New York proved the lead in turf fields can in fact be absorbed into the body through the digestive tract. **So as players tromp and grind the plastic strands into dust, they kick it up, breathe it in, swallow it in their saliva, absorb it into their bloodstream, and get dumber. Forever.**

What should parents do? First, **they should demand thorough testing of all parts of any fields their kids play on to identify those sections with lead.** In most cases only limited areas will be involved. But parents should **demand that whatever contaminated areas are identified be replaced. Do not be mollified by claims the levels are "safe." Any "safe" levels were established as a compromise between the level of poisonous effects and the cost of removal** from, for example, large tracts of soil, and **even those compromised standards are being ratcheted down almost continuously. Even the smallest amounts will harm your child's health, permanently. Demand it be eliminated!**

In the near future, the sports industry may well come to sanction the use of alternatives to the plastic carpet, as yarn made from fibers made from plants like hemp and jute and sugar cane may create a natural playing surface. Such non-plastic options may largely eliminate the lead problem.

The Burning Issue

Turf field marketers a few years ago talked about these fields getting "a little hotter than grass fields in July and August."

"A little hotter"? How about over 160 degrees? In New England!

Or over 140 degrees? In April! In New England!

Again, the initial move of the marketers was to deny it happened at all. When that became obviously silly, the next step was to minimize the problem. Now, they are resorting to "it's a problem, but nobody actually gets hurt by it."

One strategy to minimize the problem was asserting the common misconception that the fields get no hotter than other, already familiar dark outdoor surfaces like asphalt. But measurements showed otherwise, and in a paper I published in January of 2008, I explained why. The black tire crumb not only absorbs solar energy like any other black surface, but also acts as an insulator that prevents that energy from soaking into the ground. As a result, all the energy is concentrated on the surface and temperatures rise much higher than any other outdoor surface. Further measurements taken in 2008 confirmed that mechanism, and confirmed that injurious temperatures are reached even in April.

A second strategy used by the marketers to minimize the problem is to point out that air temperatures over the fields are only mildly elevated, and claiming the players are not really exposed to the heat under their feet. **But that ignores the transfer of heat to the players' bodies by radiation** – the same mechanism that allows an infrared heater to heat a room's occupants in the winter without heating the air between them. Since most people who walk out on a turf field in midday can feel the extreme heat blasting up at them, that proved a weak defense as well.

So the marketers are left with claiming the issue is one of mere inconvenience, and players just need to suck it up when it's hot out. Unfortunately, that can be a deadly mistake.

**According to a researcher at the University of North Carolina at Chapel Hill, 25 high school football players died as a result of heat related injuries between 1995 and 2005.** Heat injuries are hardly mere inconvenience.

The very first of the new generation of turf fields were only installed in 1999, and most of the

fields currently in place were installed after the decade used in the above statistic. But since the grass fields where most of these deaths occurred do not get significantly hotter than air temperature, and in fact can remain somewhat cooler than that, it should be obvious that the furnace-like conditions created by turf fields can only increase the danger.

**The magic of the free market is already addressing the problem, with a number of alternatives to ground-up tires for infill now coming available, many claiming to heat up less. These will in general be more expensive than the current waste tire alternative, and need to be carefully evaluated by potential buyers.**

What should parents do? First, recognize the seriousness of the problem. Don't let the macho culture of sports get in the way of protecting your child's health.

Second, insist that all coaches are trained and equipped to deal with heat issues. They should be trained to recognize the signs of heat stress and act immediately. They can send the child to rest in the shade, make them drink more water, spray them with a hose ... or call off the event entirely if conditions are too extreme. They should be equipped with infrared thermometers to measure field temperatures and guidelines defining maximum acceptable temperatures above which precautions must be taken.

**Third, think twice about proposals to build or replace a tire-based turf field. Natural grass fields built with the same kind of foundation and drainage as turf fields can handle much more stress than traditional grass fields. And the new alternatives to old tires are being accepted in Europe, which has been leading the U.S. in recognition of the health and environmental issues with turf fields. As this is written it is too early to say if they will take hold in the U.S. market.**

And fourth, just say no. If it's a hot sunny day between about 11 a.m. and 4 p.m., when conditions are most extreme, just don't let your child play on a turf field. Remember, about two kids a year die playing high school football from heat, even on grass fields. Is being on the team worth his life?