



MONTGOMERY COUNTY COUNCIL ROCKVILLE, MARYLAND

Comment on “Collections Related to Synthetic Turf Fields with Crumb Rubber Infill”

From: Montgomery County, Maryland Councilmember Marc Elrich (At-large)

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As an elected official, I have been confronted with the issue of whether artificial turf playing fields are safe and whether public funds should be used to construct and maintain these fields. I represent the almost one million residents of Montgomery County, Maryland; our county is one of the wealthiest and best-educated counties in the country. My staff and I have grappled with questions surrounding artificial turf for years, and the more we have examined the issue, the more we realize how little is known and how few questions can be adequately answered.

I appreciate the attempt by the federal agencies to tackle this issue, and on behalf of many of my constituents and based on years of reviewing research and conversations with scientists, parks managers, school administrators, elected officials, residents and other concerned individuals, I make the following comments, observations and requests. I have five major points and then follow them with additional information to support those points.

1. Clarify that the questions and goals outlined in this study will not answer the question of the true safety/toxicity of AT with tire crumb infill. Characterizing chemical composition and “exposure potential” are insufficient tools. This study will not satisfactorily answer the question: are artificial turf fields safe for children to use over the long-term? An epidemiological study is necessary. Only a long-term controlled epidemiological study could provide meaningful answers about human safety. University of Washington soccer coach Amy Griffin continues to collect names of soccer players, other athletes and other frequent users of artificial turf fields (like marching band participants). This information raises serious concern, and the federal agencies need to consider how they can collect information that could analyze actual uses and outcomes.
2. Any and all toxicity studies must address and examine cumulative and combined effects of toxic chemicals. Artificial turf contains a variety of chemicals that interact with each other and in the body. Without studying their synergistic effects, the study will exclude some important considerations. (See below for scientific comment on this issue.)
3. All potential health impacts should be viewed specifically and separately for children. Studies should examine exposure for **children**. “Environmental exposure for children is quite different. They take in much more of everything than adults. Their brains and nervous systems are developing quite rapidly – referred to as **“unique windows of vulnerability.”** (Joel Forman, MD, Mt. Sinai Medical School, Program Director of the Pediatric Residency

Program, Children's Environmental Health Center) Towards that end, I urge you to consult extensively with Dr. Forman, Dr. Phillip Landrigan and other researchers associated with the Childrens Environmental Health Center at Mt. Sinai Medical School.

4. For a federal study to be useful to local jurisdictions and residents, it must acknowledge and address the myriad of issues and concerns that are inextricably intertwined. The chemical composition of crumb rubber infill is an important issue, but it is not the only issue. The blades, carpet, carpet backing and the color of the blades are all integral to any meaningful assessment. Other issues should be examined and acknowledged: the heat impact for the field users as well as serious environmental concerns, including the “heat island” effect and impacts on waterways, aquatic life and wildlife.
5. Every step of the way, the involved federal agencies must be mindful of their possible biases. I would refer you to the EPA website announcing this study: “Limited studies have not shown an elevated health risk from playing on fields with tire crumb, but the existing studies do not comprehensively evaluate the concerns about health risks from exposure to tire crumb.” (<https://www.epa.gov/chemical-research/federal-research-action-plan-recycled-tire-crumb-used-playing-fields>) Such a statement is misleading and should be deleted. Results from “limited studies” have been mixed. If “limited studies” refers to EPA’s prior studies, it should be noted that they were not simply limited but also quite possibly flawed, and therefore, not an appropriate basis for any general statements.
(<http://www.peer.org/news/news-releases/epa-retracts-synthetic-turf-safety-assurances.html>)

Additional information and commentary:

Regarding points 1 and 2 above:

How we think about levels of concern of chemicals is changing and evolving.

A recently published scientific paper, “What Can Epidemiological Studies Tell Us about the Impact of Chemical Mixtures on Human Health?” explains:

“Although there is growing concern that exposure to chemical mixtures during critical periods of human development could increase the risk of adverse health effects including allergic diseases, cancer, neurodevelopmental disorders, reproductive disorders, and respiratory diseases, researchers primarily study chemicals as if exposure occurs individually. This one-chemical-at-a-time approach has left us with insufficient knowledge about the human health effects of exposure to chemical mixtures.” [Emphasis added.] <http://ehp.niehs.nih.gov/15-10569/>

Another study from 2015 suggests that the combination of “safe” chemicals may increase cancer risk:

“Our analysis suggests that the cumulative effects of individual (non-carcinogenic) chemicals acting on different pathways, and a variety of related systems, organs, tissues and cells could plausibly conspire to produce carcinogenic synergies.” [Emphasis added.] http://carcin.oxfordjournals.org/content/36/Suppl_1/S254.full?sid=db47f5ec-47a2-4879-bf30-6da9c076003d#ref-8

In commenting on the above study, the director of the National Institute of Environmental Health Sciences, Linda Birnbaum (who was not involved in the study), said

“....We live in a chemical soup....Considering the safety of individual chemicals is a lot like looking at the trees, but missing the forest, Birnbaum said. When doing research to determine chemical safety, “we’ve got to start thinking more about what reality is,” she said. This could mean sweeping changes in rules about the levels of chemicals considered safe in drinking water, food, and air. I’d like to see regulators and policy makers start looking at the totality of the exposure instead of one chemical at a time,” she said. [Emphasis added.] (“Combinations of ‘safe’ chemicals may increase cancer risk, study suggests,” *Los Angeles Times*, by Sasha Harris-Lovett, 7/1/15 <http://www.latimes.com/science/sciencenow/la-sci-sn-chemical-combinations-safety-cancer-20150626-story.html>)

While the 2015 report is important and significant, this general idea and information is not new. As the President’s Cancer Panel pointed out in its 2008-2009 annual report, federal environmental laws not only leave many known carcinogens completely unregulated, they also “fail to address the potential hazards of being exposed to combinations of chemicals”. [Emphasis added] (Environmental Working Group, <http://www.ewg.org/research/rethinking-carcinogens/executive-summary>)

The true impact of chemical exposure could take decades to be measured.

A telling example is a study of 9,300 daughters born to mothers who had been exposed to the pesticide DDT, which was banned in 1972 because of its effects on the environment, especially the eggs of the bald eagle. EPA labeled DDT as a probable carcinogen, and multiple studies linked DDT exposure to breast cancer, but then a 2014 meta-analysis found no significant association. But then this mother-daughter study showed that the prior studies were looking at the wrong generation – the daughters of women exposed to DDT - were associated with almost a fourfold increase in breast cancer, independent of the mother’s history of breast cancer. The study, which covered a span of 54 years, also determined that those with higher levels of exposure were diagnosed with more advanced breast cancer. The study results are dramatic, but they took 54 years. (“Startling link between pregnant mother’s exposure to DDT and daughter’s risk of breast cancer,” by Ariana Eunjung Cha, *The Washington Post*, 6/17/15 <https://www.washingtonpost.com/news/to-your-health/wp/2015/06/16/ddts-breast-cancer-legacy-pregnant-mothers-exposure-linked-to-four-fold-increase-in-daughters-risk/> and <http://press.endocrine.org/doi/10.1210/jc.2015-1841>)

You will not have “safety” answers in 2016 or one or two years later. Please acknowledge this fact and address epidemiological questions.

Further points to consider:

Federal agencies should not reference “prior studies” without including and acknowledging the following studies, which raise serious concern about artificial turf. One study raises the possibility of inhalable lead.

The study states “...if the lead is present to any appreciable extent in the wipes it will likely be present in the breathing zone of players who are active on these fields, and that furthermore, these levels potentially exceed ambient EPA standards. (“An Evaluation of

Potential Exposures to Lead and Other Metals as the Result of Aerosolized Particulate Matter from Artificial Turf Playing Fields Submitted to: Alan Stern, Dr.P.H. New Jersey Department of Environmental ProtectionSubmitted by: Stuart L. Shalat, Sc.D. (July 14, 2011) <http://www.nj.gov/dep/dsr/publications/artificial-turf-report.pdf>) Note that many facilities would not allow testing.

Other studies have raised serious concerns about tire crumb and lead exposure.
A 2014 study found lead and other toxins in the both the plastic rug and tire crumb infill. Lead was also was found in simulated body fluids meaning there is little or no protection of any kind against the lead getting out of the material into the body. "Since it is possible that children may be exposed to potentially high concentrations of lead while using artificial turf fields we recommend, at a minimum, all infill and fibers should be certified for low or no lead content prior to purchase and installation."

("Bio-accessibility and Risk of Exposure to Metals and SVOCs in Artificial Turf Field Fill Materials and Fibers" Brian T. Pavlonis, Clifford P. Weisel, Brian Buckley, and Paul J. Lioy <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4038666/pdf/nihms565643.pdf> 2014)

No two fields are alike because each field contains 30,000 to 40,000 ground up tires, which come from a multitude of manufacturers.

"**Every turf field has to be analyzed in detail to be sure it doesn't have a problem,**" said Paul Lioy, a professor of environmental and occupational medicine at the Robert Wood Johnson Medical School in New Jersey." [Emphasis added.] ("Feds promote artificial turf as safe despite health concerns," by Thomas Frank *USA Today*, 3/16/2015 <http://www.usatoday.com/story/news/2015/03/15/artificial-turf-health-safety-studies/24727111/>)

"Not surprisingly, the shredded tires contain a veritable witch's brew of toxic substances," Gaboury Benoit, Ph.D., Yale Professor of Environmental Chemistry and Engineering. ("Study: Artificial turf contains carcinogens," by Tony Spinelli, 7/3/15 <http://www.theridgefieldpress.com/48210/study-artificial-turf-contains-carcinogens/#ixzz47WNF1FSf>)

Additionally, the information required from field managers around the country is time-intensive as outlined in the Federal Register, and the attempt to reach a maximum of 40 fields nationally is insufficient. So the time required from the individuals is large and the amount of information collected will not be much more than anecdotal.

The fields heat is a health hazard. It is hotter than asphalt and much hotter than grass.
At the Women's World Cup in Edmonton, Canada, in June 2015, the air temperature was 75 degrees, and "**the heat from the carpet approaching 120 degrees at kickoff...** Research, partly funded by the city of Las Vegas, found artificial turf above 122 degrees is considered unsafe for sustained athletic use and that, **depending on the air temperature, turf can get as hot as 180 degrees...** This was a temperature where if you put your hand down on it, you could only hold it for five seconds or so before it would burn," Dale Devitt, director of the Center for Urban Water Conservation at the University of Nevada Las Vegas told the Vegas Sun. [Emphasis added.]

(“The artificial turf at the Women’s World Cup was reportedly 120 degrees at kick off,” by Marissa Payne, *The Washington Post*, 6/6/2015

<http://www.washingtonpost.com/news/early-lead/wp/2015/06/06/the-artificial-turf-at-the-womens-world-cup-was-reportedly-120-degrees-at-kick-off/>)

Environmental impacts of artificial turf should also be noted.

Artificial turf fields create “heat islands” – an environmental hazard.

The extreme heat “is not only a hazard for users, but also can contribute to the ‘heat island effect,’ in which cities become hotter than surrounding areas because of heat absorbed by dark man-made surfaces such as roofs and asphalt.” (“Synthetic Turf: Health Debate Takes Root” by Luz Claudio, Environmental Health Perspectives 2008 March; 116(3): A116–A122. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2265067/>

“Columbia University climate researcher Stuart Gaffin analyzed thermal images generated from NASA satellite maps of New York City. He wanted to figure out how urban trees may help cool down neighborhoods. When **Gaffin noticed a bunch of hot spots on the maps, he assumed they were rooftops...**two turned out to be turf fields” says Gaffin. In retrospect, he says he should have realized that, because they’re a perfect sunlight-absorbing system.” (“High Temps On Turf Fields Spark Safety Concerns,” by Allison Aubrey, National Public Radio, 8/7/2008

<http://www.npr.org/templates/story/story.php?storyId=93364750>)

Artificial turf appears to contribute to elevated levels of zinc in the water.

“There is a potential risk to surface waters and aquatic organisms associated with whole effluent and zinc toxicity of stormwater runoff from AT fields.” (“Artificial Turf Study, Leachate and Stormwater Characteristics,” July 2010 Conn. Department of Environmental Protection

“Crumb rubber derived entirely from truck tires may have an impact on aquatic life due to the release of zinc. For the other three types of crumb rubber, aquatic toxicity was found to be unlikely.” Pg. 2

“Zinc concentrations are higher than the surface water standards.” Pg. 29

(“An Assessment of Chemical Leaching, Releases to Air and Temperature at Crumb-rubber Infilled Synthetic Turf Fields” May 2009 from staff at NY State Department of Environmental Conservation)

Plastic artificial turf blades will likely disintegrate and degrade with some ending up in bodies of water and in the food of wildlife either directly or via landfills; plastics of various sizes are already threatening aquatic life. The impacts of larger sized plastics is more widely known, but now more is being discovered about the serious effects of microplastics. (“Ingested microscopic plastic translocates to the circulatory system of the mussel, *Mytilus edulis* (L).” by Browne MA1, Dissanayake A, Galloway TS, Lowe DM, Thompson RC, *Environmental Science & Technology*, 7/1/2008 <http://www.ncbi.nlm.nih.gov/pubmed/18678044>) “As plastic breaks into smaller pieces, it is more likely to infiltrate food webs. In laboratory and field studies, fish, invertebrates and microorganisms ingest micrometer-sized particles...” (“Classify plastic waste

as hazardous,” by Chelsea M. Rochman, Mark Anthony Browne, Eunha Hoh, Hrissi K. Karapanagioti, Lorena M. Rios- Mendoza, Hideshige Takada, Swee Teh, Richard C. Thompson. *Nature*, 2/14/13.)

Confusion over focus of the undertaking:

While the official federal register announcement does not mention playgrounds, the EPA’s website explaining this study refers to “this coordinated Federal Research Action Plan on Recycled Tire Crumb Used on Playing Fields and Playgrounds...”

(<https://www.epa.gov/chemical-research/federal-research-recycled-tire-crumbs-used-playing-fields>) It would be better to include playgrounds, especially since children are particularly vulnerable to toxic chemicals, but at a minimum the information disseminated should be consistent between postings.

Conclusion:

As should be apparent from the above information and comments, my staff, constituents and I have spent numerous hours reviewing these issues. I am deeply concerned that the study as designed will offer the false hope of absolute answers. We may not know for many years the true and complete impacts of artificial turf fields. I have concluded that we should adhere to the precautionary principle and minimize use of artificial turf fields. Instead, we need to focus our research and energy on improving natural grass fields, which already can be designed to withstand heavy rains and avoid rain-outs. Increasing knowledge and experience is helping expand the usage of these fields. The public focus should be on the best practices that give the greatest use of natural grass fields with the least amount of fertilizers, pesticides and water.