Icahn School of Medicine at Mount Sinai
Children's Environmental Health Center

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Department of Environmental Medicine and Public Health
Icahn School of Medicine at Mount Sinai
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To Peg Arguimbau, Conservation Commission Chair:

We, the Children's Environmental Health Center of the Icahn School of Medicine at Mount Sinai, strongly discourage the installation of artificial turf in the town of Sharon due to uncertainties surrounding the safety of these products. The field's recreational use and close proximity to wetlands that provide drinking water to the community increases the likelihood of widespread exposure to potentially harmful chemicals present in turf materials.

As pediatricians, epidemiologists, and laboratory scientists at the Children's Environmental Health Center of the Icahn School of Medicine at Mount Sinai, recipients of numerous research grants from the National Institute of Health, and host to one of 10 nationally funded Pediatric Environmental Health Specialty Units, we receive frequent inquiries from concerned parents and physicians regarding the wide scale use of artificial turf surfaces on school grounds and in park properties. Our continuous review of the risks and benefits of artificial playing surfaces shows persistent **significant gaps in the evidence supporting the safety of artificial turf products**. Our findings are summarized below and discussed in detail in the attached documents: "Artificial Turf: A Health-Based Consumer Guide", "Position Statement on the use of Recycled Tires in Artificial Turf Surfaces", and "Artificial Turf and Children's Health" infographic.

Children are uniquely vulnerable to harmful exposures from artificial turf surfaces. This is due to a number of factors including, but not limited to, children's unique physiology and behaviors, rapidly developing organ systems, and immature detoxification mechanisms[1]. Additionally, because of their young age, children have more future years of life and therefore more time to develop chronic diseases.

Studies to assess the safety of artificial turf are ongoing and inconclusive. The preponderance of existing data on artificial turf pertains to recycled tire infill, which contains known carcinogens and neurotoxins. There are extremely few studies that have examined the composition and safety of alternative infills including those purported to be "natural". In addition, the grass blades, mats,

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[1] Bearer, CF. Neurotoxicology 21:925-934, 2000.
[2]http://www.epa.gov/sites/production/files/201602/documents/us_federal_research_action_plan_tirecrumb_final_0.pdf
[3] https://www.epa.gov/chemical-research/december-2016-status-report-federal-research-action-plan-

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and other components utilized in all synthetic turf fields have not been thoroughly studied. On February 12, 2016, the United States Environmental Protection Agency (USEPA) announced the launch of an investigation into the safety of crumb rubber stating "existing studies do not comprehensively evaluate the concerns about health risks from exposure to tire crumb"[2]. Although the focus of the federal study is recycled rubber, **a USEPA status report released in December 2016 found research on alternative infills such as EPDM, TPE, and plant-based materials to be "lacking or limited" [3].** Indeed the lack of available information regarding the composition and safety of these newer generations of infill makes it impossible to assess safety.

Adequate safety assessment requires studies that include biomonitoring to determine children's chemical and heat exposure under realistic play conditions. Until the findings of such studies are available and conclusively demonstrate the safety of artificial surfaces, we recommend a moratorium on the use of these materials where children play.

Potential dangers that play on recycled rubber playing surfaces pose to children include:

1. **Extreme heat.** On hot summer days, temperatures of over 160 degrees Fahrenheit have been recorded on recycled rubber play surfaces, and similar measurements have been seen for alternative infills[4]. Vigorous play in these conditions conveys a very real risk of burns, dehydration, heat stress, or heat stroke. Children are less able to regulate their body temperature than adults, making them particularly susceptible to conditions of extreme heat[5]. In addition, children have a higher surface area to body mass ratio, produce more body heat per unit mass, and sweat less than adults, all factors that increase susceptibility to heat injury[6].

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[2] http://www.epa.gov/sites/production/files/201602/documents/us_federal_research_action_plan_tirecrumb_final_0.pdf

[3] https://www.epa.gov/chemical-research/december-2016-status-report-federal-research-action-plan-recycled-tire-crumb

[4] Devitt, D.A., M.H. Young, M. Baghzouz, and B.M. Bird. 2007. Surface temperature, heat loading and spectral reflectance of artificial turfgrass. Journal of Turfgrass and Sports Surface Science 83:68-82

[5] https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/Children-and-Disasters/Pages/Extreme-Temperatures-Heat-and-Cold.aspx

[6] Falk B, Dotan R. *Appl Physiol Nutr Metab.* 2008 Apr;33(2):420-7. doi: 10.1139/H07-185.

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2. **Inhalation, ingestion, and absorption of toxic and carcinogenic chemicals.** Children are particularly vulnerable to chemical exposures from play surfaces due to their developmentally appropriate hand to mouth behaviors. In addition, their close proximity to the ground and higher respiratory rates compared with adults increase the likelihood of inhalational exposures. Thus, there is a potential for toxins to be inhaled, absorbed through the skin and even swallowed by children who play on artificial turf. Analyses conducted by Mount Sinai and the Toxic Use Reduction Institute (TURI) found the presence of known carcinogens and neurotoxins including polycyclic aromatic hydrocarbons (PAHs), lead, zinc, and black carbon in almost all alternative infill materials examined[7].

   While much is known about the chemical composition of recycled tire infill, few studies have assessed potential chemical exposures from the artificial grass blades and backing materials used on synthetic playing fields. **A recent study identified perfluoroalkyl chemicals (PFAS), a class of chemicals linked to numerous health problems including cancer, nervous system toxicity, immune dysfunction, thyroid, and cardiovascular disease in the plastic grass blades and backing used on artificial turf fields**[8,9]. PFAS are persistent pollutants that have been shown to contaminate wetlands and drinking water. These findings raise concerns about PFAS groundwater contamination from turf field run off and emphasize the need for further examination of exposures that may occur from turf components other than infill. Given the proximity of the proposed Sharon turf field to community drinking water source, we strongly urge the town to maintain an organic natural grass field.

3. **Escape of chemical hazards from turf surfaces to the environment.** A number of the chemicals found in turf fields are soluble in water. When rain and snow fall on synthetic fields, these materials can leach from the surface to contaminate ground water and soil[10]. Recent studies find PFAS in wetlands adjacent to artificial turf suggesting that these chemicals may migrate from field

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[7] Athletic Playing Fields: Choosing Safer Options for Health and the Environment. https://www.turi.org/TURI_Publications/TURI_Reports/Athletic_Playing_Fields_Choosing_Safer_Options_for_Health_and_the_Environment

[8] https://www.atsdr.cdc.gov/pfas/PFAS-health-effects.html

[9] https://www.bostonglobe.com/metro/2019/10/09/toxic-chemicals-found-blades-artificial-turf/1mlVxXjzCAqRahwgXtfy6K/story.html

[10] Connecticut Department of Environmental Protection (2010) Artificial Turf Study: Leachate and Stormwater Characteristics. http://www.ct.gov/deep/lib/deep/artificialturf/dep_artificial_turf_report.pdf

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components to contaminate the environment. In addition, chemicals in turf are released into the air and may be inhaled, particularly on hot days. Infill and grass blades are accumulate in shoes and stick to bodies of players, bringing these materials into cars and homes.

Daily outdoor play and physical activity are essential components of a healthy childhood. Safe play areas are an essential component of any school environment. While it is important to maximize safe play time, we caution against the use of materials which carry the risks of chemical and heat exposure outlined above or have not been comprehensively tested for safety.

Given the uncertainty about the chemical composition and safety of artificial turf materials, and the potential for contamination of nearby drinking water supplies, we strongly urge the town of Sharon to maintain natural grass playing fields to protect children's health in your community. Thank you for the opportunity to provide you with our professional opinion. We would be happy to answer any questions that you might have.

Kind Regards,

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