

IV. Summary of Findings



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This report was written to inform the public about studies that industry says prove fields are "safe."

- This report was written so that the public can understand what is actually in the studies that industry continually claims prove the safety of synthetic turf fields.
- Careful reading of the 22 studies on industry's list shows that many of them had serious testing flaws and limitations. These studies do not serve as proof that synthetic turf fields are safe.
- When a research study found that synthetic turf fields contained numerous toxic chemicals, including carcinogens, industry often answered these findings with statements that admitted there were many chemicals in synthetic turf, but claimed that their presence did not mean that those who played on the fields were exposed or harmed by those chemicals.
- This reasoning by industry does not stand up to scientific scrutiny.

- The studies, so far, do not take into account the synergistic health effects of exposures to many toxic chemicals at the same time. In addition, studies often have not taken into account all routes of exposures when coming to their conclusions.
- None of the studies investigated how the higher surface temperatures found on synthetic turf fields may increase chemical exposures that can affect athletes and children who use these fields during warmer months.
- These investigatory gaps, and many more, along with industry's claims that the studies proved the synthetic turf fields were safe, made it clear that careful reading and analysis of industry's list was crucial.

A number of findings from the studies:

- Highly varied concentrations of chemicals and metals were found in samples from within each artificial turf field tested. These findings are important for future studies.
- The air above an indoor field had very high levels of toxic chemicals—even though the indoor field was only tested for 25 minutes. This study recommended adequate ventilation for all indoor artificial turf fields in order to protect the public's health.
- Lead that was found in one field was 500 to 1,000 times the lead concentration of other fields sampled within the same study.
- Many chemicals and metals were found in a number of studies. Some of these were at low concentrations, but some of them exceed air and water safety standards.
- Lead was found in numerous samples of synthetic turf fields—even after industry promised to stop using lead to dye the plastic grass for artificial fields.
- Zinc was found at levels above the EPA Fresh Water Standards.
- Synthetic turf fields were found to pose a toxic threat to biological organisms.
- As shredded rubber particles decreased in size, the leaching of organic compounds increased.



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- In order to protect the public's health, it was recommended that sufficient distance and soil barriers be placed between artificial turf fields and groundwater.
- Benzothiazole (BZT), an irritant, was emitted in air samples and was found leaching from crumb rubber samples.

Many studies mentioned limitations to the testing methods and many had limitations not mentioned:

- Many did not adequately list the study's testing methods.
- Many did not assess harm to human health as part of their research.
- Many did not consider all routes of exposure: inhalation, dermal (skin), and ingestion.
- Many did not have an adequate number of testing samples or testing fields.
- Some concluded that more research was needed to investigate the potential health effects of using crumb rubber on fields and playgrounds. Because of the variability of the fields, one study called for the testing of every artificial field to measure its risk to players, especially children.
- Some did not look for chemicals that have previously been found in crumb rubber.
- Some cautioned that more research was needed before any conclusions could be made about the safety or harmful effects of crumb rubber or artificial turf.

None of the studies considered the following:

- None examined the synergy of being exposed to many chemicals at the same time and what this may mean for the health of those who play on artificial fields.



- None considered the cancer risk to players from dermal exposures to polycyclic aromatic hydrocarbons (PAHs) found in crumb rubber.
- None examined whether players are exposed to latex when they play on artificial turf fields or rubber mulch playgrounds.
- None measured the health impact for children with asthma or allergies when they play on artificial turf fields or playgrounds with rubber tire mulch surfacing.
- None examined additional exposures when people sit next to the synthetic turf fields as they watch athletic matches. Often those on the sidelines are small children who can pick up rubber crumbs and put them in their mouths.
- None considered the additional exposures to crumb rubber as the tiny pellets migrate from the fields into cars, schoolrooms, and homes.
- None performed an epidemiological survey of players or others who have been exposed to artificial turf fields or rubber mulch playgrounds for the

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INDUSTRY'S CLAIMS



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last decade or longer. Maintenance workers would be very vulnerable to health effects.

- Despite industry's claims that synthetic turf fields with crumb rubber are safe, many towns and schools have become skeptical of these claims. Because of this skepticism, many are opting for alternative infills, even though most of the alternative infills are more expensive.
- Many of the alternative infills have a number of the same issues as the crumb rubber, but the largest problem is that none of the alternatives have undergone independent testing.
- Some alternative infills are either sand (silica) or crumb rubber coated with a plastic polymer. Industry claims the coating makes the products safer and cooler in the summer months. To make them "safer," industry has imbedded the plastic coating with an antibacterial called Microban, which is a trade name for triclosan. EPA has banned triclosan from soaps because it has been associated with hormone disruption and antibiotic resistance.
- With constant play and weather exposures, the plastic coating can break down and the encapsulated material can then be exposed as the plastic coating wears away.
- Another alternative infill touted by industry as safer than crumb rubber is EPDM, which stands for ethylene propylene diene monomer rubber.
- EPDM is often called by industry "virgin rubber." EPDM is a type of synthetic rubber that—like waste tires in crumb rubber—also contains many toxic chemicals and heavy metals, as well as carbon black.
- The Safety Data Sheet for EPDM reveals that the product is a possible cancer hazard—and that it can be an irritant to lungs, eyes and skin. In addition, the International Agency for Research on Cancer (IARC) classified carbon black as possibly carcinogenic to humans.
- Studies have shown that short-term exposure to high concentration of carbon black dust is a respiratory irritant.



- This report reveals that industry cited a group of studies of varying scientific quality, as it tried to prove that synthetic turf fields were safe. The studies, at the very least, establish a certainty of exposures to organic chemicals and metals that have been known to be toxic for many decades, if not for centuries.
- Cancer data collected by the University of Washington women's soccer coach Amy Griffin should be the focus of additional research. The data show that although soccer goalkeepers constitute only 10% of soccer players, goalkeepers represent 60% of those soccer players who have gotten cancer and played on synthetic turf. Since soccer goalkeepers are the most heavily exposed to the crumb rubber, these numbers are important and should be studied further.
- Environment and Human Health, Inc. maintains that there is no safer surface for athletic play than natural grass. If towns and schools would invest half the money they put into synthetic turf fields and put it into state-of-the-art natural grass fields, the health of our children, athletes and our planet would be far better protected.



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