



Health and environment at play: What the evidence says about artificial turf playing fields

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Land acknowledgement

I live, work, and play as a white settler and uninvited guest on the ancestral, unceded lands of the Coast Salish peoples, the x^wməθk^wəy̓əm (Musqueam), Sk̓wx̓wú7mesh (Squamish), and səlilwətəł (Tsleil-Waututh) Nations, who have stewarded these lands since time immemorial.

Why does this matter?

- Access to safe and inclusive recreation spaces
- Artificial turf playing fields widely used due to durability and playability
- Growing public concerns about health and environmental impacts
- Important for policy makers, facility planners, and health professionals, to understand the concerns and evidence



Questions addressed in this evidence review

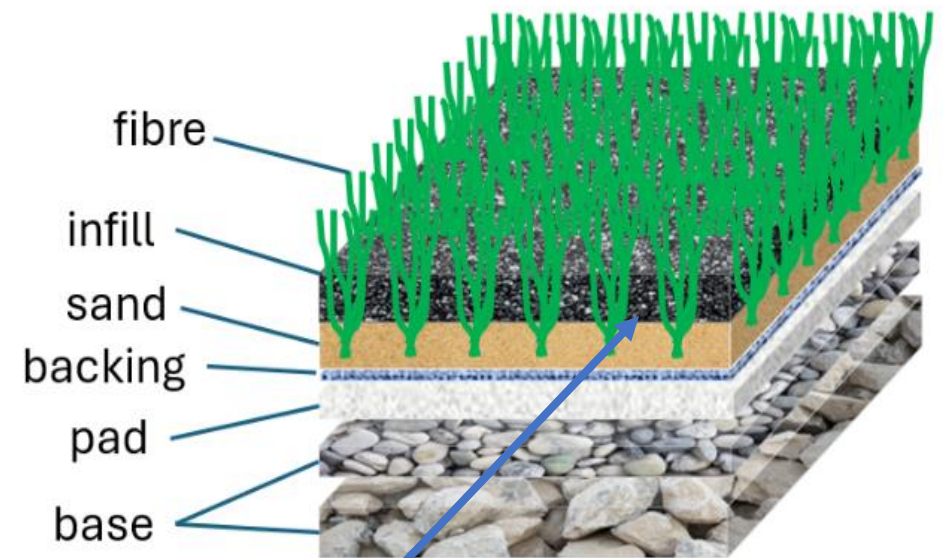
- What are the potential human health risks from playing on artificial turf?
- What environmental impacts are associated with artificial turf fields?
- What options exist to reduce or avoid these health and environmental risks?



What is artificial turf?

- Synthetic surface with plastic fibres and base layers
- Crumb rubber from recycled tires is the most common infill (~95% of fields)
- Alternatives include:
 - thermoplastic elastomers (TPE), ethylene propylene diene monomer (EPDM),
 - other organic infills such as granulate cork, coconut fibre, olive pits

Artificial turf components



Chemical composition

A photograph of a soccer field with artificial green turf. A black and white soccer ball is positioned on the field near a white boundary line. In the background, a white goalpost and a hexagonal net are visible. The scene is brightly lit, suggesting an outdoor setting.

Chemicals found in artificial turf playing field materials:

- Metals (e.g., zinc, lead, cadmium)
- Volatile organic compounds (VOCs) & semi-volatile organic compounds (SVOCs), including polycyclic aromatic hydrocarbons (PAHs)
- Tire additives such as 6PPD + 6PPD-Q
- Per- and polyfluoroalkyl substances (PFAS) in fibres/backing

Understanding health risks

Human health risk assessments/exposure studies:

- Most average exposures to crumb rubber are below levels of concern
- Cancer and non-cancer risks generally considered negligible
 - Indoor air exposures were the highest ([FRAP study, 2024](#))
 - 0-2 age infants - slightly higher cancer risk, under worst case scenarios ([OEHHA study, 2025](#))
- Alternative infill, like TPE and EPDM, have lower levels of hazardous chemicals

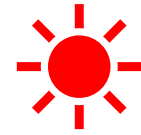


Epidemiological evidence:

- Very limited number of studies (2)
- No consistent association with cancer found



Other health considerations



Surface temps can be much higher on artificial turf surfaces vs. grass may lead to higher heat exposures, burns



Temperature-related risks (heat stress) not well quantified.



Abrasions and some lower-leg injuries more common on artificial turf.

Environmental concerns



- Microplastic release and chemicals leaching to soil and waterways, concerns about impacts on salmon



- Contribution to urban heat islands



- Reduced rainwater permeability, potentially increasing runoff and flood risk



- End-of-life disposal challenges, water use, and greenhouse gas emissions

To reduce exposure and impacts:

- ✓ Encourage handwashing after play
- ✓ Avoid ingestion of infill
- ✓ Schedule play to avoid extreme heat
- ✓ Choose alternative infills where feasible
- ✓ Install runoff filtration and containment systems



Gaps and future research

Long-term and cumulative exposures to multiple chemicals in indoor settings

Studies on heat exposure and physiology

Better understanding of PFAS and 6PPD leaching and ecological effects

Epidemiological studies

Lifecycle and disposal impacts

Summary

- Chemicals are present in artificial turf playing field materials, but typical exposures pose negligible health risk according to current HHRAs.
- Evidence gaps remain, especially around long-term impacts, heat stress, indoor exposure to chemicals.
- Environmental impacts and microplastics are important considerations.
- Decision-making should balance benefits of turf playability with community health and environmental concerns.

A scenic view of a wooden boardwalk winding through a lush forest. The boardwalk is made of wooden planks and has a simple wooden railing. The forest is filled with tall, thin trees and dense ferns. Sunlight filters through the canopy, creating a bright, glowing effect on the right side of the image. The overall atmosphere is peaceful and natural.

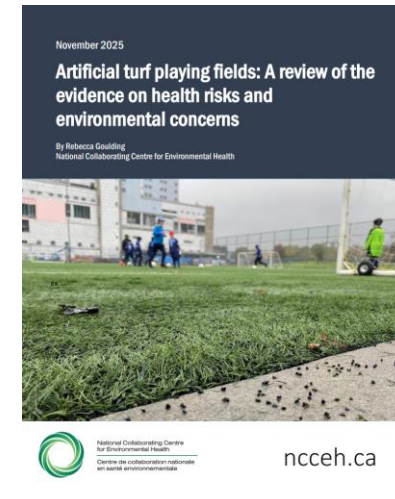
Thank you!



Please reach out!

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