



INVESTIGATING CHILDREN'S EXPOSURE TO RECYCLED TIRE RUBBER USED IN PLAYGROUND SURFACING

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INTRODUCTION

As part of the United States interagency *Federal Research Action Plan on Recycled Tire Crumb Used on Playing Fields and Playgrounds* (FRAP), CPSC staff is assessing the potential chemical exposures to children that may be associated with the use of recycled tire rubber in playground surfaces. Children can be exposed to surfacing materials by oral, dermal, and inhalation routes during typical play activities on playgrounds. The scientific literature lacks information to estimate children's exposure to tire constituents from playing on recycled tire rubber playground surfaces. CPSC staff is using field observations, focus groups, and a national survey of parents of young children to identify behavioral exposure factors for children on playgrounds that may support exposure scenarios and models and eventually a risk assessment.

CPSC staff identified five categories of playground surfacing that may be made with recycled tire rubber (see images below). Unitary surfaces include four types in which the tire rubber particles are bound together with a binding agent, such as polyurethane, or by applying heat and pressure. For some unitary surfaces, the tire rubber layer may be under a wear coat layer. Loose-fill surfaces consist of unbound particles, including various rubber mulch products.



FIELD AND FOCUS GROUP OBSERVATIONS

Field observers and focus group participants reported that children exhibit behaviors that can promote exposure to playground surface materials and their constituent compounds (see table below). Other observations include:

- It is not uncommon for children to visit playgrounds 5 times per week and stay more than 1 hour per visit.
- Children tend to wear shorts and t-shirts (more skin exposure) more often on hot days and longer pants and shirts on more moderate/cooler days.

Field Observations

CPSC staff observed children playing on playgrounds at public parks in a limited region of Maryland. Staff observed children of 6 months to 5 years in age on playgrounds with loose-fill and unitary surfaces. Observers recorded the incidences of ten behaviors of children interacting with playground surfacing during each 20-minute observation session. Observers did not interact with the children, parents, or anyone else at the playgrounds, and no identifying information about the children was collected.

Focus Groups

Three sets of participants included:

- Parents of children 1 to 3 years of age,
- Childcare providers of children 1 to 3 years of age,
- Playground inspectors.

A professional focus group moderator led an informal but structured discussion within each group to address a list of questions regarding playground visitation habits, children's activities and behaviors observed on playgrounds, clothing worn by children on playgrounds, snacks and refreshments consumed at playgrounds, hand-washing habits, and other similar topics.

METHODS

National Playground Survey

CPSC staff and the contractor (Fors Marsh Group, LLC) used information learned from the field observations and focus groups to develop a survey of parents to get firsthand perspectives of children's behaviors on playgrounds with recycled tire rubber surfacing.

The survey will be conducted by telephone to approximately 2,200 prescreened households known or suspected to have at least one child 0 to 5 years old. Each telephone interview is expected to take about 20 minutes. Participation is voluntary, and those who complete the survey will receive a small gift of appreciation. The survey sample will consist of participants throughout the United States, with demographic benchmarks comparable to the U.S. population.

Survey questions include the following topics:

- Frequency and duration of playground visits
- Types of surfacing materials at visited playgrounds
- Duration of child touching playground surface materials with hands
- Cuts or abrasions from contact with or falling on playground surfaces
- Clothing and footwear worn on playgrounds
- Handwashing and other hygiene habits during and after playground visits
- Children's use of toys on playgrounds and toy cleaning
- Mouthing surface materials, other objects, and thumb-sucking at playgrounds
- Playground surface materials that are unintentionally brought home (stuck to skin, found in clothing/shoes).

NEXT STEPS

- Currently, the Office of Management and Budget (OMB) is reviewing the National Playground Survey the National Playground Survey. We will begin administering the survey after OMB approval.
- National Playground Survey results will provide information to support development of exposure scenarios and models.
- Concurrent research by FRAP partners U.S. EPA and CDC/ATSDR and other agencies may provide chemical and exposure characterization of recycled tire crumb used in synthetic turf.
- Oral, dermal, and inhalation exposures will be considered in exposure scenarios and models.
- Each of the tire-derived playground surfacing types will be reviewed for exposure, but loose-fill rubber mulch is expected to have the highest exposure potential due to mouthing.
- Risk assessment is the ultimate goal of these activities.
- Additional research activities will depend on need and available resources.

Selected Observations Reported	Field Observers	Focus Groups
Direct hand contact with surface materials (handling/crawling)	✓	✓
Playing with toys or other objects that contact playground surface	✓	✓
Face/mouth contact with surface materials (includes mouthing)	✓	✓
Barefoot while on playground	✓	✓
Other direct skin contact (falling/sitting)	✓	✓
Eating food & drinking on playground	✓	✓
Rubber surface materials leave stains on clothing		✓
Rubber particles from surface found in clothing at home		✓
Hands not washed immediately after playground visit		✓

Contractor for Focus Groups and National Playground Survey: Fors Marsh Group, LLC, Arlington, Virginia, USA
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 Playground Photographs by CPSC Staff