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Characterization of Exposure Potential during Activities Conducted on Synthetic Turf with Crumb Rubber Infill 0920-17OB

Comment On: ATSDR-2017-0002-0001

Characterization of Exposure Potential during Activities Conducted on Synthetic Turf with Crumb Rubber Infill 0920-17OB 2017-02760

Document: ATSDR-2017-0002-0002

Characterization of Exposure Potential during Activities Conducted on Synthetic Turf with Crumb Rubber Infill 0920-17OB Comment on FR Doc # N/A

Submitter Information

Name: Zach Laris

Organization: American Academy of Pediatrics

General Comment

Thank you for the opportunity to provide comments. The American Academy of Pediatrics' comments are attached.

Attachments

AAP Crumb Rubber Turf Comments 2017-04-04



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April 5, 2017

Leroy A. Richardson
Information Collection Review Office
Centers for Disease Control and Prevention
1600 Clifton Road NE
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Atlanta, Georgia 30329

Docket No: **ATSDR-2017-0002**

Dear Mr. Richardson:

On behalf of the American Academy of Pediatrics (AAP), a non-profit professional organization of 66,000 primary care pediatricians, pediatric medical subspecialists, and pediatric surgical specialists dedicated to the health, safety and well-being of infants, children, adolescents, and young adults, we appreciate the opportunity to provide input on the Agency for Toxic Substances and Disease Registry (ATSDR) information collection regarding the ongoing project "Characterization of Exposure Potential during Activities Conducted on Synthetic Turf with Crumb Rubber Infill".

The AAP applauds ATSDR, the Environmental Protection Agency (EPA), and the Consumer Product Safety Commission (CPSC) for devoting resources to the study of exposures and possible human health risks from crumb rubber playing fields and playgrounds. We look forward to utilizing the findings of the first phase of the project. This data can help future researchers, including independent pediatric experts, better understand the chemical composition of crumb rubber infill and its potential effects on children's health.

The Federal Register Notice of February 10, 2017 requests input on this study as it enters its exposure characterization component. The AAP continues to believe in the practical utility of this research in helping children and adolescents avoid environmental hazards and any associated deleterious health effects.

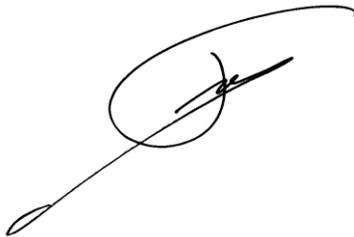
Much of the data collected for the current phase of the study will be collected during the summer months. We urge you to consider exposure to the collected hazardous materials not only at temperatures like that of a hot summer day, but at other temperatures as well because children play on these surfaces year-round. The crumb rubber playing surface can still get quite hot due to sun exposure at spring-like or cooler temperatures, and still pose a risk to children and adolescents. We also urge you to study the degradation by-products that develop as crumb rubber breaks down, and what children's exposure to those by-products may be.

We support the undertaking of surveys and focus groups of parents/caregivers as part of the CPSC's work on this topic, as well as the CPSC's focus on outdoor playgrounds that may be built with crumb rubber "mulch" or unitary tiles. Although not the focus of the current exposure study, research into children's playground exposure to chemicals is imperative. To enhance the efficacy of future studies, we strongly urge CPSC to consider a broad age range of children. Developmentally appropriate mouthing behaviors begin in infancy and continue in older children. Mouthing and sucking activity among infants and very young children is a very common and necessary part of early childhood behavior that satisfies both nutritive (e.g. breast or bottle feeding) and non-nutritive (e.g. pacifier, toy, blanket) needs. Research indicates that from two months of age to 36 months, children engage in mouthing behavior between 20 minutes to 2.5 hours per day, with a decline as children increase in age (and in some children with a cessation of such behaviors after age 5). Given this developmentally appropriate behavior, it is understandable why very young children would readily put loose tire crumb "mulch" materials in their mouths and therefore important to capture this exposure in any examination of the health risks of tire crumb.

There are large data gaps in our knowledge of the precise health effects of playing on these surfaces, particularly for infants, children, adolescents, and young adults. Additionally, the AAP is concerned about young athletes and sports participants who will play on these surfaces routinely throughout their lives on a near-daily basis. Given the potentially serious health outcomes, such as cancer, it is appropriate that ATSDR, EPA, and CPSC continue to study the health risks associate with crumb rubber.

Thank you again for the opportunity to provide input on this important research topic. If we can be of any further assistance, please do not hesitate to contact Ami Gadhia in our Washington, D.C. office at 202/347-8600 or agadhia@aap.org.

Sincerely,

A handwritten signature in black ink, appearing to read 'Fernando Stein', with a large, sweeping flourish above the name.

Fernando Stein, MD, FAAP
President
FS/avg

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Characterization of Exposure Potential during Activities Conducted on Synthetic Turf with Crumb Rubber Infill 0920-17OB 2017-02760

Document: ATSDR-2017-0002-0003

Characterization of Exposure Potential during Activities Conducted on Synthetic Turf with Crumb Rubber Infill 0920-17OB Comment on FR Doc # N/A

Submitter Information

Name: Juan Bohorquez

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General Comment

Due to the high volume of use of synthetic turf, and its use of rubber tire parts which are typically considered dirty, it's easy to see that many people might be curious as to its potential environmental and human health effects. Many such studies have been performed, measuring levels of exposure in humans through proxy measurements, such as levels of Hydroxypyrene in the urine of football players (Rooij & Jongeneelen, 2009) as well as its effect on water as it makes its way to ground water (Cheng, Hu, & Reinhard, 2014). So far these searches have found little evidence of direct human exposure to many of the harmful chemicals that would be suspect from the rubber tires, but a close look at the extant data shows that it is lacking. In Cheng's paper reviewing extant data on the environmental and human health effects of artificial turf up until October 2013 it is observed that there are few problems that come from artificial turf fields. The evidence shows no exposure hazards to humans in any of the chemicals that are commonly searched for, including heavy metals and high aromatic hydrocarbons. But the paper emphasizes that there are gaps in the data, as it is not well understood how the rubber degrades over time as it is exposed to the sunlight, changes in temperature and rainwater. Similarly, investigations of exposure don't find a link between activity on an artificial turf field and individual levels of certain chemicals, but lack the proper statistics to make a conclusive claim. The investigation makes use of only seven volunteers, three of which are excluded from

the results due to high backgrounds. (Rooij & Jongeneelen, 2009)

Thus further investigations of human exposure, such as the one proposed, are necessary. It is important to understand the human health effects of these fields as they become more widespread, even if previous data suggests there is no connection. In fact I would argue that the sample size proposed is far too small, with 12,000 fields in use nationwide there can easily be over 100,000 people in constant contact with the artificial turf. 70 people is too small a sample size to make any conclusions. It is also necessary to survey if the effects of field use changes as the age of the field changes, and whether the conditions to which a field is exposed as it ages change the amount of exposure a user might face.

While the data point to few human health impacts, they do point to adverse effects on water runoff caused by artificial turf fields. Tests on the environmental effects of artificial turf fields point to significantly raised levels of zinc in water caused by artificial turf fields. Zinc is a heavy metal which can lead to stunted growth in nearby plants and adverse developmental effects in people. This runoff should be characterized and solutions to mitigate its impact should be engineered quickly before large scale environmental degradation takes hold. (Groenevelt, 1998) (Cheng, Hu, & Reinhard, 2014)

In short, this investigation should be made, but it should be considered a part of a greater investigation which more adequately measures the human health and environmental effects of artificial turf.

References:

Cheng, H., Hu, Y., & Reinhard, M. (2014). Environmental and Health Impacts of Artificial Turf: A Review. *Environmental Science & Technology*, 48(4), 2114-2129.

doi:10.1021/es4044193

Rooij, J. G., & Jongeneelen, F. J. (2009). Hydroxypyrene in urine of football players after playing on artificial sports field with tire crumb infill. *International Archives of Occupational and Environmental Health*, 83(1), 105-110. doi:10.1007/s00420-009-0465-y

Groenevelt, P. (1998). Utilisation of crumb rubber as a soil amendment for sports turf. *Soil and Tillage Research*, 47(1-2), 169-172. doi:10.1016/s0167-1987(98)00089-0

Attachments

Turf

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Characterization of Exposure Potential during Activities Conducted on Synthetic Turf with Crumb Rubber Infill 0920-17OB 2017-02760

Document: ATSDR-2017-0002-0005

Characterization of Exposure Potential during Activities Conducted on Synthetic Turf with Crumb Rubber Infill 0920-17OB Comment on FR Doc # N/A

Submitter Information

Name: Anonymous Anonymous

Organization: ISRI

General Comment

See attached file(s)

Attachments

EPA Letter 4-11-17 FINAL

Davis, Stephanie I. (CDC/ONDIEH/NCEH)

From: Burroughs, Kenya L. (CDC/OD/OADS) on behalf of OMB-Comments (CDC)
Sent: Wednesday, April 12, 2017 8:52 AM
To: Davis, Stephanie I. (CDC/ONDIEH/NCEH)
Subject: FW: Proposed Data Collection – Agency for Toxic Substances and Disease Registry (ATSDR) and Department of Health and Human Services (HHS) – ATSDR-2017-0002
Attachments: EPA Letter 4-11-17 FINAL.pdf

Please see, attached document.

Kennya

From: Billy Johnson [mailto: BillyJohnson@isri.org]
Sent: Tuesday, April 11, 2017 2:42 PM
To: OMB-Comments (CDC) <omb@cdc.gov>
Subject: Proposed Data Collection – Agency for Toxic Substances and Disease Registry (ATSDR) and Department of Health and Human Services (HHS) – ATSDR-2017-0002

Filed through federal rulemaking portal.

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The Institute of Scrap Recycling Industries, Inc. (ISRI) is the "Voice of the Recycling Industry." ISRI and its 21 chapters represent approximately 1,300 companies operating in nearly 4,000 locations in the U.S. and 34 countries worldwide that process, broker, and consume scrap commodities, including metals, paper, plastics, glass, rubber, electronics, and textiles. With headquarters in Washington, DC, ISRI provides education, advocacy, safety and compliance training, and promotes public awareness of the vital role recycling plays in the U.S. economy, global trade, the environment and sustainable development. Generating more than \$105 billion annually in U.S. economic activity, the

scrap recycling industry provides nearly half a million Americans with good jobs. For more information about ISRI, please visit www.isri.org.



April 11, 2017

Mr. Leroy A. Richardson
Information Collection Review Office
Centers for Disease Control and Prevention
1600 Clifton Road, N.E., MS-D74
Atlanta, Georgia 30329

Re: Proposed Data Collection – Agency for Toxic Substances and Disease Registry (ATSDR) and Department of Health and Human Services (HHS) – ATSDR-2017-0002

On July 11, 2016, ATSDR and EPA were granted emergency clearance to conduct a three-part study of crumb rubber, which expired January 31, 2017. In the *Federal Research Action Plan on Recycled Tire Crumb Used on Playing Fields* (“FRAP”), issued in February 2016 and formed the basis for the initial information collection on this project, the Agencies stated “[b]y the end of 2016, the agencies anticipate releasing a draft status report that describes the preliminary findings and conclusions of the research through that point in time.” During early discussions with industry, EPA anticipated completion of the study in 2017. The Notice now indicates that EPA is asking for an additional two years’ clearance to complete the study.

This further delay is not warranted given (1) the wide body of peer-reviewed literature that finds little to no risk associated with recycled crumb rubber, including *additional findings* that were not considered and therefore not reported in EPA’s data gap analysis issued December 31, 2016; (2) duplicative ongoing research, including notably by California’s Office of Health Hazard Assessment (OEHHA); and (3) the effects of regulatory uncertainty caused by EPA’s delays on the recycled rubber industry.

Instead, we urge the Agencies to (1) re-evaluate the existing literature, particularly with regard to both the cumulative scientific value of the multitude of studies cited in the December 31, 2016 data gap analysis, as well as new research reported since then, all of which find little or no risk to human health from exposure to recycled rubber; (2) share any preliminary data with California OEHHA to avoid duplication of effort and resources; and (3) promptly issue a statement to reassure the public that, based on the extensive research conducted to date, there is no evidence that exposure to recycled rubber presents a significant risk to human health.

Background

The initial impetus for this study was based on speculation that recycled rubber used in synthetic athletic fields and playgrounds causes cancer. Specifically, in 2015, a college soccer coach hypothesized that crumb rubber infill was the cause of incidents of cancer among soccer players in Washington State. The coach compiled an admittedly anecdotal list of soccer players who had contracted cancer and offered this to news outlets.

Nonetheless, NBC and ESPN ran widely viewed, one-sided shows focusing on anecdotes that gave credence to the theory on a cancer cluster around soccer players and cited the Yale study without noting its obvious shortcomings or the more than 90 studies that did not find any significant health risks related to recycled rubber infill. The NBC and ESPN shows resulted in understandably alarmed parents, and President Obama directed the Agencies to conduct this study. Earlier this year, the Washington State Department of Health rejected these unsubstantiated claims.

Since the Agencies announced this study program, municipalities and schools across the country have in many instances decided to either delay installation of new athletic fields and playgrounds until the study is completed or use far less tested alternative materials due to the new uncertainty surrounding recycled rubber created by the study. As a result, recycled rubber suppliers have seen their orders drop by more than 30%, leading to subsequent job losses.

EPA's Study is Causing Environmental Harm and May Reduce Children's Fitness

The ironic impact of local decision makers eschewing recycled rubber in favor of less-tested alternative infills or natural turf is that these surfaces actually result in significantly reduced playtime for children.

As a result of the regulatory uncertainty caused by the prolonged studies, purchasers of athletic fields and playgrounds, mostly municipalities, recreation departments, and schools, either have delayed decisions to purchase synthetic turf fields with recycled rubber or have selected alternative infills or natural grass. Moreover, synthetic turf fields provide a safe, all-weather playing surface. Availability of synthetic turf during or after rain events increases field play time by a factor of five. Accordingly, synthetic turf fields lead to more active, healthier kids. In considering health, it is also important to note the shock absorption qualities of recycled rubber on playgrounds, which bring added safety for youths in the event of falling and other accidents. Environmental factors also matter with regard to maintenance, as grass fields result in increased water usage, pesticides, herbicides, and fertilizers that would not be used with a synthetic turf field.

Decisions to keep or install grass fields rather than install synthetic turf with recycled rubber have negative impacts on both the environment and the health of the users. It is important to note that each synthetic turf field with recycled rubber that is not installed results in approximately 25,000 to 30,000 used tires either going to a landfill or to an incinerator. The recycled rubber and synthetic turf industries provide an endpoint for used tires that removes them from the waste stream. Accordingly, EPA's requested two-year delay in assuring communities that recycled rubber is appropriate for use on athletic fields and playgrounds will result in millions of additional tires in the waste stream rather than having them recycled for a beneficial use.

EPA's Research is Duplicative of Other State, University, and International Studies

The research landscape has changed since the federal agencies began their review of recycled crumb rubber in early 2016, and even more so since the release of the December 31, 2016 Interim Status Report. Before wasting additional resources and exacerbating the adverse impacts that the study has created, we urge EPA to re-evaluate the research by considering (1) the cumulative scientific value of all

of the studies that have reported little or no adverse health impacts from recycled rubber and (2) the several new studies that affirm the safety of recycled rubber. In addition, EPA should carefully consider the prudence, given what we already know about the safety of the product, of duplicating research already under way with California OEHHA, and which is on a similar timeline as EPA's new proposed timeline.

EPA's study of recycled rubber is duplicative of the current study being conducted by California OEHHA. Both studies include multi-pathway exposure analysis. When EPA began its review of recycled rubber in early 2016, EPA's projected completion was approximately two years in advance of California OEHHA's projected completion, so the undersigned supported EPA's efforts to bring clarity more quickly to parents confused and needlessly concerned as a result of the speculation fueled by the NBC and ESPN reports. With EPA's new two-year extension request, the federal study is now on pace to be completed approximately the same time as the California OEHHA study. Since the two similar studies are now on the same schedule, EPA can share its preliminary raw data with California OEHHA, but duplicative exposure analyses would be redundant and a waste of federal resources.

A critical flaw in the data gap analysis is, while EPA identified the strengths and weaknesses of each known published study of recycled rubber, EPA failed to assess the cumulative scientific value of the various studies in demonstrating the safety of recycled rubber. While it is important to identify data gaps when evaluating the state of the science for a chemical or product, it is generally accepted scientific methodology that analysis should (1) identify where there are limited data that prevent making informed decisions, and (2) identify where the data are strong in other research and might overcome some of the limitations identified.

For instance, if multiple individual studies each have a small sample size but all have reasonably consistent results, it is likely that the strength of that consistency can overcome the small sample size of each study individually. As another example, if no one study has studied all relevant exposure routes simultaneously, yet there are studies that collectively have evaluated different routes, once again the combined data might be a strength that offsets the lack of one study that has evaluated all routes at once. Because EPA's initial data gap analysis fails to assess the cumulative scientific value of the more than 90 studies it reviewed, the Interim Status Report does not present an accurate evaluation of the strengths and weaknesses of the totality of all of the available data. The research when viewed as a whole would allay parents' concerns about their children's health when playing on synthetic turf containing recycled rubber.

The primary issue identified by EPA is that there has not been a systematic chemical characterization of recycled rubber, combined with a multi-pathway health risk assessment. The aforementioned study by California's Office of Health Hazard Assessment (OEHHA) will address the point of having a multi-pathway health risk assessment, which is well-underway in its progress. Furthermore, EPA states that there are only limited biomonitoring studies and no epidemiology studies available. Notwithstanding the point that these statements fail to account for the cumulative scientific value of the literature reviewed, new research published since EPA's Interim Status Report, closes the data gaps such that the merits of continuing EPA's study should be re-evaluated.

Since the EPA Interim Status Report, three new studies have become available: (1) a Washington Department of Health (WDOH) cancer cluster investigation, (2) a Dutch government (RIVM) risk assessment, and (3) a European Chemicals Agency (ECHA) study released in February, 2017 of the health effects of playing on recycled rubber infill fields including exposure to metals, PAHs, and volatiles



through skin contact, inhalation, and ingestion that concluded there is a very low level of concern and found no reason to advise against playing on fields using recycled rubber infill. All three of these studies conclude, as almost all of the previous 90+ studies on this issue, recycled rubber does not present significant health concerns for users of synthetic turf fields.

Washington State

The ultimate irony, however, is that the Washington Department of Health (“WDOH”) has since refuted the soccer cancer cluster theory, and actually found fewer instances of cancer among soccer players than expected when compared to Washington residents of the same ages. Yet the subsequent studies sparked by her unfounded hypothesis continue on, and the subsequent regulatory uncertainty has delayed purchasing decisions while the public awaits the Agencies’ findings.

The WDOH study had two main goals: 1) to compare the number of cancers among soccer players on the coach's list to the number expected in a normal population, and 2) to describe the demographics of the individuals on the list, including factors related to cancer. The WDOH report concluded, "Using Coach Griffin's list to identify soccer players with cancer, this investigation found less cancer among the soccer players than expected based on rates of cancer among Washington residents of the same ages. This finding does not suggest that soccer players, select and premier soccer players, or goalkeepers in Washington are at increased risk for cancer compared to the general population. In addition, the currently available research on the health effects of artificial turf does not suggest that artificial turf presents a significant public health risk. Assurances of the safety of artificial turf, however, are limited by a lack of adequate information on potential toxicity and exposure."

Dutch and European Studies

Interestingly, the two studies by the Dutch government/RIVM and ECHA provide additional information on toxicity and exposure, thereby addressing the issue brought up by WDOH. The RIVM evaluated the exposure to chemicals in recycled rubber *via* skin, ingestion, and inhalation, using rubber samples from 100 different fields. They concluded that, "...because the substances are more or less ‘enclosed’ in the granulate, which means that the effect of these substances on human health is virtually negligible." The risk assessment by ECHA reported nearly identical findings. They evaluated 50 samples of new recycled rubber, as well as more than 100 fields in use. They concluded, "ECHA has considered exposure to rubber granules by skin contact, ingestion, and inhalation of substances evaporating from the granules, as well as dust formed by the granules themselves. ECHA concludes that there is at most a very low level of concern from exposure to recycled rubber granules."

Given these three new studies as well as the strength of the existing scientific evidence, we would encourage the agencies to reevaluate the existing evidence, in particular in relation to how the safety of other common consumer products has been evaluated. We feel that the existing evidence has only been strengthened with each new study, and that the time has come for the agencies to acknowledge that the current scientific evidence consistently has supported the safety of this product and remove the regulatory uncertainty surrounding this material.



Conclusion

We urge the Agencies to (1) re-evaluate the available research to apply a more cumulative analysis to the available research and include recent data points that further affirm the safety of recycled rubber; (2) conclude their effort with a definitive public statement that makes clear that the agency has not found issues of concern based on its own research to date, but will aggressively investigate should future evidence indicate that is appropriate; and (3) support the study being done by California OEHHA by providing it with the research done to date. The need for a duplicative federal study, especially given the new research that has now been done, is unjustifiable.

At the very least, EPA's activities must not result in regulatory uncertainty and result in harm to the environment or the communities they serve. EPA already has ample evidence to support a statement affirming the use of recycled rubber in synthetic turf fields and playgrounds. Any further delays in concluding the study and reassuring communities will cause further harm to the environment and those who would have purchased playing surfaces with recycled rubber but for the regulatory uncertainty being sustained by the delayed federal study.

Respectfully,

The Safe Fields Alliance

The Recycled Rubber Council

The Synthetic Turf Council

The Institute of Scrap Recycling Industries, Inc.

Response to public comment #1

Thank you for your interest in the joint U.S. Environmental Protection Agency (EPA) and the Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry (ATSDR) study on “Characterization of Exposure Potential during Activities Conducted on Synthetic Turf with Crumb Rubber Infill”. Federal researchers understand the interest and importance of better characterization of children’s exposure to tire crumb rubber constituents in synthetic turf fields. For the exposure characterization study activity described in this information collection request, players, including children and adolescents, on a number of fields from the four US census regions will be recruited. The different field locations should allow for a variety of field conditions, including temperature differences and different age and weathering patterns of the fields. The research is designed to improve our understanding of the chemicals children and adults may be exposed to and the types of activity and contact information needed to better characterize the inhalation, dermal, and ingestion pathways of exposure for adults and children using synthetic turf fields.

Research on children’s exposures at playgrounds with tire-derived rubber surfaces is not included in this information collection request, which focuses on synthetic turf fields. We have forwarded your comment to the Consumer Product Safety Commission, whose research efforts are aimed at identifying and assessing the risks associated the use of recycled tire crumb rubber in playground surfaces.

Response to public comment #2

Thank you for your interest in the joint U.S. Environmental Protection Agency (EPA) and the Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry (ATSDR) study on “Characterization of Exposure Potential during Activities Conducted on Synthetic Turf with Crumb Rubber Infill”. The exposure characterization study is a pilot-scale effort aimed at collecting information on how people might be exposed to chemicals in crumb rubber infill while playing on synthetic turf fields. For the exposure characterization study, players, including children and adolescents, on a number of fields from the four US census regions will be recruited. The different field locations should allow for a variety of field conditions, including temperature differences and different age and weathering patterns of the fields. Because the activity will not involve a statistically-based sampling design, the research will not provide data intended for nationwide generalizations. However, while the sample size is likely not sufficient for determining statistical differences, the exposure characterization study will fill essential data and knowledge gaps regarding the potential for human exposure during activities on synthetic turf fields. The information gained from the research activities conducted under the Federal Research Action Plan will help answer some key questions and will be used to identify future follow-up activities that could be conducted to provide additional insights about potential risks.

Federal researchers understand the concern regarding the water runoff caused by synthetic turf fields. The State-of-the-Science Literature Review/Gaps Analysis included in the December 2016 Status Report (<https://www.epa.gov/chemical-research/december-2016-status-report-federal-research-action-plan-recycled-tire-crumb>) identified nearly 30 articles or reports relevant to chemical leaching from tire crumb rubber and/or ecological toxicity and risk. However, examining the potential for ecological exposure and risks are beyond the scope of the current research activity which focuses on the better understanding the potential for human exposure for people using synthetic turf fields.

Response to public comment #3

Thank you for your interest in the joint U.S. Environmental Protection Agency (EPA) and the Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry (ATSDR) study on “Characterization of Exposure Potential during Activities Conducted on Synthetic Turf with Crumb Rubber Infill”.

As part of the work under the *Federal Research Action Plan on Recycled Tire Crumb Used on Playing Fields and Playgrounds*, the Agency for Toxic Substances and Disease Registry (ATSDR) and the United States Environmental Protection Agency (US EPA) were granted a six-month emergency OMB approval for a research protocol titled “Collections Related to Synthetic Turf Fields with Crumb Rubber Infill” (OMB Control No. 0923-0054, expiration date 01/31/2017) on July 22, 2016. The research goals of the protocol’s pilot-level investigations are to evaluate and characterize: the chemical composition and use of crumb rubber infill in synthetic turf using a convenience sample of nine tire recycling manufacturing plants and 40 facilities that use synthetic turf fields (tire crumb characterization study) and the human exposure potential to constituents in crumb rubber infill (exposure characterization study).

Since the six-month emergency Paperwork Reduction Act clearance was granted, ATSDR and US EPA completed the field work portion of tire crumb characterization study field work, which included sampling 40 synthetic turf fields with crumb rubber infill across the United States after garnering consent from field managers. These activities are reported in the "Status Report on the Federal Research Action Plan on Recycled Tire Crumb Used on Playing Fields and Playgrounds." The Status Report was released on December 30, 2016.

The new information collection request (ICR) is submitted under the typical (non-emergency) ICR process as a two-year request to complete the exposure characterization portion of the study; it is the intention of researchers to complete the remaining research and reporting activities as soon as possible. Ideally, the work will be completed by the end of the calendar year 2017. The timeline will depend in part on the availability of resources and most importantly on the availability and recruitment success of research participants. To provide more context for potential research timeline impacts, we describe below the technical aspects of collecting exposure characterization data that are needed to help fill important data gaps for a range of synthetic field users and to appropriately frame information generated as part of the tire crumb rubber characterization.

This new ICR proposes to use fields previously identified during the tire crumb characterization study to investigate the potential for human exposure to environmental constituents from contact with crumb rubber infill. The exposure characterization study is a pilot-scale effort aimed at collecting information on how people might be exposed to chemicals in crumb rubber infill while playing on synthetic turf fields. The study will use a questionnaire to determine different activities adults and children have on synthetic turf fields that may affect their potential exposures to chemicals in synthetic turf fields. In this study, we aim to include persons who have the potential for higher exposures, including children. Specifically, we plan to recruit and enroll children ages 6-17 and college-age individuals who engage in physical activities on synthetic turf fields with crumb rubber infill, in addition to adults. In addition to the questionnaire, we will use pre-existing video to collect information on types and frequencies of activities on synthetic turf fields, along with clothing and protective

equipment usage. A subset of the participants in the exposure characterization study, including children, will be asked to participate in an exposure measurements sub-study. In the exposure measurements sub-study, several types of samples will be collected. Personal air samples and ambient on-field air samples will be collected during the sports or training activity on the synthetic turf field; dermal wipe samples will be collected immediately following the activity. Air samples will be analyzed for metals, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs); dermal wipe samples will be analyzed for metals and SVOCs. Urine and blood samples will be collected at three time points around the sports or training activity, one sample pre-activity, one sample post-activity, and one sample 24 hours later. These samples will be archived for future analysis.

While previous and recent studies to date have not shown an elevated health risk from playing on fields with tire crumb rubber, these studies have limitations, particularly with regard to exposure assessment. The State-of-the-Science Literature Review/Gaps Analysis included in the December 2016 FRAP Status Report (<https://www.epa.gov/chemical-research/december-2016-status-report-federal-research-action-plan-recycled-tire-crumb>) identified several important exposure-related data gaps. These include limited information on human activity pattern information for synthetic field users, limited data needed to better characterize dermal and ingestion exposure pathways, variability in exposures, biomonitoring, limited aggregate and cumulative assessments, and no epidemiological investigations identified prior to the Washington Department of Health report in December 2016.

Most previous risk assessments and recent Netherlands RIVM and the European Chemicals Agency reports have relied in part on default and/or assumed exposure factors and assumptions, with limited information available to support dermal and ingestion pathways in their assessments. While the recent RIVM and ECHA reports have many strengths, they largely focused on soccer player and worker exposure scenarios while important U.S. scenarios, for example American football with potentially higher field material contact rates, have not been considered. The recent Washington state Department of Health investigation of cancer in Washington soccer players did not find an increased risk of cancer compared to the general population, but the authors noted that “Assurances of the safety of artificial turf, however, are limited by lack of adequate information on potential toxicity and exposure”. The WADOH study only looked at cancer rates in soccer players compared to state-wide cancer rates and did not consider other types of field users, such as football players. Although these recent reports provide additional information, the State-of-the-Science Literature Review/Gaps Analysis was not intended to make any conclusions or recommendations regarding the safety of the use of recycled tire crumb rubber in synthetic turf fields and playgrounds. The review was intended to identify important data gaps for guiding and designing future research efforts needed to further address questions regarding exposures, including those that are the subject of this ICR.

The exposure characterization research activities included in the current information collection request are not duplicative of previous research efforts and are aimed at reducing some important exposure data gaps that still remain. To date, there has been no comprehensive evaluation of exposure to tire crumb rubber constituents in the United States. Previous exposure studies are limited, often due to small sample size, limited geographic coverage, limited number/type of constituents measured, incomplete exposure pathway assessment, lack of biomonitoring sample collection, and absent or inadequate collection of exposure factor information needed to move away from default and assumed

exposure factors. Existing research in the United States is also limited in examining differences in exposures between adult and child synthetic field users, and across different types of athletic and physical training activities. Additional information is needed to better understand exposures in indoor facilities, with very limited information available in the United States. While this effort won't provide all the answers about whether synthetic turf fields are safe, it represents the first time that such a large study is being conducted across the U.S. The study will provide a better understanding of potential exposures that athletes and others may experience and will help answer some of the key questions that have been raised.

There are other studies currently being conducted, primarily by the California Office of Environmental Health and Hazard Assessment (OEHHA). While there are some similar efforts between the FRAP and the California OEHHA activities, their activities are limited to the state of California and may not reflect conditions and factors important for understanding exposures to synthetic field users across the United States. Consultation between the federal research team and Cal-OEHHA researchers is ongoing. The researchers will identify and implement methods and approaches that will, where feasible, produce comparable data. This could effectively expand the overall U.S. research sample size and will provide additional insight into potential exposure variability. There are also important differences between the federal and Cal-OEHHA studies that will provide complimentary data for improved exposure assessment. There is no duplication of efforts with the Washington State Department of Health study as their cancer incidence investigation looked only at cancer incidence rates among soccer players and did not investigate the potential chemical exposures as related to play on synthetic turf fields.