Michael Regan, Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue NW
Washington, DC 20460

Docket EPA-HQ-OAR-2022-0389

January 17, 2023

Dear Administrator Regan,

We are members of Project TENDR (Targeting Environmental Neuro-Development Risks), a group of scientists, health professionals, and children's and environmental advocates concerned about the contributions of environmental chemicals to neurodevelopmental disorders such as intellectual and learning disabilities, autism spectrum disorder, and attention deficit hyperactivity disorder. Some of the world's most recognized experts on the dangers of early life lead exposure participate in Project TENDR and published a consensus paper (Bellinger et al. 2017) to inform on and advocate for adequate protections based on decades of strong scientific evidence.

We urgently call for the Environmental Protection Agency (EPA) to finalize a finding that lead air pollution may reasonably be anticipated to endanger the public health and welfare within the meaning of section 231(a) of the Clean Air Act and that lead emissions from the engines of certain aircraft cause or contribute to this lead air pollution.

Over many decades, lead has been found to be causal in neurodevelopmental detriment for multiple indicators including cognitive and academic performance (Lanphear et al. 2000), sensorimotor development (Dietrich, et al. 1985, Bellinger et al. 1991), behavior (Needleman, et al. 1996), and attention regulation (Davis, et al. 2004) for many populations. Moreover, scientists now recognize that lead does lasting harm to children even at extremely low exposure levels. In 2012, the National Toxicology Program concluded that adverse effects are apparent on academic achievement, IQ, attention-related behaviors, and behavioral problems at blood lead concentration below 5 μg/dL.

Furthermore, there is growing evidence of effect modification in young BIPOC (Evans, et al. 2015, Amato, et al. 2013) and low-income children (Marshall, et al. 2020). This suggests that social conditions can worsen the impact of lead exposures.

In 2012, the Centers for Disease Control and Prevention (CDC) moved away from a "level of concern" for lead – which would imply a safe level below that, or that there exists a level of little to no concern - to a population-based guidance level in children that represents a sample of children at higher blood lead levels than the rest of the children in the nation. The population-based guidance level, referred to as "reference value," was set at 5 μg/dL in 2012 for the highest 2.5 percent of blood lead levels in children. This move was motivated by the fact that no safe level of lead has been found over decades of research and hundreds of scientific publications. The CDC further reduced the blood lead reference value to 3.5 μg/dL in 2021 to

reflect the populational trend over time (CDC, 2021). Therefore, it is urgent and necessary that EPA eliminate sources of environmental lead at every potential opportunity.

Restrictions and phasing out of lead in gasoline, paints, and other consumer products have resulted in blood lead concentrations in U.S. children decreasing; however lead exposure remains a major preventable cause of neurodevelopmental morbidity. Protective environmental health policies remain necessary to prevent adverse impacts of lead exposure in the first place.

Neurodevelopmental harm is particularly concerning because of its intergenerational impact along the lifespan (Washington HA, 2019). Neurodevelopmental impacts hinder school success, job readiness, language transfer to children, and are associated with adjudicated delinquency, lost lifetime earnings, and many other life-altering impacts. Therefore, it is appropriate that the US EPA finalize this proposed finding, as it is well supported by Executive Orders 12898 (59 FR 7629) and 14008 (86 FR) that require EPA to enact policy to incorporate Environmental Justice into their programs and policies, and Executive Order 13045 (62 FR 19885) that requires EPA to enact policy to protect children from environmental health risks and safety risks. Moreover, the rule is mandated under the Clean Air Act, 42 USC 7571, which says that "The Administrator shall, from time to time, issue proposed emission standards applicable to the emission of any air pollutant from any class or classes of aircraft engines which in his judgment causes, or contributes to, air pollution which may reasonably be anticipated to endanger public health or welfare. "

The rule is strongly supported by decades of scientific studies, past policy outcomes associated with decreased lead burden in populations, and the Biden administration's final lead strategy (CFR, 2022). The draft published analysis for this proposed rule was developed from a variety of connected studies and technical methodologies that follow the classic source to exposure to health effect continuum (Teegarden JG, et al. 2016).

This comprehensive analysis by EPA documents a case for public health endangerment based on the potential for NAAQS violations near general aviation airports. The lead NAAQS is a level of airborne lead that is set to be protective against a 2-point IQ loss. EPA’s analysis certainly provides strong evidence that airborne lead levels are not protective of the lead NAAQS IQ decrement, but we would like to make clear that since there has been no safe exposure level of lead found, this analysis albeit thorough, analytically sound, and well documented is not based on fully health protective assumptions.

Moreover, the lead NAAQS are not a good measure of whether leaded avgas endangers public health since the standard is quite outdated (last updated in 2008) and is not health protective, permitting significant IQ loss. EPA missed its October 2021 deadline for reviewing and revising the lead NAAQS. Even if areas around an airport are compliant with the lead NAAQS, public health and particularly children’s health could still be endangered. That said, the fact that the lead NAAQS are potentially exceeded shows how great a public concern leaded avgas is.

Monitoring studies of general aviation airports resulted in two demonstrated exceedances of the NAAQS using particulate monitoring. The monitoring studies employed a filter-based particulate capture methodology, which therefore does not capture gas-phase organically substituted lead. As a result, potential exceedances of the lead NAAQS are likely to be occurring at more than the reported number of small airports tested.

Lead from piston-engine aircraft is emitted in both gas and particle phase, and so health protective monitoring would include both gas phase and particle collection methods, and air dispersion modeling would need to be set up such that deposition algorithms as well as gas phase transport was appropriately parameterized. Therefore, potential NAAQS violations at small airports is well supported based on the particulate-based ambient air monitoring since this method did not capture all potential lead species.

Due to the underpredictions of potential NAAQS violations at small airports demonstrated by ambient air monitoring, EPA set up an air dispersion modeling study of 13,000 airports. Modeled predictions of lead concentrations, annual averages, and 3-month rolling averages for lead NAAQS compliance demonstration were estimated based on a sensitivity analysis. Locations and activity levels were varied to test potential concentration and location maxima.

Lead is also a persistent bioaccumulative toxicant, and risks from historic lead deposition to soil and surface waters, with resuspension from soils as discussed by EPA from Heiken et al. 2014, has been and is an ongoing source of potential exposures and harm. Source apportionment of soil lead from deposition and resuspension is technically challenging due to the dynamic processes and treatment of topsoil, although it is unclear to what extent EPA accounted for resuspension in their modeled estimates for airborne concentrations of lead. This process of deposition and resuspension is also an important contributor to future potential harm. Therefore, it is important to assess both lead resuspended, emitted, and entrained in the air as well as lead that can enter terrestrial and surface water environments and the food chain.

One parameter that was not well defined or explained in the proposed rule and the supporting information were the deposition parameters for lead. Deposition parameters that would be particularly important in this type of analysis are gas/particle fraction and the size range of the particles. In health protective air dispersion and deposition analyses, these deposition parameters would be maximized to a reasonable extent such that maximum air concentrations could be resolved as well as maximum potential deposition. In this case, the subsequent soil and surface water contamination and uptake into the food chain could be properly investigated.

Project TENDR supports the finding of endangerment of lead in aviation fuel, since potential lead NAAQS exceedances and concerning risk from multi-media exposures resulted from the analysis even without all possible worst-case scenarios developed. The finding of a minimum use level of 0.1 tons per year could be lower dependent on the relative concentrations of gas phase lead versus particulate phase lead emissions. This is reaffirmed by our earlier assertion

that an argument based on lead NAAQS exceedance is not fully protective of neurodevelopmental detriment since there is no safe level of lead exposure.

In the past two years, the U.S. EPA has made cumulative impacts a priority in research, and framework development (U.S. EPA Cumulative Impacts: Recommendations for ORD Research, U.S. EPA Equity Action Plan). One aspect of cumulative impacts is the consideration of the release or emissions of other chemicals with similar health endpoints. Lead is a well-known cognitive and neurodevelopmental toxicant. Small engine aircraft also emit combustion related air pollutants, including fine particulate and polycyclic aromatic hydrocarbons. There is existing and growing evidence of combustion related air pollution as a neurodevelopmental toxicant (Payne-Sturges et al. 2019). There is evidence of associations between fine and ultra-fine particulate exposure and impairments in learning, memory, and impulsive-like behaviors (Allen et al. 2017, Cory-Slechta 2018, Zhang et al 2018). Polycyclic aromatic hydrocarbons have also been found to be associated with neurodevelopmental and cognitive harm (Perera FP et al. 2014). When this rule is finalized, we ask that EPA acknowledge that the co-occurrence of these neurodevelopmental toxicants from this type of air emission source supports a finding of endangerment for lead emissions from piston-engine airplane emissions and further work may be required to address cumulative impacts in environmental justice communities.

Project TENDR has previously advocated for [1]protection of populations from exposure to lead, most recently in their letter to the CDC supporting a lower guidance level of lead. This step by the U.S. EPA is a necessary step towards prevention of children's lead exposure to reduce the ills that lead causes. There has been no safe level of lead exposure found; exposure to even a small amount of lead threatens the developing brain. Reducing this source of lead will further a critical goal of achieving public health and reducing exposure and health disparities in BIPOC and low-income communities that are disproportionally exposed to lead.

Thank you for your attention to this important public health action. We are happy to discuss this with you further.

Sincerely,

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[1] Project TENDR letter in support of lowering CDC Blood Lead Reference Value, https://projecttendr.com/wp-content/uploads/2021/10/Project-TENDR-letter_CDC_BLRL-8.2.21.pdf
Project TENDR peer-reviewed Consensus Statement, https://ehp.niehs.nih.gov/doi/10.1289/ehp358
Project TENDR scientists' publication "Establishing and Achieving National Goals for Preventing Lead Toxicity and Exposure in Children", https://jamanetwork.com/journals/jamapediatrics/article-abstract/2627572

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