October 24, 2017

Re: Consideration of Chlorpyrifos for possible Prop 65 listing based on developmental toxicity

Dear Chairperson Gold and Developmental and Reproductive Toxicant Identification Committee Members,

The following comments are submitted on behalf of the undersigned individuals and organizations, none of whom have any financial interest in the topic of these comments.

The U.S Environmental Protection Agency (EPA)’s previous risk assessments make clear the potential for adverse health effects in children after fetal exposure to chlorpyrifos, one of the most commonly used organophosphate pesticides (OP).1 EPA concluded that the observed neurodevelopmental impacts in children following prenatal chlorpyrifos exposures occur at levels below those that trigger cholinesterase inhibition in the pregnant mother.2

Data from toxicological studies has found disruption in neuronal development, neurotransmitter systems and synaptic formation as well as behavioral and cognitive impairments in test animals following perinatal chlorpyrifos exposure, including at exposure levels below those that cause cholinesterase inhibition.3

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2 USEPA, “Chlorpyrifos: Revised Human Health Risk Assessment for Registration Review..”


In dozens of epidemiologic studies, OP pesticide exposure during fetal development has been linked to developmental abnormalities of primitive reflexes in newborns, increases in mental and motor delays among preschoolers, ADHD in childhood, and decreases in working memory, verbal comprehension, perceptual reasoning, and full-scale IQ among elementary-school age children (see references for published reviews and study summaries). Applications of OP pesticides on agricultural fields within 1.5 km of homes where pregnant women resided was associated with an increased risk of autism spectrum disorders in their children, with the strongest associations seen for chlorpyrifos exposures.

A small preliminary prospective birth cohort study found chlorpyrifos in umbilical cord blood to be associated with volumetric changes in the brain measured by magnetic resonance imaging among school-age children. These changes were present in regions responsible for attention, receptive language processing, social cognition, and regulation of inhibition, suggesting neuroanatomic alterations that may underpin the behavioral and cognitive deficits associated with chlorpyrifos.

Similarly, arm tremors seen in children at age 11 years following prenatal chlorpyrifos exposure, as well as delayed synaptic development observed in rats underscores how impacts on the central and peripheral nervous system from intrauterine exposure can be enduring and may include latent effects.

As environmental health experts, we are concerned that further evidence of harm may emerge as studies continue to follow children with documented fetal exposure or of those exposed postnatally.


Given the astounding rate of brain growth during gestation (on average, 250,000 new neurons formed per minute), along with myelination and further brain development postnatally, opportunities for permanent damage are enormous.

In conclusion, chlorpyrifos warrants Prop 65 listing because, as described above, it has been clearly shown through scientifically valid testing according to generally accepted principles to cause developmental toxicity in both animal models and human epidemiologic studies.

Respectfully submitted,

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