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STATEMENT OF PHILIP J. LANDRIGAN, MD, MSc, FAAP

February 11, 2020

Re: SB 300– Pesticides –Use of Chlorpyrifos - Prohibition

Submitted to: The Senate Education, Health and Environmental Affairs Committee

Position: In support of SB 300

A Ban on Chlorpyrifos Will Safeguard the Health of Maryland’s Children

I am a pediatrician,, public health physician and epidemiologist. I currently serve as Director of the Program in Global Public Health and the Common Good at Boston College. I am also Professor Emeritus of Preventive Medicine and Pediatrics and Chair Emeritus of the Department of Preventive Medicine at the Icahn School of Medicine at Mount Sinai. Until June, 2018 I was Professor of Preventive Medicine, and Pediatrics, and Dean for Global Health at the Icahn School of Medicine at Mount Sinai.

I have undertaken research to understand the impacts of toxic chemicals on children’s health, and I have worked for more than four decades to protect children against toxic chemicals and other environmental hazards. I am an elected member of the National Academy of Medicine.

From 1988-1993, I chaired a National Academy of Sciences’ Committee on Pesticides in the Diets of Infants and Children. This Committee was convened at the request of the Committee on Agriculture of the United States Senate. Its investigations found that children, including children in the womb, are uniquely susceptible to pesticides - much more vulnerable than adults - and provided the blueprint for the Food Quality Protection act of 1996, the federal law on pesticides.

Chlorpyrifos is an organophosphate insecticide, a member of class of chemicals deliberately engineered to be toxic to the brain and nervous system. It is through injury to nervous system that organophosphate insecticides kill insects, and it is also through injury to the brain and nervous system that these chemicals cause acute and chronic poisoning in humans. Perhaps the most notorious member of the organophosphate family is sarin, the war gas used in the 1995 Tokyo subway attack.

Chlorpyrifos is highly toxic to the developing brains of infants and young children. Infants in the womb are especially vulnerable. When a pregnant woman is exposed to chlorpyrifos, the chemical moves

immediately from her bloodstream into the bloodstream of her unborn child to cause fetal brain damage.

Three recent epidemiologic studies confirm that exposure to chlorpyrifos during the nine months of pregnancy has harmful effects on children's brains that persist at least to the age of 7 years. These three studies, based on different populations, located in distinct geographical regions of the US, with different routes of exposure, and using different biomarkers of exposure, have produced strongly convergent results. One study from the University of California at Berkeley reported harmful effects on cognition – reductions in IQ scores - among the children of agricultural workers in the Salinas Valley. The second study was undertaken at my institution, the Mount Sinai School of Medicine, and found similar effects in a New York City Hispanic population, whose exposures were largely residential. And the third study, also conducted in New York City by investigators at Columbia University among a population of African-American and Dominican children found negative effects of prenatal chlorpyrifos exposure on children's brain development.

In addition to damaging children's cognitive abilities and reducing their IQ, chlorpyrifos exposure during pregnancy is associated also with changes in children's social behavior and with developmental delays. Thus the Columbia University study found that children with higher exposures in the womb to chlorpyrifos were behind their peers from the same communities in motor and mental development by age three. These children were also more than 5 times more likely to be diagnosed on the autism spectrum, more than 6 times more likely to have ADHD-type symptoms, and more than 11 times more likely to have symptoms of other attention disorders.

Another striking finding from the Columbia University study was that children born before a ban on residential use of chlorpyrifos that took effect in the United States in the year 2000 had much higher exposure levels, tended to be smaller, had poorer reflexes, and had smaller head circumference at birth than children born after the ban. Small head circumference at birth is an indicator impaired brain development during pregnancy and is also one of the hallmarks of prenatal Zika virus infection.

Most recently, a study using magnetic resonance imaging (MRI) found that even low to moderate levels of prenatal exposure to chlorpyrifos – levels that are below current EPA standards - may lead to long-term, potentially irreversible changes in the structure of the developing brain. This study was undertaken within the population of chlorpyrifos-exposed children followed at Columbia University.

It is important to note that in addition to being exquisitely sensitive to chlorpyrifos, infants and small children are also extensively exposed to this insecticide. Due to their small body size and greater intake of food per pound of body weight, EPA estimates that children ages 1 to 12 are exposed to significantly more chlorpyrifos through their diets than adults. Chlorpyrifos is authorized for use on nearly 50 food crops, including fruits, vegetables, and nuts heavily consumed by children. In annual tests for pesticide residues on conventionally grown produce, the U.S. Department of Agriculture finds chlorpyrifos on commonly eaten fruits and vegetables, with especially high concentrations on peaches and nectarines.

In conclusion, the medical evidence is consistent and it is overwhelming. Children are extensively exposed to chlorpyrifos, and chlorpyrifos can cause permanent injury to children's brains, and these risks are greatest to unborn children. Chlorpyrifos reduces children's intelligence, impairs their social functioning, and ultimately reduces their ability to contribute to the United States of America. To permit the continuing exposure of unborn children to a chemical that damages their brains is not only an affront to morality, but also a threat to the security of our nation.

Given US EPA's most recent appeal of the 9th Circuit Court of Appeals ruling in August 2018 stating that the EPA must "revoke all tolerances and cancel all registrations for chlorpyrifos", it behooves states to take the lead on banning chlorpyrifos". The previous EPA administrator Scott Pruitt chose to disregard his own agency scientists' recommendation that chlorpyrifos be banned for all agricultural uses, resulting in several state attorney generals, including Maryland Attorney Brian Frosh suing the agency. The 9th Circuit Court ruled that there was "no justification for the EPA's decision ... in the face of scientific evidence that its residue on food causes neurodevelopmental damage to children." EPA will likely continue its efforts to keep chlorpyrifos on the market.

I urge this committee to pass a favorable report on SB 300 for an immediate ban on all uses of chlorpyrifos in the state of Maryland. It is urgently needed to protect the health of Maryland's children.

Philip J. Landrigan, MD, MSc, FAAP is Director of the Program in Global Public Health and the Common Good within the Schiller Institute for Integrated Science and Society at Boston College. He is also Professor Emeritus of Preventive Medicine and Pediatrics and Chair Emeritus, Department of Preventive Medicine in the Icahn School of Medicine at Mount Sinai

Dr. Landrigan's research on the effects of lead poisoning in children contributed to the U.S. government's decision to remove lead from gasoline and paint. His leadership of a National Academy of Sciences Committee on Pesticides in the Diets of Infants and Children generated widespread understanding that children are uniquely vulnerable to pesticides and other toxic chemicals and helped to secure passage of the Food Quality Protection Act of 1996, the only federal environmental law in the United States that contains explicit protections protecting the health of children. In New York City, Dr. Landrigan was centrally involved in the medical and epidemiologic follow-up studies of the first responders to the attacks on the World Trade Center on September 11, 2001. He has consulted to the World Health Organization and chaired The Lancet-Mount Sinai Global Commission on Pollution & Health.

Dr. Landrigan is a graduate of Boston Latin School, Boston College, Harvard Medical School and the London School of Hygiene & Tropical Medicine. He is a 41-year veteran of the US Public Health Service and the US Navy and retired from the Navy at the rank of Captain (O-6).

Sincerely,

A handwritten signature in black ink, appearing to read 'Philip J. Landrigan', with a stylized flourish at the end.

Philip J. Landrigan, MD, MSc, FAAP