



House Environment and Transportation Committee  
February 4, 2026  
House Bill 91 – *Agriculture - Neonicotinoid Pesticides - Prohibitions*  
**POSITION: SUPPORT**

The Maryland Chapter of the American Academy of Pediatrics (MDAAP) is a statewide association representing more than 1,100 pediatricians and allied pediatric and adolescent healthcare practitioners in the State and is a strong and established advocate promoting the health and safety of all the children we serve. On behalf of MDAAP, we submit this letter of **support** for House Bill 91.

**Children and fetuses are uniquely susceptible to the effects of toxic substances.**

Despite being smaller than adults, children ingest and inhale larger amounts of toxic substances relative to their body weight. They eat and drink more per pound, and they breathe at a faster rate. Their hand to mouth behaviors increase ingestion from sources such as soil or house dust which can be contaminated by a variety of toxic chemicals. Because children and fetuses are actively growing, and their organs are forming and developing, substances that interfere with this growth and development can have lasting and potentially irreversible impacts. It's the vulnerability of growing and developing fetuses and children that puts them at greater risk from toxic exposures, not the dose of the poison to which they are exposed.

Neonics have been shown to cross the placenta to enter the fetal circulation<sup>1</sup> and have also been found in human breastmilk, with one study demonstrating the presence of at least one neonic in >94% of samples.<sup>2</sup>

Frequent exposure to the neonic imidacloprid during pregnancy was associated with a 2x risk of Autism Spectrum Disorder (ASD).<sup>3</sup> Prenatal exposures to neonics as a group and imidacloprid individually was associated with a 2.4x increased risk of Tetralogy of Fallot, a cardiac malformation.<sup>4</sup> Imidacloprid exposure was also associated with a 2.9x increased risk of anencephaly, a condition in which the brain and skull do not fully form.<sup>5</sup> A study of the effects agricultural exposures to pesticides on the IQ of 7-year-old children showed modest but significant decreases of Full-Scale IQ (-1.7), Perceptual Reasoning (-1.9), and Verbal Comprehension (-1.9) in association with neonic exposure.<sup>6</sup> Very limited research into chronic exposure to neonics over time has been conducted, particularly in light of the widespread use of this class of insecticides.

**Children and fetuses are increasingly exposed to neonics.**

In a sample of pregnant women from across the US from 2017-2020, neonics and their metabolites were highly detected, with two detected in over 90% of samples (thiomethoxam-92%; NDMA-96%). Several neonics were found in increasing concentrations over the four-year study period,<sup>7</sup> and neonics were also detected more frequently than in an earlier survey from 2015-2016.<sup>8</sup>

Neonics contaminate food and drinking water, which are among the main sources of human exposure. Neonics are systemic pesticides, becoming incorporated into the entire plant, including its leaves and fruits. Because neonics become part of the edible portions of plants, they cannot be removed by washing or peeling. Plants absorb these neonics from soils where neonics have been used previously and from direct applications to seeds. A study of neonic residues from 1999-2015 identified neonic residues in >20% of samples of cherries, apples,

pears, strawberries, grapes, cauliflower, celery, lettuce, spinach, greens and potatoes (range 20.9-57.5%). At least one neonic was found in 25% of pears, 35.9% of peaches and 51.5% of applesauce sold as baby foods.<sup>9</sup>

Neonics are highly water-soluble and readily contaminate groundwater, streams, and other surface waters through runoff from agricultural, lawn care and garden usage. They are not removed from drinking water sources by conventional treatment processes,<sup>10</sup> and chlorination can result in compounds with increased toxicity.<sup>11</sup> Exposures to neonics can also occur from proximity to agricultural fields, from in-home pest treatments, and from contact with flea and tick treatments for household pets.<sup>12</sup>

### **Additional Neonic Toxicity Studies in Humans**

Neonics act by targeting receptors on nerve cells and, along with their metabolites, have demonstrated symptoms of neurotoxicity in humans.<sup>13,14</sup> A review of 842 neonic-associated poisonings from 2018-2022 reported symptoms of headache, dizziness, lethargy, muscle weakness, and tremor in moderate poisonings, and seizures and death in major poisonings.<sup>12</sup>

Additional studies in adults have linked neonic exposures to memory loss and tremors;<sup>13</sup> reproductive toxicity in women<sup>15</sup> and men, including decreased testosterone,<sup>16</sup> semen quality,<sup>17</sup> and sperm count;<sup>18</sup> and altered insulin and glucose regulation.<sup>19</sup>

One additional concern, particularly in light of the above evidence, is the failure of EPA to apply the 10-fold child safety factor, as required by the Food Quality Protection Act,<sup>20</sup> to neonic pesticides. The EPA also failed to take into account potential harms from cumulative exposure to multiple neonics and their metabolites, which appear to have particular potential for human harm.

Exposures to neonic pesticides are increasing, and a growing body of evidence suggests that exposure to these chemicals and their metabolites has the potential for human harm, particularly to the most vulnerable, children and fetuses. Because HB 0091 would reduce such exposures, children in our state would benefit from protection from the harmful effects of these chemicals. MDAAP requests a favorable report on this proposed legislation.

### **References**

<sup>1</sup> Zhang, H, Bai, X, et al. Neonicotinoid Insecticides and Their Metabolites Can Pass through the Human Placenta Unimpeded. *Environ Sci Technol.* 2022, 56 (23), 17143-17152. doi.org/10.1021/acs.est.2c06091

<sup>2</sup> Zhang, Q. et al. Occurrence, distribution and potential risk to infants of neonicotinoids in breast milk: a case study in Hangzhou, China. *Sci Total Environ.* 2023, 878, 163044. doi.org/10.1016/j.scitotenv.2023.163044

<sup>3</sup> Keil, AP, Daniels, JL and Hertz-Picciotto, I. Autism spectrum disorder, flea and tick medication, and adjustments for exposure misclassification: the CHARGE (CHildhood Autism Risks from Genetics and Environment) case-control study. *Environmental Health.* 2014, 13 (3) <http://www.ehjournal.net/content/13/1/3>

<sup>4</sup> Carmichael, SL, Yang, W et al. Residential agricultural pesticide exposures and risk of selected congenital heart defects among offspring in the San Joaquin Valley of California. *Environ Res.* 2014, 135: 133-138. doi:10.1016/j.envres.2014.08.030

<sup>5</sup> Yang, W, Carmichael, SL et al. Residential Agricultural Pesticide Exposures and Risk of Neural Tube Defects and Orofacial Clefts Among Offspring in the San Joaquin Valley of California. *Am J Epidemiol.* 2014, 179 (6): 740-748. doi:10.1093/aje/kwt324

<sup>6</sup> Gunier, RB, Bradman, A et al. Prenatal Residential Proximity to Agricultural Pesticide Use and IQ in 7-Year-Old Children. *Environmental Health Perspectives.* 2017, 125 (5):057002. doi.org/10.1289/EHP504

- <sup>7</sup> Buckley, JP, Kuiper, JR et al. Exposure to Contemporary and Emerging Chemicals in Commerce among Pregnant Women in the United States: The Environmental influences on Child Health Outcome (ECHO) Program. *Environ. Sci. Technol.* 2022, 56, 6560-6573. doi.org/10.1021/acs.est.1c08942
- <sup>8</sup> Ospina, M, Wong, L-Y et al. Exposure to Neonicotinoid Insecticides in the US General Population: Data from the 2015-2016 National Health and Nutrition Examination Survey (NHANES). *Environ Res.* 2019, 176: 10855. doi:10.1016/j.envres.2019.108555
- <sup>9</sup> Craddock, HA, Huang, D et al. Trends in neonicotinoid pesticide residues in food and water in the United States, 1999-2015. *Environmental Health.* 2019, 18 (7). doi.org/10.1186/s12940-018-0441-7
- <sup>10</sup> Klarich, KL, Pflug, NC et al. Occurrence of Neonicotinoid Insecticides in Finished Drinking Water and Fate during Drinking Water Treatment. *Environ. Sci. Technol. Lett.* 2017, 4:168-173. doi:10.1021/acss.estlett.7b00081
- <sup>11</sup> Klarich Wong, KL, Webb, DT et al. Chlorinated Byproducts of Neonicotinoids and their Metabolites: An Unrecognized Human Exposure Potential? *Environ. Sci. Technol. Lett.* 2019, 6 (2): 98-105. doi.org/10.1021/acs.estlett.8b00706
- <sup>12</sup> Sass, JB and Raichel, D. Human acute poisoning incidents associated with neonicotinoid pesticides in the US. Incident Data System (IDS) database from 2018-2022—frequency and severity show public health risks and regulatory failures. *Environmental Health.* 2024, 23(102). doi.org/10.1186/s12940-024-01139-2
- <sup>13</sup> Marfo, JT, Fujioka, K et al. Relationship between Urinary *N*-Desmethyl Acetamiprid and Typical Symptoms including Neurological Findings: A Prevalence Case-Control Study. *PLoS ONE.* 10 (11): e0142172. doi:10.1371/journal.pone.0142172
- <sup>14</sup> Zhang, J, Song, S et al. Transformation Products of Neonicotinoids: A Review of Human Exposure, Toxicity, and Health Risks. *Environ. Sci. Technol.* 2025, 59 (34): 17933-17951. doi:10.1021/acs.est.Sc00372
- <sup>15</sup> Oladosu, JI and Flaws, JA. The impact of neonicotinoid pesticides on reproductive health. *Toxicol. Sci.* 2025, 203 (2): 131-146. doi:10.1093/toxsci/kfae138
- <sup>16</sup> Mendy, A and Pinney, SM. Exposure to neonicotinoids and serum testosterone in men, women, and children. *Environ. Toxicol.* 2022, 37 (6): 1521-1528. doi:10.1002/tox.23503
- <sup>17</sup> Wang, A, Wan, Y et al. Neonicotinoid insecticide metabolites in seminal plasma: Associations with semen quality. *Sci. Total Environ.* 2022, 811: 151407. doi:10.1016/j.scitotenv.2021.151407
- <sup>18</sup> Hafez, EM, Issa, SY et al. The Neonicotinoid Pesticide Imidocloprid: A Male Reproductive System Toxicity Inducer-Human and Experimental Study. *Toxicol. Open Access.* 2016, 2: 109. doi:10.4172/2476-2067.1000109
- <sup>19</sup> Vuong, AM, Zhang, C and Chen, A. Associations of neonicotinoids with insulin and glucose homeostasis parameters in US adults: NHANES 2015-2016. *Chemosphere.* 2022, 286 (Pt. 1): 131642. doi:10.1016/j.chemosphere.2021.131642
- <sup>20</sup> Food Quality Protection Act: <https://www.epa.gov/laws-regulations/summary-food-quality-protection-act>

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