



BEYOND PESTICIDES

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Linda Irokawa-Otani, Regulations Coordinator
Brian Leahy, Director
Department of Pesticide Regulation (DPR)
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RE: Draft regulations for pesticide use near schools

Dear Director Leahy and Coordinator Irokawa-Otani:

Beyond Pesticides is a national, grassroots, membership organization that represents community-based organizations and a range of people seeking to improve protections from pesticides and promote alternative pest management strategies that reduce or eliminate a reliance on toxic pesticides. Our membership spans the 50 states, the District of Columbia, and groups around the world. We are submitting this statement on behalf of our supporters who are residents of California.

Beyond Pesticides is extremely concerned that DPR's draft regulations for pesticide use near schools and day care centers do not adequately protect school children or staff from the health threats of highly hazardous, drift-prone pesticide applications, because the proposed buffer zones are far too small and apply for only a part of the day. The buffer zones need to be in place 24 hours per day and be at least one mile wide. Additionally, counties must retain full authority to adopt stricter requirements based on local conditions.

Children are at Particular Risk from Exposure to Pesticides and Pesticide Drift

As a national health and environmental organization, we have serious concerns about widespread agricultural pesticide use near local schools. We urge DPR to move swiftly to improve the draft policy to provide comprehensive protections for school children and staff from hazardous and volatile pesticides.

Children face unique dangers from pesticide exposure. The National Academy of Sciences reports that children are more susceptible to chemicals than adults and estimates that 50% of

lifetime pesticide exposures occur during the first five years of life.¹ In fact, studies show children's developing organs create "early windows of great vulnerability" during which exposure to pesticides can cause great damage.² Additionally, according to researchers at the University of California-Berkeley School of Public Health, exposure to pesticides while in the womb may increase the odds that a child will have attention deficit hyperactivity disorder (ADHD).³

As EPA points out in its document, *Pesticides and Their Impact on Children: Key Facts and Talking Points*:⁴

- "Due to key differences in physiology and behavior, children are more susceptible to environmental hazards than adults."
- "Children spend more time outdoors on grass, playing fields, and play equipment where pesticides may be present."
- "Children's hand-to-mouth contact is more frequent, exposing them to toxins through ingestion."

In 2012, the American Academy of Pediatrics (AAP) released a landmark policy statement, *Pesticide Exposure in Children*, on the effects of pesticide exposure in children, acknowledging the risks to children from both acute and chronic effects.⁵ AAP's statement notes that, "Children encounter pesticides daily and have unique susceptibilities to their potential toxicity." The report discusses how kids are exposed to pesticides every day in air, food, dust, and soil. Germane to DPR's proposed rules, AAP writes, "In agricultural settings, pesticide spray drift is important for residences near treated crops or by take-home exposure on clothing and footwear of agricultural workers."

Prenatal exposures to pesticides can also have long-lasting impacts on infants and children. A 2008 ecological study analyzing incidence data from U.S. children ages 0-14 years diagnosed with cancer between 1995 and 2001 and residence in a county with agricultural activity finds an elevated risk for malignant bone tumors and for subtype osteosarcoma at high agricultural activity.⁶ Herbicides, like glyphosate, widely used in agriculture, can adversely affect embryonic, placental and umbilical cord cells, and can impact fetal development. Preconception exposures to glyphosate were found to moderately increase the risk for spontaneous abortions

¹ National Research Council, National Academy of Sciences. 1993. *Pesticides in the Diets of Infants and Children*, National Academy Press, Washington, DC: 184-185.

² Landrigan, P.J., L Claudio, SB Markowitz, et al. 1999. "Pesticides and inner-city children: exposures, risks, and prevention." *Environmental Health Perspectives* 107 (Suppl 3): 431-437.

³ Marks AR, Harley K, Bradman A, Kogut K, Barr DB, Johnson C, et al. 2010. Organophosphate Pesticide Exposure and Attention in Young Mexican-American Children: The CHAMACOS Study. *Environ Health Perspect* 118:1768-1774.

⁴ See: <https://www.epa.gov/sites/production/files/2015-12/documents/pest-impact-hsstaff.pdf>

⁵ Roberts JR, Karr CJ; Council On Environmental Health. 2012. Pesticide exposure in children. *Pediatrics*. 2012 Dec; 130(6):e1765-88.

⁶ Carrozza, S.E., et al. 2008. *Environ Health Perspect* 116(4):559-565.

in mothers exposed to glyphosate products.⁷ Studies also find that pesticides, like 2,4-D, can also pass from mother to child through umbilical cord blood and breast milk.^{8,9}

A 2012 study finds that children with high exposure levels of the commonly used organophosphate chlorpyrifos have changes to the brain, including enlargement of superior temporal, posterior middle temporal, and inferior postcentral gyri bilaterally, and enlarged superior frontal gyrus, gyrus rectus, cuneus, and precuneus along the mesial wall of the right hemisphere.¹⁰ For children with lower exposures, a significant exposure/ IQ interaction is observed due to chlorpyrifos' disruption of normal IQ associations.

Additional research by Rauh et al. finds that children exposed to high levels of chlorpyrifos had mental development delays, attention problems, attention-deficit/hyperactivity disorder problems, and pervasive developmental disorder problems at three years of age.^{11,12} The results of these cohort studies have consistently found that depressed cognitive development, birth weights and other neurodevelopmental endpoints are adversely impacted by chlorpyrifos and other pesticidal exposures.¹³

One study from the University of California, Berkeley, examining families in the intensive agricultural region of Salinas Valley, California, found that IQ levels for children with the most organophosphate (OP) exposure were a full seven IQ points lower than those with the lowest exposure levels. The Berkeley team also found that every tenfold increase in measures of OPs detected during a mother's pregnancy corresponded to a 5.5 point drop in overall IQ scores in the seven-year-olds.¹⁴ Researchers from Mount Sinai School of Medicine also found that prenatal exposure to organophosphates is negatively associated with cognitive development, particularly perceptual reasoning, with evidence of effects beginning at 12 months and continuing through early childhood.¹⁵

In the context of these health impacts to children, also consider that Latino school children are disproportionately exposed to toxic pesticide drift, a fact documented by the Department of Public Health (DPH) report released in 2014. Latino children are almost twice as

⁷ Arbuckle, T. E., Lin, Z., & Mery, L. S. (2001). An Exploratory Analysis of the Effect of Pesticide Exposure on the Risk of Spontaneous Abortion in an Ontario Farm Population. *Environ Health Perspect*, 109, 851–857.

⁸ Pohl, HR., et al. 2000. Breast-feeding exposure of infants to selected pesticides. *Toxicol Ind Health*. 16:65-77.

⁹ Sturtz, N., et al. 2000. Detection of 2,4-dichlorophenoxyacetic acid (2,4-D) residues in neonates breast-fed by 2,4-D exposed dams. *Neurotoxicology* 21(1-2): 147-54.

¹⁰ Rauh VA, Perera FP, Horton MK, et al. 2012. Brain anomalies in children exposed prenatally to a common organophosphate pesticide. *Proc Natl Acad Sci U S A*. 109(20):7871-6.

¹¹ Rauh VA. 2006. Impact of prenatal chlorpyrifos exposure on neurodevelopment in the first 3 years of life among inner-city children. *Pediatrics*;118(6):e1845-59.

¹² Rauh V, Arunajadai S, Horton M, Perera F, Hoepner L, Barr DB, et al. 2011. Seven-Year Neurodevelopmental Scores and Prenatal Exposure to Chlorpyrifos, a Common Agricultural Pesticide. *Environ Health Perspect* 119:1196-1201.

¹³ Perera FP, et al. 2005. A summary of recent findings on birth outcomes and developmental effects of prenatal ETS, PAH, and pesticide exposures. *Neurotoxicology*;26(4):573-87.

¹⁴ Bouchard MF, Chevrier J, Harley KG, Kogut K, Vedar M, Calderon N, et al. 2011. Prenatal Exposure to Organophosphate Pesticides and IQ in 7-Year-Old Children. *Environ Health Perspect*. 119:1189-1195.

¹⁵ Engel, S. et al. 2011. Prenatal Exposure to Organophosphates, Paraoxonase 1, and Cognitive Development in Childhood. *Environ Health Perspect*. 119:1182-1188.

likely as white children to attend schools near the heaviest agricultural pesticide use. This is a civil rights violation that DPR must rectify by decreasing the risk of pesticide exposure at schools across the state. The DPH report also found soil fumigants and other pesticides that are known to cause cancer, reproductive system effects, harm to the brain and nervous system and respiratory effects being used in large quantities within ¼-mile of many California schools. The draft regulations allow for the continuation of these unjust conditions, as the threats from pesticide drift continue long after applications outside the 6 a.m. to 6 p.m. buffer zone period for most applications and 36 hour period for fumigations, and from applications beyond the insufficient ¼-mile buffer zone distance.

One-Quarter Mile Drift Buffers Are Not Protective of Human Health

A 2001 study by Texas A&M University researchers shows that pesticides can volatilize into the gaseous state and be transported over long distances fairly rapidly through wind and rain.¹⁶ A U.S. Geological Survey report also published in 2001 reached similar conclusions, finding, “After they are applied, many pesticides volatilize into the lower atmosphere, a process that can continue for days, weeks, or months after the application, depending on the compound. In addition, pesticides can become airborne attached to wind-blown dust.”¹⁷ The report also documents that pesticides in rainfall collected in Modesto, California exceeded state guidelines for the protection of aquatic life in most samples.

DPR should require at least one-mile protection zones (buffer zones) for pesticides of public health concern between fields where these pesticides are used and schools, childcare centers, school bus stops, and known school routes. Pesticides of public health concern include pesticides that show evidence of causing cancer, reproductive damage, harm to the brain and nervous and immune system, and asthma and other respiratory problems. Hundreds of thousands, if not millions, of pounds of these hazardous pesticides are currently used annually near schools and day care centers in agricultural counties throughout California.

As studies show, protection zones of ¼-mile are simply not adequate for health protection. The first comprehensive report of drift-related pesticide poisoning conducted by state and federal health departments, found that in eleven states (including California) 15% of the people impacted in pesticide drift incidents were over 1 mile from the pesticide application, so 85% would have been protected by a one mile buffer zone. Seventy-six percent of the cases occurred at distances over ¼-mile from the application site, so ¼-mile buffer zones would not help in most cases. DPR’s own air-monitoring network has shown ¼-mile buffer zones to be inadequate. For example, the air monitor at Shafter High School in Kern County has registered over the last four years average concentrations of the toxic fumigant Telone at 175% of DPR’s previous lifetime cancer risk level of concern, which agency risk assessment experts continue to

¹⁶ Wade, T., et al. 2001. Atmospheric Deposition of PAH, PCB and Organochlorine Pesticides to Corpus Christi Bay. Texas A&M Geochemical and Environmental Research Group. Presented at the National Atmospheric Deposition Program Committee Meeting.

¹⁷ Majewski, M., et al. 2001. “Diazinon and Chlorpyrifos Loads in Precipitation and Urban and Agricultural Storm Runoff during January and February 2001. in the San Joaquin River Basin, California.” U.S. Geological Survey.

support. This occurred despite ¼-mile buffer zones for schools in Kern County and zero Telone applications within ¼-mile of the school.

Research from the University of California, Davis, Childhood Autism Risks from Genetics and the Environment (CHARGE) study finds that pregnant women who live within one mile of agricultural fields treated with insecticides are more likely to have their child develop autism.¹⁸ For women who lived less than one mile from crops sprayed with OP insecticides during their pregnancy, researchers found the likelihood of their child being diagnosed with autism increased 60%. Women in the second trimester living near fields treated with chlorpyrifos are 3.3 times more likely to have their children diagnosed with autism.

No-spray protection zones around schools and day care centers should be enforced 24 hours a day, 7 days a week for fumigations, ground air blast, as well as for aircraft applications, not only Monday through Friday, from 6am to 6pm. The fact is that students, teachers and community members are often on school grounds for scheduled events and unscheduled activities when school is not formally in session. Furthermore, given that pesticides can evaporate off the crop plants for days and even weeks after they are applied, and pesticide contaminated dust can be blown onto school grounds and tracked into classrooms, it should be noted that eight of the ten pesticides most heavily used within a ¼-mile of schools persist in the environment for more than a week. The state must also not neglect protection of children that do not attend public schools, such as private K-12 schools or family day care homes. This is a significant oversight in DPR's regulations, and leaves a wide number of children at risk of continued exposure to toxic pesticides.

The State Quantifies Costs, But Not Benefits

The proposed regulation's Economic and Fiscal Impact Statement is woefully inadequate at capturing the wide ranging benefits of implementing sensible buffer zones near where children learn and play. While DPR was more than willing to place the costs of this regulation into real numbers, it appears hesitant to quantify the monetary benefits of decreased pesticide exposure to children and bystanders. We hope to assist. There are strong arguments in peer reviewed literature to suggest DPR should consider impacts to the well-being of the school children and staff outside of simply counting the number of pesticide illnesses reported to the agency.

An October 2016 study published in *The Lancet* by an international team of health researchers conducted a wide-ranging analysis quantifying the financial cost exposure to endocrine disrupting chemicals causes in the United States.¹⁹ A large proportion of financial cost came in the form of lost IQ points. For pesticide exposure in particular, which was found to be the second most costly chemical group in the U.S. (only behind flame retardant chemicals),

¹⁸ Shelton, J, Geraghty, EM, Tancredi, DJ, et al. 2014. Neurodevelopmental Disorders and Prenatal Residential Proximity to Agricultural Pesticides: The CHARGE Study. *Environ Health Perspect.* 122:1103–1109.

¹⁹ Attina et al. 2016. Exposure to endocrine-disrupting chemicals in the USA: a population-based disease burden and cost analysis. *The Lancet Diabetes and Endocrinology.* Volume 4, No. 12, p996–1003.

scientists have determined that 1.8 million IQ points were lost each year, leading to 7,500 annual intellectual disability cases, with an estimated cost at a staggering \$44.7 billion.

According to the National Center for Education Statistics, average student membership size per school in California was 712.2 students in the 2009–2010 school year.²⁰ DPR indicates that 3,499 school facilities are near agricultural pesticide applications and potentially affected by drift.²¹ Thus, according to publicly available figures, roughly 2,491,988 children are at risk from toxic pesticide drift. Of the U.S. population, which according to the U.S. census is currently 319 million, this represents approximately 0.008%. Thus, we can take this percent (0.008%) of the \$44.7 billion, as *The Lancet* analysis indicates, to identify costs in terms of lost IQ points to be estimated at \$350 million in the state of California. There are, of course, interceding factors that we are not discounting. For instance, this regulation would not eliminate pesticide use, just curtail it at certain times, so one could expect this number to be lower. But even taking a fraction, 10% of this number, we find that the benefits of this regulation far outweigh the costs – by over \$15 million according to the state’s Economic Impact Statement.²²

And this is a conservative approach. Over a third of the country’s vegetables and two-thirds of the country’s fruits and nuts are grown in California.²³ In 2007, the latest year where comparable data is available, the U.S. Environmental Protection Agency indicates roughly 1.13 billion lbs of pesticide were sold in the U.S., while DPR estimates 677 million lbs of pesticide were sold in the state of California that year, thus leaving the state to account for over half of sales.²⁴ While sales certainly do not equate to usage, nor is usage evenly spread, it follows that agricultural production is much higher in California than other locations, and particularly in locations where children from underserved and minority groups need to be protected by buffer zones.

Indeed there is an argument to be made that it is likely that in the most pesticide-intensive areas around California where this regulation will apply, the loss of IQ points is the highest. Also recall that *The Lancet* analysis indicates this is a *yearly* cost, so benefits over the course of the regulation’s lifetime would also be much higher. Further, this review is limited specifically to loss of IQ points for which there is a strong probability of causation.²⁵ As these comments have discussed, there are other health effect costs associated with pesticide exposure which should be mentioned, considered, and assigned a weight in DPR’s cost-benefit analysis. For instance, the economic burden of autism spectrum disorders was recently

²⁰ National Center for Education Statistics. 2012. https://nces.ed.gov/pubs2011/pesschools09/tables/table_05.asp.

²¹ California Department of Pesticide Regulation. 2016. Initial Statement of Reasons and Public Report. Pertaining to Pesticide Applications Near Schoolsites. http://www.cdpr.ca.gov/docs/legbills/rulepkgs/16-004/16-004_initial_statement.pdf.

²² State of California. 2016. Department of Finance. Economic and Fiscal Impact Statement. Pesticide Regulation: Pesticide Use near Schoolsites. http://www.cdpr.ca.gov/docs/legbills/rulepkgs/16-004/16-004_form.pdf

²³ California Department of Food and Agriculture. 2016. California Agricultural Production Statistics. <https://www.cdfa.ca.gov/statistics/>.

²⁴ EPA. 2016. Pesticides Industry Sales and Usage 2006 and 2007 Market Estimates. <https://www.epa.gov/pesticides/pesticides-industry-sales-and-usage-2006-and-2007-market-estimates>; DPR. 2007. Pesticides Sold in California for Year: 2007. <http://www.cdpr.ca.gov/docs/mill/pdsd2007.pdf>.

²⁵ Attina et al. 2016. Exposure to endocrine-disrupting chemicals in the USA: a population-based disease burden and cost analysis. *The Lancet Diabetes and Endocrinology*. Volume 4, No. 12, p996–1003.

estimated at \$268 billion in 2015, (\$40 billion in California),²⁶ and is expected to rise to \$461 billion by 2025.²⁷ Data from EPA finds the direct and indirect costs of asthma in the U.S. economy were \$19.7 billion in 2007.²⁸ Each case of childhood cancer costs an estimated \$623,000.²⁹ And while pesticide use is socialized, the harm these chemicals cause is privatized to families that can least afford it.

It is critical that DPR provide California school children, residents, and the public at-large with a full economic cost-benefit analysis that incorporates the latest science and seriously considers the negative externalities and market failures caused by the use of highly toxic pesticides near school sites. Our comments provide DPR and the state's Department of Finance with the groundwork for such an analysis.

Counties Should Not Be Preempted

Counties need to retain full authority to keep and adopt stricter requirements based on local conditions. The draft policy requirement that schools, growers, and the County Agricultural Commissioner all need to agree on stricter requirements around specific schools hampers county official's ability to protect children. Some counties currently enforce school buffer zones during evening and weekend hours and have adopted buffer zones well beyond ¼-mile for certain pesticide applications. Growers should not be given veto power over such added protections.

It is critical that localities continue to be provided the ability to respond to the unique social and environmental conditions pesticide use poses to their community. It must be understood by DPR that even proposed local changes involve a wide range of stakeholders, so there is no reason for the state of California to preemptively stymie local debates and hamstring local legislators from responding to calls from their community members. The proposal as written provides no specific incentive for operators of pesticide application sites to agree to anything stricter than the new regulation. We see no reason for this and urge DPR to revise section 6691(f) to provide explicit rights for localities to go farther than state requirements in regulating pesticide use near school sites.

The State Must Encourage Pesticide Alternatives

Finally, we strongly encourage DPR to devote significant resources and attention, in collaboration with other agencies and universities, to reducing the use of, and phasing out, the use of soil fumigants and other high toxicity, drift-prone pesticides and helping farmers obtain

²⁶ Gorn, David. 2015. High Cost of Autism in California. California Healthline. <http://californiahealthline.org/news/high-cost-of-autism-to-california/>.

²⁷ Leigh JP and Juan Du. 2015. Brief Report: Forecasting the Economic Burden of Autism in 2015 and 2025 in the United States. *Journal of Autism and Developmental Disorders*. Volume 45, *Issue 12*, pp 4135–4139. <http://link.springer.com/article/10.1007/s10803-015-2521-7>.

²⁸ Environmental Protection Agency. 2016. Children's Environmental Health Facts. <https://www.epa.gov/children/childrens-environmental-health-facts#cancer>.

²⁹ Ibid.

resources to assist with this transition. Through innovation in agriculture, we can help California farmers adopt cutting-edge practices and tools that keep agriculture productive and protective of human health.

As the American Academy of Pediatrics recommends in its report, there is a need to “[s]upport research to expand and improve IPM [Integrated Pest Management] in agriculture and nonagricultural pest control.³⁰” We must remember that while certain pesticides can have a place in farming, sustainable, integrated solutions and systems have been adopted as part of USDA certified organic farming systems that do not allow toxic synthetic pesticide use but rather emphasize feeding and maintaining healthy soils and cooperating with nature. Rigorous science-based decision-making that requires precaution on the allowance of chemical products in the face of hazards and scientific uncertainty must be adopted at the regulatory level. The Organic Foods Production Act provides the framework for doing this with the independent stakeholder National Organic Standards Board (NOSB) of environmentalists, farmers, consumers and public input providing oversight on allowable synthetic materials in organic and policies that govern organic systems. Keeping in mind the underlying standards of the organic rule, which require that practices “maintain or improve soil organic matter content in a manner that does not contribute to contamination of crops, soil, or water by plant nutrients, pathogenic organisms, heavy metals, or residues of prohibited substances,” is the only viable and sustainable path forward that can take us off the toxic treadmill, and protect children and other vulnerable populations in farming communities.

We urge the adoption of our recommendation to the draft regulations so that the State of California will adequately advance the protection children’s health and the success of farmers.

Sincerely,

A handwritten signature in black ink, appearing to read 'Drew Toher', with a stylized, cursive script.

Drew Toher
Public Education Associate

³⁰ Roberts JR, Karr CJ; Council On Environmental Health. 2012. Pesticide exposure in children. *Pediatrics*. 2012 Dec; 130(6):e1765-88.