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Statement of
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BEFORE
The Connecticut State Legislature Public Health Committee
REGARDING
H.B. 5330: AN ACT CONCERNING THE APPLICATION OF PESTICIDES AT PARKS, PLAYGROUNDS, ATHLETIC FIELDS AND MUNICIPAL GREENS
March 13, 2014

Thank you for the opportunity to address the Public Health Committee. I am Drew Toher, the Public Education Associate at Beyond Pesticides, a national, grassroots membership organization that represents community-based groups 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 includes Connecticut residents and spans the 50 states and groups around the world.

Beyond Pesticides supports the proposed bill's intent to extend Connecticut's robust pesticide protections to parks, playgrounds, athletic fields and municipal greens. The science on the hazards of pesticide use to children reveals the importance of this bill, especially given the availability of effective alternative turf management practices.

I. The Health Effects of Pesticides

A landmark policy statement issued by the American Academy of Pediatrics in December 2012 stated, "Children encounter pesticides daily and have unique susceptibilities to their potential toxicity… Recognizing and reducing problematic exposures will require attention to current inadequacies in medical training, public health tracking, and regulatory action on pesticides."[1]

Children are particularly vulnerable to pesticides because they take in more of a chemical relative to their body weight and have developing organ systems less able to detoxify hazardous chemicals. Studies show that children exposed to pesticides suffer elevated rates of

[1] American Academy of Pediatrics. 2012. "Pesticide Exposure in Children." *Pediatrics.* http://pediatrics.aappublications.org/content/early/2012/11/21/peds.2012-2757.full.pdf+html

leukemia, brain cancer, soft tissue sarcoma, and non-Hodgkin lymphoma,[2,3] in addition to numerous other adverse health endpoints. This issue is discussed in additional detail in Beyond Pesticides' factsheet *Children and Pesticides Don't Mix* (see Addendum A), [4] which cites peer-reviewed scientific literature on the health effects of pesticides to kids. Below is detailed information on the wide-ranging health effects of the top two most commonly used active pesticide ingredients in both the residential and commercial sector.

2,4-D: #1 Most Commonly Used Pesticide Active Ingredient[5]

2,4-D is one of the most widely used herbicides for the control of broadleaf weeds for commercial agriculture and residential landscapes in the United States. According to EPA's 2005 Registration Eligibility Decision for the chemical, each year 16 million pounds are used on non-agricultural settings, such as golf courses, playing fields, rights-of-ways and residential lawns.[6]

Contamination

- Research documents that once tracked indoors from lawns, 2,4-D can stay indoors (on carpets) for up to a year.[7]
- A 2003 study found 63% of houses in the U.S. contained traces of 2,4-D.[8]
- Its heavy use on a wide range of agricultural crops and on turf grass, as well as its high ability to leach through soil has lead 2,4-D to be one of the most frequently detected herbicides in surface and groundwater. [9]
- One study found that dogs living in and around residences with 2,4-D treated lawns absorb measurable amounts of the herbicide for several days after application. Urine concentrations were higher and persisted longer than previous reports.[10]

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[2] Ma, X. et al. 2002. "Critical Windows of Exposure to Household Pesticides and Risks of Childhood Leukemia." EHP 110(9): 955-960 ; Zahm, S., et al. 1998 "Pesticides and Childhood Cancer." *EHP* 106(Supp. 3): 893-908

[3] Buckley, J.D., et al. 2000. "Pesticide exposures in children with non-Hodgkin lymphoma." *Cancer* 89 (11):2315-232

[4] Beyond Pesticides, *Children and Pesticides Don't Mix*, http://www.beyondpesticides.org/lawn/factsheets/Pesticide.children.dontmix.pdf

[5] Environmental Protection Agency. 2012. "Pesticide Industry Sales and Usage." http://www.epa.gov/opp00001/pestsales/07pestsales/usage2007_3.htm#3_7

[6] Environmental Protection Agency. 2005. "Reregistration Eligibility Decision for 2,4-D." http://www.epa.gov/oppsrrd1/REDs/24d_red.pdf

[7] Nishioka MG, Burkholder HM, Brinkman MC, Gordon SM. 1996. "Measuring lawn transport of lawn applied herbicide acids from turf to home: Correlation of dislodgeable 2,4-D turf residues with carpets dust and carpet surface residues." *Environmental Sci and Tech*. 30:3313-3320.

[8] Rudel, Ruthann, et al. 2003. "Phthalates, Alkylphenols, Pesticides, Polybrominated Diphenyl Ethers, and Other Endocrine-Disrupting Compounds in Indoor Air and Dust." *Environmental Science and Technology* 37(20):4543-4553.

[9] Cox, C. 2005. "2,4-D Herbicide Factsheet." *Journal of Pesticide Reform* 25(4): 10-15.

[10] Reynolds, P.M., Reif, J.S., Ramsdell, H.S., and Tessari, J.D. 1994. Canine exposure to herbicide-treated lawns and urinary excretion of 2,4-dichlorophenoxyacetic acid. *Cancer Epidemiology, Biomarkers & Prevention* 3, 233-237.

Cancer in Humans and Pets

- Scientific studies point to 2,4-D's association with cancer, particularly non-Hodgkin's lymphoma.[11,12]
- Several studies have found an association with 2,4-D exposure with canine malignant lymphoma.[13,14, 15]

Endocrine Disruption and Reproductive Effects

- A study by Garry et al. found a direct correlation of urinary levels of 2,4-D with serum levels of luteinizing hormone (LH) and high testosterone levels at the time of highest exposure to 2,4-D, suggesting a direct effect on hormonal levels by the herbicide. [16] LH, produced by the pituitary gland, stimulates the production of testosterone and helps regulate the menstrual cycle and ovulation. Fluctuations in these hormones may affect human fertility.
- Research published in 2002 revealed that a combination of the herbicides 2,4-D, mecoprop, and dicamba have the potential to impact a mother's ability to successfully reproduce.[17]

Glyphosate: #2 Most Commonly Used Pesticide Active Ingredient[18]

Since glyphosate's registration with EPA in 1974, its popularity has increased dramatically along with erroneous claims that it is of low toxicity. Studies have investigated glyphosate and reported that it is associated with increased risk of genetic damage, neurological impacts, endocrine disruption and certain cancers.

Certain Cancers: non-Hodgkin Lymphoma, Leukemia, and Multiple Myeloma

- Glyphosate has been suggestively associated with an increased risk of multiple

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[11] Lennart Hardell, and Eriksson, M. 1999. "A case-control study of non-Hodgkin lymphoma and exposure to pesticides." *Cancer* 85, 1353-1360.
[12] Ibrahim, M.A., Bond, G.G., Burke, T.A., et al. 1991. "Weight of the evidence on the human carcinogenicity of 2,4-D". *Environmental Health Perspectives* 96, 213-222.
[13] Hayes, H.M., Tarone, R.E., Cantor, K.P., Jessen, C.R., McCurnin, D.M., and Richardson, R.C. 1991. "Case-Control Study of Canine Malignant Lymphoma: Positive Association With Dog Owner's Use of 2, 4-Dichlorophenoxyacetic Acid Herbicides." *J. National Cancer Institute, 83:17*pp. 1226-1231.
[14] Hayes, H.M., Tarone, R.E., and Cantor, K.P. 1995. "On the Association between Canine Malignant Lymphoma and Opportunity for Exposure to 2,4-Dichlorophenoxyacetic Acid." *Environmental Research* 70, 119-125.
[15]INCHEM. Environmental Health Criteria For 2,4-Dichlorophenoxyacetic Acid. World Health Orgnization, Geneva.
[16] Garry, V.F., Tarone, R.E., Kirsch, I.R., Abdallah, J.M., Lombardi, D.P., Long, L.K., Burroughs, B.L., Barr, D.B., and Kesner, J.S. 2001.
[17] Maria Fernada Cavieres et al. 2002. "Developmental Toxicity of a Commercial Herbicide mixture in mice: Effects on Embryo Implantation and litter size." *Environmental Health Perspectives.* 110(11):1081-1085.
[18] Environmental Protection Agency. 2012. "Pesticide Industry Sales and Usage." http://www.epa.gov/opp00001/pestsales/07pestsales/usage2007_3.htm#3_7

myeloma, according to an Agricultural Health Study published in 2005.[19]

- One study found that people exposed to glyphosate are 2.7 times more likely to contract non-Hodgkin Lymphoma (NHL).[20]
- In 2002, a study of Swedish men showed that glyphosate exposure was significantly associated with an increased risk of NHL, and hairy cell leukemia- a rare subtype of NHL. [21]
- A 2003 review of studies conducted on farmers by researchers at the National Cancer Institute also shows that exposure to glyphosate is associated with an increased incidence of NHL.[22]

Embryonic Cell Damage

- Researchers determined that the "inert" ingredients in glyphosate products, particularly polyethoxylated tallowamine or POEA - a surfactant commonly used in the product Roundup, are even more toxic than glyphosate itself. Studies reveal that POEA kills human embryonic cells.[23]

Endocrine Disruption and Developmental Effects

- Glyphosate has also been associated with ADD/ADHD,[24] increased risks of late abortion,[25] and endocrine disruption. [26,27]
- A 2013 study found that formulated Roundup could have an impact on male fertility.[28]

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[19] De Roos, A. J. D., Blair, A., Rusiecki, J. A., Hoppin, J. A., Svec, M., Dosemeci, M., Sandler, D. P., & Alavanja, MC .2005. "Cancer Incidence among Glyphosate-Exposed Pesticide Applicators in the Agricultural Health Study." *Environmental Health Perspectives*, 113(1), 49-54.

[20] Hardell, L., & Eriksson, M. 1999. "A Case-Control Study of Non-Hodgkin Lymphoma and Exposure to Pesticides." *Cancer*, 85(6), 1353–1360.

[21] Hardell L, Eriksson M, & Nordstrom M. 2002. "Exposure to pesticides as risk factor for non-Hodgkin's lymphoma and hairy cell leukemia: pooled analysis of two Swedish case-control studies." *Leuk Lymphoma*, 43(5), 1043-1049.

[22] De Roos, et al. 2003. "Integrative assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men." *Occup Environ Med*, 60(9).

[23] Benachour, et. al. 2009. "Glyphosate Forumlations Induce Apoptosis and Necrosis in Human Umbilical, Embryonic, and Placental Cells. 22(1): 97-105 http://pubs.acs.org/doi/abs/10.1021/tx800218n

[24] Garry, V. F., et al. 2002. "Birth defects, season of conception, and sex of children born to pesticide applicators living in the Red River Valley of Minnesota, USA." *Environ Health Perspect*, 110(Suppl 3), 441–449.

[25] Arbuckle, T.E., Z. Lin, and L.S. Mery. 2001. "An Exploratory Analysis of the Effect of Pesticide Exposure on the Risk of Spontaneous Abortion in an Ontario Farm Population." *Environmental Health Perspectives* 109:851-857.

[26] Walsh, L. P., McCormick, C., Martin, C., & Stocco, D. M. 2000." Roundup Inhibits Steroidogenesis by Disrupting Steroidogenic Acute Regulatory (StAR) Protein Expression." *Environ Health Perspect*, 108, 769–776.

[27] Romano MA, Romano RM, Santos LD, et al. 2012 "Glyphosate impairs male offspring reproductive development by disrupting gonadotropin expression." Arch Toxicol. 86(4):663-73 http://www.ncbi.nlm.nih.gov/pubmed/22120950

[28] de Liz Oliveira Cavalli VL, Cattani D, Heinz Rieg CE, et al. 2013. "Roundup disrupts male reproductive functions by triggering calcium-mediated cell death in rat testis and Sertoli cells." Free Radic Biol Med. 65:335-46 http://www.ncbi.nlm.nih.gov/pubmed/23820267

II. Limitations of the Federal Pesticide Registration Process

Children and other vulnerable population groups are inadequately protected by the risk assessments that the U.S. Environmental Protection Agency (EPA) uses to register chemicals. Critical issues of exposure, such as the synergic effects of pesticides mixed with other pesticides or with pharmaceuticals, are not addressed by EPA or state regulation. "Inert" ingredients, which can make up over 90% of a pesticide product's formulation and be just as toxic as the active ingredient, are not fully evaluated and are not required to be disclosed to consumers. This omits crucial information that physicians and those that suspect they were poisoned by pesticides can use to treat possible pesticide-related illnesses.

The difficulty, from a public health perspective, is that the inadequate regulatory system, allowing widespread use of poisons that are more often than not unnecessary, results in a pesticide product label that is also inadequate, or fails in restricting use or conveying hazard information. This inadequate labeling leads to misinformation and mis-education about the safety of pesticide products, which can result in misuse and exposure that is otherwise avoidable.

As Public Education Associate at Beyond Pesticides, I take calls from the public on a wide range of pesticide-related issues. While some that call simply want to, for example, know how to handle cockroaches without toxic chemicals, others call our office after they've experienced a pesticide poisoning incident – and their stories are heart-wrenching. Connecticut should be proud of the pesticide rules it now has in place. In other states without these protections I hear from, for example, a mother whose autistic child can't go to school because of health effects from the constant spraying, or a teacher whose class was exposed to pesticide drift from an application during school hours. In many instances those who were poisoned encounter a high bar to find restitution, and even when disciplinary action is taken the resultant warning or fine gives them very little assurance that such an incident won't happen again.

We should be moving to prevent pesticide exposure whenever possible, not mitigate risk, because everyone, but especially the most vulnerable among us, has a right to freedom from exposure to toxic chemicals.

III. Effective Alternatives Are Available

Conventional landscape and turf management systems are generally centered on a synthetic product approach that continually treats "cosmetic" symptoms, while natural turf management is a "feed-the-soil" approach that centers on natural, organic fertilization, microbial inoculants, compost teas, and topdressing as needed with high quality finished compost. It is a program that supports the natural processes that nature has already in put in motion.

Experience finds that this approach builds a soil environment rich in microbial activity that will produce strong, healthy turf that is able to withstand many of the stresses that affect turfgrass.

The turf system will be better able to withstand pressures from heavy usage, insects, weeds, and disease, as well as drought and heat stress, as long as good cultural practices continue to be followed and products are chosen to enhance and continually address the soil biology.

While problems can arise in any turf system, they will be easier to alleviate with a soil that is healthy, and that has the proper microbiology in place. Given that, of 30 commonly used lawn and turf pesticides, 17 are linked with cancer or carcinogenicity, 11 are linked with birth defects, 19 with reproductive effects, 24 with liver or kidney damage, 14 with neurotoxicity, and 18 with disruption of the endocrine (hormonal) system (See Addendum B),[29] extending these management practices to the parks, playgrounds, athletic fields, and municipal greens where children play is an important public health decision.

VI. Conclusion

While there are some who will view this bill as burdensome and fear that their current products may be pushed out of the marketplace, in reality, the public's health and the environment will be better protected as new, safer, cost-effective pest management practices and products continue to take hold.

Thank you for the opportunity to provide testimony. We appreciate your commitment to protecting and improving health and the environment for children in Connecticut. Beyond Pesticides remains available to the Committee to address any questions or concerns related to this testimony.

[29] Beyond Pesticides. "Health Effects of 30 Commonly Used Lawn Pesticides." http://www.beyondpesticides.org/lawn/factsheets/30health.pdf

Addendum A:

Children and Pesticides Don't Mix

Children are especially vulnerable to pesticides

- The National Academy of Sciences reports that children are more susceptible to chemicals than adults and estimates that 50% of lifetime pesticide exposure occurs during the first five years of life.[1]
- EPA concurs that children take in more pesticides relative to body weight than adults and have developing organ systems that are more vulnerable and less able to detoxify toxic chemicals.[2]
- Infants crawling behavior and proximity to the floor account for a greater potential than adults for dermal and inhalation exposure to contaminants on carpets, floors, lawns, and soil.[3]
- Children with developmental delays and those younger than six years are at increased risk of ingesting pesticides through nonfood items, such as soil.[4]
- Studies find that pesticides such as the weedkiller 2,4-D pass from mother to child through umbilical cord blood and breast milk.[5]
- Consistent observations have led investigators to conclude that chronic low-dose exposure to certain pesticides might pose a hazard to the health and development of children.[6]
- The World Health Organization (WHO) cites that over 30% of the global burden of disease in children can be attributed to environmental factors, including pesticides.[7]

Children, cancer and pesticides

- The probability of an effect such as cancer, which requires a period of time to develop after exposure, is enhanced if exposure occurs early in life.[8]
- A study published in the *Journal of the National Cancer Institute* finds that household and garden pesticide use can increase the risk of childhood leukemia as much as seven-fold.[9]
- Studies show that children living in households where pesticides are used suffer elevated rates of leukemia, brain cancer and soft tissue sarcoma.[10]
- Pesticides can increase susceptibility to certain cancers by breaking down the immune system's surveillance against cancer cells. Infants and children, the aged and the chronically ill are at greatest risk from chemically-induced immune suppression.[11]
- A study published by the American Cancer Society finds an increased risk for non-Hodgkin's lymphoma (NHL) in people exposed to common herbicides and fungicides, particularly the weedkiller mecoprop (MCPP). People exposed to glyphosate (Roundup®) are 2.7 times more likely to develop NHL.[12]
- 75 out of all 99 human studies done on lymphoma and pesticides find a link between the two.[13]
- Four peer-reviewed studies demonstrate the ability of glyphosate-containing herbicides to cause genetic damage to DNA (mutagenicity), even at very low concentration levels.[14]
- A 2007 study published in *Environmental Health Perspectives* finds that children born to mothers living in households with pesticide use during pregnancy had over twice as much risk of getting cancer, specifically acute leukemia (AL) or non-Hodgkin lymphoma (NHL).[15]
- A 2007 Canadian report shows that a greater environmental risk exists for boys, specifically when it comes to cancer, asthma, learning and behavioral disorders, birth defects and testicular dysgenesis syndrome.[16]

Commonly Used Chemicals

Chemical	Common Use	Health Effects
2,4-D	Lawns	c, ed, r, n, kl, si, bd
Dicamba	Lawns	r, n, kl, si, bd
Fipronil	Indoor/outdoor baits, pet care	c, ed, n, kl, si
Glyphosate	Lawns	c, r, n, kl, si
Permethrin	Mosquitoes, head lice, garden	c, ed, r, n, kl, si

Key: Birth/developmental defects=bd; Kidney/liver damage=kl; Sensitizer/irritant=si; Cancer=c; Neurotoxicity=n; Endocrine Disruption=ed; Reproductive effects=r

Alternatives

Reduce exposure to toxic chemicals by adopting sound organic or integrated pest mangement (IPM) practices that use cultural, mechanical and biological methods of control and least-toxic chemicals only as a last resort. An organic diet limits children's pesticide exposure and toxic body burden.

Addendum B:

Health Effects of 30 Commonly Used Lawn Pesticides

Pesticides	Health Effects						
	Cancer	Endocrine Disruption	Reproductive Effects	Neurotoxicity	Kidney/Liver Damage	Sensitizer/ Irritant	Birth Defects
Herbicides							
2,4-D*	X[4]	X[10]	X[7]	X[8]	X[8]	X[1]	X[11]
Benfluralin					X[1]	X[1]	
Bensulide				X[2]	X[1]	X[2]	
Clopyralid			X[7]			X[2]	X[7]
Dachthal	Possible[3]	X[6]			X[7]	X[11]	
Dicamba*			X[1]	X[2]	X[2]	X[1]	X[1]
Diquat Dibromide			X[12]		X[11]	X[1]	
Fluazifop-p-butyl			X[1]		X[1]		X[1]
Glyphosate*	X[7]	X[8]	X[1]		X[8]	X[1]	
Isoxaben	X[3]				X[2]		
MCPA		X[6]	X[2]	X[2]	X[11]	X[1]	
MCPP*	Possible[3]	X[6]	X[2]	X[1]	X[9]	X[1]	X[1]
Pelargonic Acid*						X[1]	
Pendimethalin*	Possible[3]	X[6]	X[1]			X[2]	
Pronamide	Probable[4]	X[6]			X[9]	X[1]	
Triclopyr			X[7]		X[9]	X[1]	X[7]
Trifluralin*	Possible[3]	X[6]	X[1]		X[2]	X[1]	
Insecticides							
Acephate	Possible[3]	X[6]	X[11]	X[9]		X[2]	
Bifenthrin*§	Possible[3]	Suspected[6,10]		X[8]		X[1]	X[9]
Carbaryl*	X[3]	X[10]	X[8]	X[1]	X[11]	X[11]	X[7]
Dichlorvos	X[4]	Suspected[10]		X[11]	X[2]	X[11]	
Fipronil	Possible[3]	X[6]	X[8]	X[8]	X[8]	X[8]	
Imidacloprid			X[7]		X[2]		X[7]
Malathion*	Possible[3]	X[10]	X[11]	X[9]	X[2]	X[2]	X[2]
Permethrin*§	X[3]	Suspected[6,10]	X[1,7]	X[9,7]	X[9]	X[1]	
Trichlorfon	X[3]	X[6]	X[11]	X[2]	X[2]		X[2]
Fungicides							
Azoyystrobin					X[2]	X[2]	
Myclobutanil		Probable[6]	X[2]		X[2]		
Sulfur						X[1]	
Ziram	Suggestive[3]	Suspected[6]		X[2]	X[2]	X[2]	
Totals:	17	18	19	14	24	25	11

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