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Lt. Governor



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Chairperson, Board of Agriculture

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State of Hawaii
DEPARTMENT OF AGRICULTURE
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**TESTIMONY OF SCOTT E. ENRIGHT
CHAIRPERSON, BOARD OF AGRICULTURE**

**BEFORE THE SENATE COMMITTEES ON HEALTH, AGRICULTURE, AND ENERGY
AND ENVIRONMENT**

Thursday, February 12, 2015
3:40 P.M.
CONFERENCE ROOM 414

**SENATE BILL NO. 692
RELATING TO PESTICIDES**

Chairpersons Green and Ruderman and Members of the Committees:

Thank for the opportunity to testify on Senate Bill No. 692. This bill seeks to eliminate the issuance of a Warning Notice to applicators who have misapplied a pesticide product and adds a criminal penalty component of any person who causes physical harm to another person through the negligent application of a pesticide, and shall be guilty of a class C felony and shall on conviction be fined not more than \$10,000 or imprisoned for not more than five years, or both. The Hawaii Department of Agriculture (HDOA or Department) has strong reservations about SB 692.

We feel that this bill will impact many homeowners who may inadvertently misapply a pesticide that can have large ramifications such as the evacuation of schools or causing harm to family members. While the seriousness of creating a high level episode due to misapplication of a pesticide is noted, making felons out of homeowners is of concern.

Furthermore, while our Pesticide Branch enforcement inspectors are trained to follow EPA inspection procedures, they are not trained to conduct criminal investigations and would need additional training to conduct their investigations/inspections according to proper criminal procedures (chain of custody, Miranda warnings, etc.) or need the assistance of trained criminal investigators. This would mean enforcement would proceed more slowly and take more of the inspection staff's limited time.

Thank you for allowing testimony from the Department.



American Academy of Pediatrics

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Hawaii Chapter

AAP - Hawaii Chapter

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Sylvia R. Pager, MD, representing the American Academy of Pediatrics, Hawaii Chapter, presented the following testimony the morning of February 5th to the Hawaii House Committee on Energy and Environmental Protection.

Dr. Pager passed away on Sunday, February 8th following a severe stroke that occurred just after she testified at the state Legislature on Thursday.

To honor Dr. Pager's long-standing service and advocacy on behalf of Hawaii's pregnant women, breast-feeding mothers, and young children, the American Academy of Pediatrics, Hawaii Chapter will submit her testimony for HB1514 to committee hearings on every bill related to disclosure, notification, and buffer zones of toxic, restricted use pesticides and to our concern about pesticide exposure that science demonstrates negatively impacts the health and well-being of Hawaii's keiki.

Mahalo for the opportunity to honor Dr. Pager in this way, ensuring the voice of the American Academy of Pediatrics, Hawaii Chapter continues to be heard throughout this legislative session.

Aloha,

R. Michael Hamilton, MD, MS, FAAP

Committee on Energy and Environmental Protection
Representative Chris Lee, Chair
Representative Nicole E. Lowen, Vice Chair

Thursday, February 5, 2015
8:30am, Conference Room 325

Sylvia R. Pager, MD, MS, FAAP, FABM, IBCLC
Pediatrics Breastfeeding Medicine
Assoc. Clin. Prof., Dept. of Pediatrics
JABSOM, University of Hawaii
AAP Hawaii Chapter Breastfeeding Coordinator

TESTIMONY IN STRONG SUPPORT OF HB1514 – RELATING TO ENVIRONMENTAL PROTECTION

Aloha Kakou, Members of the Committee on Energy and Environmental Protection,

My name is Dr. Sylvia Pager and as a practicing pediatrician for over 38 years, I am writing to urge your strong support of HB1514 - Relating to Environmental Protection. This bill requires that the state to protect keiki and kupuna health by requiring disclosure, notification, and buffer zones of toxic restricted use pesticides around schools and nursing homes.

This bill protects our communities who could be potentially impacted by pesticide drift by requiring that restricted-use pesticide users disclose the pesticides they are spraying and notify communities who could be potentially impacted by pesticide drift. **Such regulations are in line with the regulations of 31 other states that understand it is vital for states to protect children and sensitive populations from the toxic impacts of pesticide use by regulating pesticide use on or around schools.**

It is critical that the state take action to reduce childhood pesticide exposure because toxic exposure to pesticides during fetal,¹ neonatal,² and infant life can disrupt critical developmental processes.³ Early life pesticide

¹ Rull RP, Gunier R, Von Behren J, Hertz A, Crouse V, Buffler PA, and Reynolds P. 2009. Residential Proximity to Agricultural Pesticide Applications and Childhood Acute Lymphoblastic Leukemia. *Environmental Research*, 109(7): 891-899.

² Chevrier C, Limon G, Monfort C, Rouget F, Garlantezec R, Petit C, Durand G, and Cordier A. 2011. Urinary Biomarkers of Prenatal Atrazine Exposure and Adverse Birth Outcomes in the PELAGIE Birth Cohort. *Environmental Health Perspectives*, 119(7): 1034-1041.

³ Shelton, JF et al. 2014. Neurodevelopmental Disorders and Prenatal Residential Proximity to Agricultural Pesticides: The CHARGE Study. *Environmental Health Perspective*, 122(10): 1103-1110.

exposure has been linked to long-term health effects including cancer,⁴ decreased cognitive function,^{5,6,7} behavior problems,^{8,9} birth defects and other adverse birth outcomes,^{10,11} and asthma.¹²

The American Academy of Pediatrics (AAP) recently published a major report entitled “**Pesticide Exposure in Children**” that comprehensively reviewed 195 medical studies on the subject (see Roberts and Karr 2012). Among other impacts, their chief concerns were as follows:

- 1) **Childhood cancers**, especially leukemia and brain tumors;
- 2) **Neurobehavioral and cognitive deficits**, such as reduced IQ and attention deficit/hyperactivity disorder;
- 3) **Adverse birth outcomes**, including preterm birth, low birth weight, and congenital anomalies; and
- 4) **Asthma**.

We briefly discuss each of these impacts below, with reference to the AAP’s comprehensive review.

Childhood cancers:

Five of six recent case-control studies found a statistically significant relationship between pesticide exposure and leukemia (see Roberts and Karr 2012, p. e1773-e1774). Two of the studies had the most detailed exposure assessment conducted to date, and found increasing risk with rising exposure, a strong indication that the observed associations are real. Maternal exposure to pesticides between the periods of preconception through pregnancy was the

⁴ Infante-Rivard C, Labuda D, Krajinovic M, Sinnett D. 1999. Risk of childhood leukemia associated with exposure to pesticides and with gene polymorphisms. *Epidemiology* 10(5): 481-487.

⁵ Rauh V, Arunajadai S, Horton M, et al. 2011. Seven-year neurodevelopmental scores and prenatal exposure to chlorpyrifos, a common agricultural pesticide. *Environ Health Perspect.* 119(8): 1196–1201.

⁶ Bouchard MF, Chevrier J, Harley KG, et al. 2011. Prenatal exposure to organophosphate pesticides and IQ in 7-year-old children. *Environ Health Perspect.* 119(8): 1189–1195.

⁷ Engel SM, Wetmur J, Chen J, et al. 2011. Prenatal exposure to organophosphates, paraoxonase 1, and cognitive development in childhood. *Environ Health Perspect.* 119(8): 1182–1188.

⁸ Roberts EM, English PB, Grether JK, Windham GC, Somberg L, and Wolf C. 2007. Maternal Residence near Agricultural Pesticide Applications and Autism Spectrum Disorder among Children in the California Central Valley. *Environmental Health Perspectives*, 115(10): 1482-1489.

⁹ Bouchard MF, Bellinger DC, Wright RO, Weisskopf MG. 2010. Attention-deficit/hyperactivity disorder and urinary metabolites of organophosphate pesticides. *Pediatrics*. 125(6). Available at: www.pediatrics.org/cgi/content/full/125/6/e1270.

¹⁰ Garry VF, Harkins ME, Erickson LL, Long-Simpson LK 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. *Environmental Health Perspectives* 110 (Suppl. 3): 441-449.

¹¹ Garry VF, Harkins ME, Erickson LL, Long-Simpson LK 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. *Environmental Health Perspectives* 110 (Suppl. 3): 441-449.

¹² Salam MT, Li YF, Langholz B, Gilliland FD; Children’s Health Study. 2004. Early-life environmental risk factors for asthma: findings from the Children’s Health Study. *Environ Health Perspect.* 112(6): 760–765.

primary risk factor. Maternal use of either herbicides or insecticides was associated with nearly double the risk of childhood leukemia (Infante-Rivard et al. 1999). A meta-analysis provided additional support, also showing double the risk of leukemia in mothers exposed to pesticides while pregnant or while their children were young (Wigle et al. 2009). Monge et al. (2007) also found increased risk of leukemia in children borne to parents exposed occupationally to pesticides in Costa Rica.

Nine of the ten studies examining pesticides and brain cancer that have been conducted since 1998 demonstrated an **increased risk estimate of brain tumors with maternal and/or paternal exposure to pesticides**, though not all achieved statistical significance. One study, which involved 321 cases demonstrated that **maternal exposure to insecticides before or during pregnancy was associated with a 90% greater risk of astrocytoma** (a type of brain cancer) in the child, as well as a trend to higher risk in exposed fathers (van Wijngaarden et al. 2003).

Neurobehavioral and cognitive deficits:

Exposure to many pesticides causes acute neurological symptoms, such as headaches and dizziness. However, a spate of recent studies is building an irrefutable case that long-term, low-level exposure to organophosphate insecticides (OPs) in early life (particularly *in utero*) has profoundly negative impacts on children's neurological development.

The National Institutes of Health and the EPA are sponsoring three large-scale studies into this subject, two in urban settings and one in a rural community (see Roberts and Karr 2012, e1775-e1776). Women were enrolled during pregnancy, and their exposure to OPs carefully measured. Their children were tested for neurological development in the following years. The studies demonstrate that at two to four years of age, higher prenatal OP exposure was associated with "significantly poorer mental development," "pervasive developmental disorder," and in one group "increased scores for attention-deficit/hyperactivity disorder" (Eskenazi et al. 2007, Rauh et al. 2006). At seven years of age, kids more highly exposed to OPs in the womb had lower IQ scores in all three groups (Rauh et al. 2011, Bouchard et al. 2011, Engel et al 2011). Bouchard et al (2010) similarly found increased rates of attention-deficit/hyperactivity disorder in eight to 15-years olds whose urine had higher levels of OP breakdown products, a sign of greater exposure.

These findings are even more concerning when one considers the intensive use of chlorpyrifos in Hawaii's seed corn operations, coupled with its propensity to drift. **Chlorpyrifos has been linked to lung cancer, colorectal cancer, and non-Hodgkin's lymphoma.** An examination of California's Pesticide Illness Surveillance Program shows that chlorpyrifos was among the most frequently cited culprits in drift-related pesticide illnesses over the past two decades (CA PISP 1992-2011). The US Geological Survey has found "toxic rainfall"

containing excessive levels of chlorpyrifos (for aquatic life) in California (USGS 2003).

Records released by DuPont-Pioneer show the company sprays OPs on Kaua'i frequently, once every four days (91 days/year). The OP insecticide chlorpyrifos is also one of the most heavily used RUPs on Kaua'i, and **according to the Kauai Good Neighbor Program, in the last 13 months 1,975lbs of chlorpyrifos has been used on Kauai**. Air sampling at Waimea school has consistently detected chlorpyrifos. Thus, based on these lines of evidence, there is sure reason to expect that chlorpyrifos drift is adversely affecting the health of residents.

Adverse birth outcomes

The American Academy of Pediatrics is also concerned about the possible role of pesticides in triggering adverse birth outcomes (see Roberts and Karr 2012, e1776-e1778). Two studies in Minnesota have revealed a **higher rate of birth defects in children fathered by male pesticide applicators in areas of the state where chlorophenoxy herbicides (e.g. 2,4-D) and fungicides are most heavily applied**. These studies also found a seasonal effect, with **children conceived in the spring, when herbicide use is heaviest, exhibiting the highest birth defect rates** (Garry et al. 1996, Garry et al. 2002). Six additional studies described by Roberts and Karr (2012) found higher risk ratios for birth defects in mothers exposed to pesticides, with three of them showing statistically significant effects. A study of expectant mothers carried out in New York demonstrated an association between exposure to chlorpyrifos and reduced birth weight and length (Perera et al. 2003). Wolff et al. (2007) also found reduced birth weight in infants born to mothers exposed to OPs during pregnancy, but only in those children with a mutation that reduces their ability to detoxify OPs. Another study found that *in utero* exposure to OPs was associated with reduced gestation time (Eskenazi et al. 2004). Prenatal atrazine exposure has been associated with suppression of fetal growth (Chevrier et al 2011) and **exposure to chlorophenoxy herbicides and certain other classes of herbicide, such as triazines (e.g. atrazine), with increased risk of spontaneous abortion** (Arbuckle et al. 1999, 2001).

Asthma

The AAP also considers asthma to be a major adverse health outcome of pesticide exposure (see Roberts and Karr 2012, e1779). Asthma is the most common, chronic noninfectious disease of childhood, and is estimated to affect 300 million people worldwide, causing a quarter of a million deaths each year (Strina et al. 2014). Asthma is characterized by intermittent breathing difficulty, including chest tightness, wheezing, cough and shortness of breath. There have been few studies of pesticides and asthma in children, but those conducted raise serious concerns. For instance, **exposure to either herbicides or insecticides in the first year of life was strongly linked to a diagnosis of asthma before the age of five** in a study carried out in southern California – an over four-fold higher risk from herbicides and more than two-fold greater risk from insecticide

exposure (Salam et al 2004). Studies of adults provide similar evidence. **Farmers are at high risk of asthma and other respiratory diseases** (Hoppin 2002), and exposure to organophosphate and carbamate insecticides has been linked to asthma in Canadian farmers (Senthilselvan et al. 1992). Two studies in the U.S. have associated exposure to a number of pesticides with wheezing, one of the major symptoms of asthma. Hoppin et al (2002) found a higher incidence of wheezing in farmers exposed to the herbicides atrazine, alachlor and paraquat, as well as the OP insecticides chlorpyrifos, parathion and malathion. **All of these pesticides are used heavily and frequently in Hawai'i.** These findings take on added weight when one considers the testimony of Kaua'i physicians that Westside residents are very frequently afflicted with symptoms of respiratory distress.

Children may be exposed to and harmed by pesticides even when they are exposed only at second hand. For example, farmworkers exposed to pesticides may accumulate residues on their skin and clothing, and thereby inadvertently expose their families (Thompson et al., 2003). Similarly, rural homes have much higher levels of pesticide residues in dust than non-rural residences (Simcox et al, 1995, 1999; Rull et al., 2009). These take-home pathways can contribute to children's exposure to pesticides in agricultural communities (Lu et al, 2000).

Health Harms Specifically Linked to Pesticide Drift

The medical studies discussed above address the harms of pesticides from a variety of exposure pathways: food, water, dermal contact, inhalation and/or drift. Below, we discuss studies that specifically address health outcomes where drift is the presumed exposure pathway.

A growing body of research supports the proposition that living near pesticide-sprayed fields increases the risks of a number of serious diseases, and exposure via pesticide drift is the only logical explanation. Many of these studies have been conducted in California, which has an extremely fine-grained pesticide reporting system that provides precise information on which pesticides are sprayed near any given community, when, and in what amounts. Epidemiological studies based on this information have made some troubling findings. For instance, Costello et al. (2009) have found that **exposure to paraquat and maneb within 500 meters of the home increased the risk of Parkinson's disease by 75%, with those under 60 years of age at higher risk.**

Autism

Roberts et al. (2007) conducted an analysis, which found that **expectant mothers residing within 500 meters of fields sprayed with organochlorine insecticides (e.g. dicofol and endosulfan) during early pregnancy had a six-fold higher risk of bearing children with autism spectrum disorder than**

mothers not living near such fields; this ASD risk declined with increasing distance from field sites and increased with rising application amounts.

Shelton et al. (2014) found a 60% increased risk of autism spectrum disorder (ASD) in children of mothers who lived near fields sprayed with organophosphate insecticides at some point during their pregnancies, with much higher risk when exposure occurred in the second trimester of their pregnancies. Similarly increased risk – for both ASD and developmental delay – was found for children of mothers near fields treated with pyrethroid insecticides just prior to conception or during their third trimester. Proximity to carbamate-treated fields was also linked to higher risk of developmental delay.

Several of the insecticides at issue in this California study are used on Kaua'i and likely on other islands as well: one of the three organophosphates (chlorpyrifos); four of the five pyrethroid insecticides – permethrin, lambda-cyhalothrin, cypermethrin and esfenvalerate; and one of the two carbamates (methomyl).

With at least 26 schools in Hawaii located within one mile of large agricultural companies, this is of grave concern.

The medical evidence is staggering and highly unnerving. As a doctor, it is my obligation to tend to the health of my community. I take this responsibility with great seriousness. I respectfully urge the committee members to take their role as policymakers with the same level of seriousness, and pass this measure to protect our keiki.

Thank you for this opportunity to provide testimony, I am happy to provide further analysis or respond to follow-up questions from the Committee.

Sincerely,

Sylvia R. Pager, MD

From: mailinglist@capitol.hawaii.gov
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Subject: Submitted testimony for SB692 on Feb 12, 2015 15:40PM
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SB692

Submitted on: 2/6/2015

Testimony for HTH/AGL on Feb 12, 2015 15:40PM in Conference Room 414

Submitted By	Organization	Testifier Position	Present at Hearing
Peggy McArdle	Individual	Support	No

Comments: Aloha. Many Pesticides/Herbicides are derived from Weapons of War and are manufactured by some of the same Chemical Companies in the BioTech Ag Industry currently operating in Hawaii. For example, Dow Chemical's Agent Orange component 2,4-D has recently been approved by the USDA. These Pesticide/Herbicides are deadly and toxic and should be treated as such. When Pesticides are negligently applied, those operators need to be held accountable, like those who recklessly use any other deadly weapons in our society.

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SB692

Submitted on: 2/7/2015

Testimony for HTH/AGL on Feb 12, 2015 15:40PM in Conference Room 414

Submitted By	Organization	Testifier Position	Present at Hearing
Diane Ragone	Individual	Oppose	No

Comments: I do not support this bill because of the Class C felony designation. With the litigious and fear-based actions of too many Hawaii residents, especially on Kauai, even a single use of a pesticide could cause a law suit.

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SB692

Submitted on: 2/10/2015

Testimony for HTH/AGL on Feb 12, 2015 15:40PM in Conference Room 414

Submitted By	Organization	Testifier Position	Present at Hearing
deb mader	Individual	Support	No

Comments:

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SB692

Submitted on: 2/10/2015

Testimony for HTH/AGL on Feb 12, 2015 15:40PM in Conference Room 414

Submitted By	Organization	Testifier Position	Present at Hearing
Elle Cochran	Maui County Council Member	Support	No

Comments: I support SB 692

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SB692

Submitted on: 2/9/2015

Testimony for HTH/AGL on Feb 12, 2015 15:40PM in Conference Room 414

Submitted By	Organization	Testifier Position	Present at Hearing
sharon	Individual	Support	No

Comments: POISON is POISON - first time or last! I know _ I suffered Organophosphate poisoning! Mahalo Support!

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TESTIMONY IN SUPPORT OF SB692

Hawaii State Senate

Thursday, February 12, 2015

State Conference Room 414 at 3:40p

Submitted by Lynn B. Wilson, PhD

Chair & Committee Members of the Senate Committees on Health, Agriculture, and Judicial

Dear Senators:

I am a cultural anthropologist who has invested over 20 years in supporting the health and well being of young children and their families in Hawaii by partnering with public and private agencies including the Hawaii State Department of Health, UH JABSOM Department of Pediatrics, American Academy of Pediatrics/Hawaii Chapter, community health centers, and early childhood organizations in the areas of health, early learning, family engagement and support. I have also co-founded small businesses with Sharon Taba, MEd, Webfish Pacific, LLC & Same Small Boat Productions, LLC, that have received federal, state, and foundation support to develop projects supporting young children and their families.

I am writing to urge you to support **SB692: Relating to Pesticides**, introduced by Senators Gabbard, Chun Oakland, Green, Ruderman, Galuteria, Ihara.

This proposed law aims to change laws for negligent application of a pesticide.

Research clearly demonstrates that even low exposures to environmental toxins, such as pesticides (including fumigants, herbicides, pesticides, etc.), put healthy brain development in fetuses and young children at tremendous risk. Please see attached policy statements from the American Academy of Pediatrics and the American College of Obstetricians and Gynecologists. This research shows pesticide exposure can negatively impact human motor-neuron systems, increase autism, and result in endocrine disruption, with dramatic effects on vulnerable populations especially pregnant women and children.

Therefore, it is critical to establish appropriate penalties for inappropriate application of pesticide.

Thank you for this opportunity to ask your support of **SB692**. It's a critical time to pay attention to the "upstream" solutions that will play such a prominent role in positively influencing the health and well-being of Hawaii's communities, families and young children for generations to come.

With Respect & Aloha,

Lynn B. Wilson, PhD

94-870 Lumiauau Street, B204

Waipahu, HI 96797



POLICY STATEMENT

Pesticide Exposure in Children

COUNCIL ON ENVIRONMENTAL HEALTH

KEY WORDS

pesticides, toxicity, children, pest control, integrated pest management

ABBREVIATIONS

EPA—Environmental Protection Agency

IPM—integrated pest management

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abstract

FREE

This statement presents the position of the American Academy of Pediatrics on pesticides. Pesticides are a collective term for chemicals intended to kill unwanted insects, plants, molds, and rodents. Children encounter pesticides daily and have unique susceptibilities to their potential toxicity. Acute poisoning risks are clear, and understanding of chronic health implications from both acute and chronic exposure are emerging. Epidemiologic evidence demonstrates associations between early life exposure to pesticides and pediatric cancers, decreased cognitive function, and behavioral problems. Related animal toxicology studies provide supportive biological plausibility for these findings. Recognizing and reducing problematic exposures will require attention to current inadequacies in medical training, public health tracking, and regulatory action on pesticides. Ongoing research describing toxicologic vulnerabilities and exposure factors across the life span are needed to inform regulatory needs and appropriate interventions. Policies that promote integrated pest management, comprehensive pesticide labeling, and marketing practices that incorporate child health considerations will enhance safe use. *Pediatrics* 2012;130:e1757–e1763

INTRODUCTION

Pesticides represent a large group of products designed to kill or harm living organisms from insects to rodents to unwanted plants or animals (eg, rodents), making them inherently toxic (Table 1). Beyond acute poisoning, the influences of low-level exposures on child health are of increasing concern. This policy statement presents the position of the American Academy of Pediatrics on exposure to these products. It was developed in conjunction with a technical report that provides a thorough review of topics presented here: steps that pediatricians should take to identify pesticide poisoning, evaluate patients for pesticide-related illness, provide appropriate treatment, and prevent unnecessary exposure and poisoning.¹ Recommendations for a regulatory agenda are provided as well, recognizing the role of federal agencies in ensuring the safety of children while balancing the positive attributes of pesticides. Repellents reviewed previously (eg, N,N-diethyl-meta-toluamide, commonly known as DEET; picaridin) are not discussed.²

SOURCES AND MECHANISMS OF EXPOSURE

Children encounter pesticides daily in air, food, dust, and soil and on surfaces through home and public lawn or garden application, household insecticide use, application to pets, and agricultural product

TABLE 1 Categories of Pesticides and Major Classes

Pesticide category	Major Classes	Examples
Insecticides	Organophosphates	Malathion, methyl parathion, acephate
	Carbamates	Aldicarb, carbaryl, methomyl, propoxur
	Pyrethroids/pyrethrins	Cypermethrin, fenvalerate, permethrin
	Organochlorines	Lindane
	Neonicotinoids	Imidacloprid
Herbicides	N-phenylpyrazoles	Fipronil
	Phosphonates	Glyphosate
	Chlorophenoxy herbicides	2,4-D, mecoprop
	Dipyridyl herbicides	Diquat, paraquat
Rodenticides	Nonselective	Sodium chlorate
	Anticoagulants	Warfarin, brodifacoum
	Convulsants	Strychnine
	Metabolic poison	Sodium fluoroacetate
Fungicides	Inorganic compounds	Aluminum phosphide
	Thiocarbamates	Metam-sodium
	Triazoles	Fluconazole, myclobutanil, triadimefon
Fumigants	Strobilurins	Pyraclostrobin, picoxystrobin
	Halogenated organic	Methyl bromide, Chloropicrin
	Organic	Carbon disulfide, Hydrogen cyanide, Naphthalene
Miscellaneous	Inorganic	Phosphine
	Arsenicals	Lead arsenate, chromated copper arsenate, arsenic trioxide
	Pyridine	4-aminopyridine

residues.^{3–9} For many children, diet may be the most influential source, as illustrated by an intervention study that placed children on an organic diet (produced without pesticide) and observed drastic and immediate decrease in urinary excretion of pesticide metabolites.¹⁰ 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.^{9,11,12} Teen workers may have occupational exposures on the farm or in lawn care.^{13–15} Heavy use of pesticides may also occur in urban pest control.¹⁶

Most serious acute poisoning occurs after unintentional ingestion, although poisoning may also follow inhalational exposure (particularly from fumigants) or significant dermal exposure.¹⁷

ACUTE PESTICIDE TOXICITY

Clinical Signs and Symptoms

High-dose pesticide exposure may result in immediate, devastating, even lethal consequences. Table 2 summarizes features of clinical toxicity for

the major pesticides classes. It highlights the similarities of common classes of pesticides (eg, organophosphates, carbamates, and pyrethroids) and underscores the importance of discriminating among them because treatment modalities differ. Having an index of suspicion based on familiarity with toxic mechanisms and taking an environmental history provides the opportunity for discerning a pesticide's role in clinical decision-making.¹⁸ Pediatric care providers have a poor track record for recognition of acute pesticide poisoning.^{19–21} This reflects their self-reported lack of medical education and self-efficacy on the topic.^{22–26} More in-depth review of acute toxicity and management can be found in the accompanying technical report or recommended resources in Table 3.

The local or regional poison control center plays an important role as a resource for any suspected pesticide poisoning.

There is no current reliable way to determine the incidence of pesticide exposure and illness in US children. Existing data systems, such as the American Association of Poison Control Centers'

National Poison Data System or the National Institute for Occupational Safety and Health's Sentinel Event Notification System for Occupational Risks,^{27,28} capture limited information about acute poisoning and trends over time.

There is also no national systematic reporting on the use of pesticides by consumers or licensed professionals. The last national survey of consumer pesticide use in homes and gardens was in 1993 (Research Triangle Institute study).²⁹

Improved physician education, accessible and reliable biomarkers, and better diagnostic testing methods to readily identify suspected pesticide illness would significantly improve reporting and surveillance. Such tools would be equally important in improving clinical decision-making and reassuring families if pesticides can be eliminated from the differential diagnosis.

The Pesticide Label

The pesticide label contains information for understanding and preventing acute health consequences: the active ingredient; signal words identifying acute toxicity potential; US Environmental Protection Agency (EPA) registration number; directions for use, including protective equipment recommendations, storage, and disposal; and manufacturer's contact information.³⁰ Basic first aid advice is provided, and some labels contain a "note for physicians" with specific relevant medical information. The label does not specify the pesticide class or "other"/"inert" ingredients that may have significant toxicity and can account for up to 99% of the product.

Chronic toxicity information is not included, and labels are predominantly available in English. There is significant use of illegal pesticides (especially in immigrant communities), off-label use, and overuse, underscoring the importance of education, monitoring, and enforcement.³¹

TABLE 2 Common Pesticides: Signs, Symptoms, and Management Considerations^a

Class	Acute Signs and Symptoms	Clinical Considerations
Organophosphate and N-methyl carbamate insecticides	<ul style="list-style-type: none"> • Headache, nausea, vomiting, abdominal pain, and dizziness • Hypersecretion: sweating, salivation, lacrimation, rhinorrhea, diarrhea, and bronchorrhea • Muscle fasciculation and weakness, and respiratory symptoms (bronchospasm, cough, wheezing, and respiratory depression) • Bradycardia, although early on, tachycardia may be present • Miosis • Central nervous system: respiratory depression, lethargy, coma, and seizures 	<ul style="list-style-type: none"> • Obtain red blood cell and plasma cholinesterase levels • Atropine is primary antidote • Pralidoxime is also an antidote for organophosphate and acts as a cholinesterase reactivator • Because carbamates generally produce a reversible cholinesterase inhibition, pralidoxime is not indicated in these poisonings
Pyrethroid insecticides	<ul style="list-style-type: none"> • Similar findings found in organophosphates including the hypersecretion, muscle fasciculation, respiratory symptoms, and seizures • Headache, fatigue, vomiting, diarrhea, and irritability • Dermal: skin irritation and paresthesia 	<ul style="list-style-type: none"> • At times have been mistaken for acute organophosphate or carbamate poisoning • Symptomatic treatment • Treatment with high doses of atropine may yield significant adverse results • Vitamin E oil for dermal symptoms • Supportive care
Neonicotinoid insecticides	<ul style="list-style-type: none"> • Disorientation, severe agitation, drowsiness, dizziness, weakness, and in some situations, loss of consciousness • Vomiting, sore throat, abdominal pain • Ulcerations in upper gastrointestinal tract 	<ul style="list-style-type: none"> • Consider sedation for severe agitation • No available antidote • No available diagnostic test • Supportive care • No available antidote • No available diagnostic test
Fipronil (N-phenylpyrazole insecticides)	<ul style="list-style-type: none"> • Nausea and vomiting • Aphthous ulcers • Altered mental status and coma • Seizures 	<ul style="list-style-type: none"> • Control acute seizures with lorazepam
Lindane (organochlorine insecticide)	<ul style="list-style-type: none"> • Central nervous system: mental status changes and seizures • Paresthesia, tremor, ataxia and hyperreflexia 	<ul style="list-style-type: none"> • Lindane blood level available as send out • Supportive care • Pulmonary effects may be secondary to organic solvent
Glyphosate (phosphonate herbicides)	<ul style="list-style-type: none"> • Nausea and vomiting • Aspiration pneumonia type syndrome • Hypotension, altered mental status, and oliguria in severe cases • Pulmonary effects may in fact be secondary to organic solvent 	<ul style="list-style-type: none"> • Consider urine alkalinization with sodium bicarbonate in IV fluids
Chlorophenoxy herbicides	<ul style="list-style-type: none"> • Skin and mucous membrane irritation • Vomiting, diarrhea, headache, confusion • Metabolic acidosis is the hallmark • Renal failure, hyperkalemia, and hypocalcemia • Probable carcinogen 	<ul style="list-style-type: none"> • Consider PT (international normalized ratio)
Rodenticides (long-acting anticoagulants)	<ul style="list-style-type: none"> • Bleeding: gums, nose, and other mucous membrane sites • Bruising 	<ul style="list-style-type: none"> • Observation may be appropriate for some clinical scenarios in which it is not clear a child even ingested the agent • Vitamin K indicated for active bleeding (IV vitamin K) or for elevated PT (oral vitamin K)

IV, intravenous; PT, prothrombin time.

^a Expanded version of this table is available in the accompanying technical report.¹

CHRONIC EFFECTS

Dosing experiments in animals clearly demonstrate the acute and chronic toxicity potential of multiple pesticides. Many pesticide chemicals are classified by the US EPA as carcinogens. The

past decade has seen an expansion of the epidemiologic evidence base supporting adverse effects after acute and chronic pesticide exposure in children. This includes increasingly sophisticated studies addressing

combined exposures and genetic susceptibility.¹

Chronic toxicity end points identified in epidemiologic studies include adverse birth outcomes including preterm birth, low birth weight, and congenital

TABLE 3 Pesticide and Child Health Resources for the Pediatrician

Topic/Resource	Additional Information	Contact Information
Management of acute pesticide poisoning <i>Recognition and Management of Pesticide Poisonings</i>	Print: fifth (1999) is available in Spanish, English, 6th edition available 2013	http://www.epa.gov/pesticides/safety/healthcare/handbook/handbook.htm 1 (800) 222-1222
Regional Poison Control Centers	Cooperative agreement between Oregon State University and the US EPA. NPMMP provides informational assistance by E-mail in the assessment of human exposure to pesticides	npmmp@oregonstate.edu or by fax at (541) 737-9047
Chronic exposure information and specialty consultation The National Pesticide Medical Monitoring Program (NPMMP)	Coordinated by the Association of Occupational and Environmental Clinics to provide regional academically based free consultation for health care providers	www.aococ.org/PEHSU.htm ; toll-free telephone number (888) 347-AOEC (extension 2632)
Pediatric Environmental Health Specialty Units (PEHSUs)		www.epa.gov/oppfead1/Publications/Cit_Guide/citguide.pdf
Resources for safer approaches to pest control US EPA <i>Citizens Guide to Pest Control and Pesticide Safety</i>	Consumer information documents <ul style="list-style-type: none"> • Household pest control • Alternatives to chemical pesticides • How to choose pesticides • How to use, store, and dispose of them safely • How to prevent pesticide poisoning • How to choose a pest-control company Recommended safest approaches and examples of programs Information on IPM approaches for common home and garden pests	www.epa.gov/pesticides/controlling/index.htm www.ipm.ucdavis.edu
Controlling pests The University of California Integrative Pest Management Program		www.niehs.nih.gov/research/supported/centers/prevention
Other resources National research programs addressing children's health and pesticides	<ul style="list-style-type: none"> • NIEHS/EPA Centers for Children's Environmental Health & Disease Prevention Research • The National Children's Study Pesticide product labels	www.nationalchildrensstudy.gov/Pages/default.aspx www.epa.gov/pesticides/regulating/labels/product-labels.htm#projects
US EPA		http://toxtown.nlm.nih.gov/text_version/chemicals.php?id=23
The National Library of Medicine "Tox Town"	Section on pesticides that includes a comprehensive and well-organized list of web link resources on pesticides	

anomalies, pediatric cancers, neuro-behavioral and cognitive deficits, and asthma. These are reviewed in the accompanying technical report. The evidence base is most robust for associations to pediatric cancer and adverse neurodevelopment. Multiple case-control studies and evidence reviews support a role for insecticides in risk of brain tumors and acute lymphocytic leukemia. Prospective contemporary birth cohort studies in the United States link early-life exposure to organophosphate insecticides with reductions in IQ and abnormal behaviors associated with attention-deficit/hyperactivity disorder and autism. The need to better understand the health implications of ongoing pesticide use practices on child health has benefited from these observational epidemiologic data.³²

EXPOSURE PREVENTION APPROACHES

The concerning and expanding evidence base of chronic health consequences of pesticide exposure underscores the importance of efforts aimed at decreasing exposure.

Integrated pest management (IPM) is an established but undersupported approach to pest control designed to minimize and, in some cases, replace the use of pesticide chemicals while achieving acceptable control of pest populations.³³ IPM programs and knowledge have been implemented in agriculture and to address weeds and pest control in residential settings and schools, commercial structures, lawn and turf, and community gardens. Reliable resources are available from the US EPA and University of California—Davis (Table 3). Other local policy approaches in use are posting warning signs of pesticide use, restricting spray zone buffers at schools, or restricting specific types of pesticide products in schools. Pediatricians can

play a role in promotion of development of model programs and practices in the communities and schools of their patients.

RECOMMENDATIONS

Three overarching principles can be identified: (1) pesticide exposures are common and cause both acute and chronic effects; (2) pediatricians need to be knowledgeable in pesticide identification, counseling, and management; and (3) governmental actions to improve pesticide safety are needed. Whenever new public policy is developed or existing policy is revised, the wide range of consequences of pesticide use on children and their families should be considered. The American Academy of Pediatrics, through its chapters, committees, councils, sections, and staff, can provide information and support for public policy advocacy efforts. See <http://www.aap.org/advocacy.html> for additional information or contact chapter leadership.

Recommendations to Pediatricians

1. Acute exposures: become familiar with the clinical signs and symptoms of acute intoxication from the major types of pesticides. Be able to translate clinical knowledge about pesticide hazards into an appropriate exposure history for pesticide poisoning.
2. Chronic exposures: become familiar with the subclinical effects of chronic exposures and routes of exposures from the major types of pesticides.
3. Resource identification: know locally available resources for acute toxicity management and chronic low-dose exposure (see Table 3).
4. Pesticide labeling knowledge: Understand the usefulness and limitations of pesticide chemical information on pesticide product labels.
5. Counseling: Ask parents about pesticide use in or around the home to help determine the need for providing targeted anticipatory guidance. Recommend use of minimal-risk products, safe storage practices, and application of IPM (least toxic methods), whenever possible.

6. Advocacy: work with schools and governmental agencies to advocate for application of least toxic pesticides by using IPM principles. Promote community right-to-know procedures when pesticide spraying occurs in public areas.

Recommendations to Government

1. Marketing: ensure that pesticide products as marketed are not attractive to children.
2. Labeling: include chemical ingredient identity on the label and/or the manufacturer's Web site for all product constituents, including inert ingredients, carriers, and solvents. Include a label section specific to "Risks to children," which informs users whether there is evidence that the active or inert ingredients have any known chronic or developmental health concerns for children. Enforce labeling practices that ensure users have adequate information on product contents, acute and chronic toxicity potential, and emergency information. Consider printing or making available labels in Spanish in addition to English.
3. Exposure reduction: set goal to reduce exposure overall. Promote application methods and practices that minimize children's exposure, such as using bait stations and gels, advising against overuse of pediculicides. Promote education regarding proper storage of product.
4. Reporting: make pesticide-related suspected poisoning universally reportable and support a systematic central repository of such incidents to optimize national surveillance.
5. Exportation: aid in identification of least toxic alternatives to pesticide use internationally, and unless safer alternatives are not available or are impossible to implement, ban export of products that are banned or restricted for toxicity concerns in the United States.
6. Safety: continue to evaluate pesticide safety. Enforce community right-to-know procedures when pesticide spraying occurs in public areas. Develop, strengthen, and enforce standards of removal of concerning products for home or child product use. Require development of a human biomarker, such as a urinary or blood measure, that can be used to identify exposure and/or early health implications with new pesticide chemical registration or reregistration of existing products. Developmental toxicity, including endocrine disruption, should be a priority when evaluating new chemicals for licensing or reregistration of existing products.
7. Advance less toxic pesticide alternatives: increase economic incentives for growers who adopt IPM, including less toxic pesticides. Support research to expand and improve IPM in agriculture and nonagricultural pest control.
8. Research: support toxicologic and epidemiologic research to better identify and understand health risks associated with children's exposure to pesticides. Consider supporting another national study of pesticide use in the home and garden setting of US households as a targeted initiative or through cooperation with existing research opportunities (eg, National Children's Study, NHANES).
9. Health provider education and support: support educational efforts to increase the capacity of pediatric health care providers to diagnose and manage acute pesticide

poisoning and reduce pesticide exposure and potential chronic pesticide effects in children. Provide support to systems such as Poison Control Centers to provide timely, expert advice on exposures. Require the development of diagnostic tests to assist providers with diagnosing (and ruling out) pesticide poisoning.

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REFERENCES

1. Roberts JR, Karr CK; American Academy of Pediatrics, Council on Environmental Health. Technical report—pesticide exposure in children. *Pediatrics*. 2012;130(6)
2. Katz TM, Miller JH, Hebert AA. Insect repellents: historical perspectives and new developments. *J Am Acad Dermatol*. 2008;58(5):865–871
3. Lewis RG, Fortune CR, Blanchard FT, Camann DE. Movement and deposition of two organophosphorus pesticides within a residence after interior and exterior applications. *J Air Waste Manag Assoc*. 2001;51(3):339–351
4. Hore P, Robson M, Freeman N, et al. Chlorpyrifos accumulation patterns for child-accessible surfaces and objects and urinary metabolite excretion by children for 2 weeks after crack-and-crevice application. *Environ Health Perspect*. 2005;113(2):211–219
5. Gurunathan S, Robson M, Freeman N, et al. Accumulation of chlorpyrifos on residential surfaces and toys accessible to children. *Environ Health Perspect*. 1998;106(1):9–16
6. Fenske RA, Black KG, Elkner KP, Lee CL, Methner MM, Soto R. Potential exposure and health risks of infants following indoor residential pesticide applications. *Am J Public Health*. 1990;80(6):689–693
7. Nishioka MG, Lewis RG, Brinkman MC, Burkholder HM, Hines CE, Menkedick JR. Distribution of 2,4-D in air and on surfaces inside residences after lawn applications: comparing exposure estimates from various media for young children. *Environ Health Perspect*. 2001;109(11):1185–1191
8. Coronado GD, Vigoren EM, Thompson B, Griffith WC, Faustman EM. Organophosphate pesticide exposure and work in pome fruit: evidence for the take-home

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- pesticide pathway. *Environ Health Perspect*. 2006;114(7):999–1006
9. Lu C, Fenske RA, Simcox NJ, Kalman D. Pesticide exposure of children in an agricultural community: evidence of household proximity to farmland and take home exposure pathways. *Environ Res*. 2000;84(3):290–302
10. Lu C, Toepel K, Irish R, Fenske RA, Barr DB, Bravo R. Organic diets significantly lower children's dietary exposure to organophosphorus pesticides. *Environ Health Perspect*. 2006;114(2):260–263
11. Curl CL, Fenske RA, Kissel JC, et al. Evaluation of take-home organophosphorus pesticide exposure among agricultural workers and their children. *Environ Health Perspect*. 2002;110(12):A787–A792
12. Curwin BD, Hein MJ, Sanderson WT, et al. Pesticide contamination inside farm and nonfarm homes. *J Occup Environ Hyg*. 2005;2(7):357–367
13. Shipp EM, Cooper SP, del Junco DJ, Bolin JN, Whitworth RE, Cooper CJ. Pesticide safety training among adolescent farmworkers from Starr County, Texas. *J Agric Saf Health*. 2007;13(3):311–321
14. Gamlin J, Diaz Romo P, Hesketh T. Exposure of young children working on Mexican tobacco plantations to organophosphorous and carbamate pesticides, indicated by cholinesterase depression. *Child Care Health Dev*. 2007;33(3):246–248
15. Eckerman DA, Gimenes LA, de Souza RC, Lopes Galvão PR, Sarcinelli PN, Chrisman JR. Age related effects of pesticide exposure on neurobehavioral performance of adolescent farm workers in Brazil. *Neurotoxicol Teratol*. 2007;29(1):164–175
16. Landrigan PJ, Claudio L, Markowitz SB, et al. Pesticides and inner-city children: exposures, risks, and prevention. *Environ Health Perspect*. 1999;107(suppl 3):431–437
17. Reigart JR, Roberts JR. *Recognition and Management of Pesticide Poisoning*, 5th ed. Washington, DC: US Environmental Protection Agency; 1999
18. American Academy of Pediatrics, Committee on Environmental Health. Taking an environmental history and giving anticipatory guidance. In: Etzel RA, Balk SJ, eds. *Pediatric Environmental Health*. 2nd ed. Elk Grove Village, IL: American Academy of Pediatrics; 2003:39–56
19. Sofer S, Tal A, Shahak E. Carbamate and organophosphate poisoning in early childhood. *Pediatr Emerg Care*. 1989;5(4):222–225
20. Zwiener RJ, Ginsburg CM. Organophosphate and carbamate poisoning in infants and children. *Pediatrics*. 1988;81(1):121–126
21. Lifshitz M, Shahak E, Sofer S. Carbamate and organophosphate poisoning in young children. *Pediatr Emerg Care*. 1999;15(2):102–103
22. Balbus JM, Harvey CE, McCurdy LE. Educational needs assessment for pediatric health care providers on pesticide toxicity. *J Agromed*. 2006;11(1):27–38
23. Kilpatrick N, Frumkin H, Trowbridge J, et al. The environmental history in pediatric practice: a study of pediatricians' attitudes, beliefs, and practices. *Environ Health Perspect*. 2002;110(8):823–871
24. Trasande L, Schapiro ML, Falk R, et al. Pediatrician attitudes, clinical activities, and knowledge of environmental health in Wisconsin. *WMMJ*. 2006;105(2):45–49
25. Karr C, Murphy H, Glew G, Keifer MC, Fenske RA. Pacific Northwest health professionals survey on pesticides and children. *J Agromed*. 2006;11(3-4):113–120

26. Roberts JR, Balk SJ, Forman J, Shannon M. Teaching about pediatric environmental health. *Acad Pediatr*. 2009;9(2):129–130
27. Bronstein AC, Spyker DA, Cantilena LR Jr, Green JL, Rumack BH, Dart RC. 2010 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 26th Annual Report. *Clin Toxicol*. 2011;49(10):910–941
28. Baker EL. Sentinel Event Notification System for Occupational Risks (SENSOR): the concept. *Am J Public Health*. 1989;79(suppl):18–20
29. Whitmore RW, Kelly JE, Reading PL, et al. Pesticides in urban environments. *ACS Symp Ser*. 1993;522(3):18–36
30. US Environmental Protection Agency. Pesticide product labels. Available at: www.epa.gov/pesticides/regulating/labels/product-labels.htm#projects. Accessed October 15, 2012
31. US Environmental Protection Agency. Illegal pesticide products. Available at: www.epa.gov/opp00001/health/illegalproducts. Accessed October 15, 2012
32. Kimmel CA, Collman GW, Fields N, Eskenazi B. Lessons learned for the National Children's Study from the National Institute of Environmental Health Sciences/U.S. Environmental Protection Agency Centers for Children's Environmental Health and Disease Prevention Research. *Environ Health Perspect*. 2005;113(10):1414–1418
33. US General Accounting Office. Agricultural pesticides: Management improvements needed to further promote integrated pest management. Available at: www.gao.gov/new.items/d01815.pdf. Accessed October 15, 2012

ERRATA

Spoooner. We Are Still Waiting for Fully Supportive Electronic Health Records in Pediatrics. *Pediatrics*. 2012;130(6):e1674–e1676.

An error occurred in this article by Spooner, titled “We Are Still Waiting for Fully Supportive Electronic Health Records in Pediatrics” published in the December 2012 issue of *Pediatrics* (2012;130[6]:e1674–e1676; originally published online November 19, 2012; doi:10.1542/peds.2012-2724). On page e1674, on line 33, this reads: “The alarming result from the survey was that only 3% of AAP Fellows reported that they had a system that provided all of the items listed by Leu and colleagues.” This should have read: “The alarming result from the survey was that only 9.6% of AAP Fellows reported that they had or planned to adopt within 12 months a system that provided all of the five “pediatric-supportive” items listed by Leu and colleagues.”

doi:10.1542/peds.2013-0134

Auger et al. Medical Home Quality and Readmission Risk for Children Hospitalized With Asthma Exacerbations. *Pediatrics*. 2013;131(1):64–70

An error occurred in this article by Auger et al, titled “Medical Home Quality and Readmission Risk for Children Hospitalized With Asthma Exacerbations” published in the January 2013 issue of *Pediatrics* (2013;131[1]:64–70; doi:10.1542/2012-1055). On page 69, in Table 2 under the heading Adjusted HR, on the line Medicaid, this reads: “0.28 (0.51–1.34).” This should have read: “0.82 (0.51–1.34).”

doi:10.1542/peds.2013-0187

Council on Environmental Health. Policy Statement: Pesticide Exposure in Children. *Pediatrics*. 2012;130(6):e1757–e1763

A couple of errors occurred in this AAP Policy Statement titled “Pesticide Exposure in Children” published in the December 2012 issue of *Pediatrics* (2012;130[6]:e1757–e1763; originally published online November 26, 2012; doi:10.1542/peds.2012-2757). In Table 2, in the second and third columns where glyphosate is discussed, the words “organic solvent” should be replaced with the word “surfactant.” On page e1758, in the first paragraph of the left-hand column, immediately beneath Table 1, the first full sentence should be amended to read: “For many children, diet may be the most influential source, as illustrated by an intervention study that placed children on an organic diet (produced without most conventional pesticides) and observed drastic and immediate decrease in urinary excretion of organophosphate pesticide metabolites.”

doi:10.1542/peds.2013-0576

Robert JR, Karr CJ; Council on Environmental Health. Technical Report: Pesticide Exposure in Children. *Pediatrics*. 2012;130(6):e1765–e1788

Several inaccuracies occurred in this AAP Technical Report titled “Pesticide Exposure in Children” published in the December 2012 issue of *Pediatrics* (2012;130[6]:e1765–e1788; originally published online November 26, 2012; doi:10.1542/peds.2012-2758). On page e1773 and in Tables 1 and 2 where the phosphonate herbicide glyphosate is discussed, changes should be noted. In the first paragraph of the first column on page e1773 about acute glyphosate poisoning, the word “intentional” should be substituted for the word “unintentional.” In this same paragraph as well as in Tables 1 and 2, the word “surfactant” should replace the words “hydrocarbon solvent” and “organic solvent, respectively.” The

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The American College of
Obstetricians and Gynecologists
WOMEN'S HEALTH CARE PHYSICIANS



COMMITTEE OPINION

Number 575 • October 2013

The American College of Obstetricians and Gynecologists Committee on Health Care for Underserved Women

American Society for Reproductive Medicine Practice Committee

The University of California, San Francisco Program on Reproductive Health and the Environment

This Committee Opinion was developed by the American College of Obstetricians and Gynecologists Committee on Health Care for Underserved Women and the American Society for Reproductive Medicine Practice Committee with the assistance of the University of California, San Francisco (UCSF) Program on Reproductive Health and the Environment. The Program on Reproductive Health and the Environment endorses this document. This document reflects emerging clinical and scientific advances as of the date issued and is subject to change. This information should not be construed as dictating an exclusive course of treatment or procedure to be followed.

Exposure to Toxic Environmental Agents

ABSTRACT: Reducing exposure to toxic environmental agents is a critical area of intervention for obstetricians, gynecologists, and other reproductive health care professionals. Patient exposure to toxic environmental chemicals and other stressors is ubiquitous, and preconception and prenatal exposure to toxic environmental agents can have a profound and lasting effect on reproductive health across the life course. Prenatal exposure to certain chemicals has been documented to increase the risk of cancer in childhood; adult male exposure to pesticides is linked to altered semen quality, sterility, and prostate cancer; and postnatal exposure to some pesticides can interfere with all developmental stages of reproductive function in adult females, including puberty, menstruation and ovulation, fertility and fecundity, and menopause. Many environmental factors harmful to reproductive health disproportionately affect vulnerable and underserved populations, which leaves some populations, including underserved women, more vulnerable to adverse reproductive health effects than other populations. The evidence that links exposure to toxic environmental agents and adverse reproductive and developmental health outcomes is sufficiently robust, and the American College of Obstetricians and Gynecologists and the American Society for Reproductive Medicine join leading scientists and other clinical practitioners in calling for timely action to identify and reduce exposure to toxic environmental agents while addressing the consequences of such exposure.

Reproductive Environmental Health

Robust scientific evidence has emerged over the past 15 years, demonstrating that preconception and prenatal exposure to toxic environmental agents can have a profound and lasting effect on reproductive health across the life course (1–3). Exposure to toxic environmental agents also is implicated in increases in adverse reproductive health outcomes that emerged since World War II; these changes have occurred at a rapid rate that cannot be explained by changes in genetics alone, which occur at a slower pace. For additional information, a detailed review is available at www.acog.org/goto/underserved.

Exposure to environmental chemicals and metals in air, water, soil, food, and consumer products is ubiquitous. An analysis of National Health and Nutrition

Examination Survey data from 2003–2004 found that virtually every pregnant woman in the United States is exposed to at least 43 different chemicals (4). Chemicals in pregnant women can cross the placenta, and in some cases, such as with methyl mercury, can accumulate in the fetus, resulting in higher fetal exposure than maternal exposure (5–7). Prenatal exposure to environmental chemicals is linked to various adverse health consequences, and patient exposure at any point in time can lead to harmful reproductive health outcomes. For example, prenatal exposure to certain pesticides has been documented to increase the risk of cancer in childhood; adult male exposure to pesticides is linked to altered semen quality, sterility, and prostate cancer; and postnatal exposure to some pesticides can

interfere with all developmental stages of reproductive function in adult females, including puberty, menstruation and ovulation, fertility and fecundity, and menopause (8). A group of chemicals called endocrine disrupting chemicals has been shown to interfere with the role of certain hormones, homeostasis, and developmental processes (9). They represent a heterogeneous group of agents used in pesticides, plastics, industrial chemicals, and fuels. One study shows that the endocrine disrupting chemical bisphenol-A works in a fashion that is comparable to diethylstilbestrol at the cell and developmental level (10). Likewise, research has clearly shown that many industrial chemicals can affect thyroid function (9, 11). Because of deficiencies in the current regulatory structure, unlike pharmaceuticals, most environmental chemicals have entered the marketplace without comprehensive and standardized information regarding their reproductive or other long-term toxic effects (12).

Vulnerable Populations and Environmental Disparities

Although exposure to toxic environmental agents is ubiquitous among all patient populations, many environmental factors harmful to reproductive health also disproportionately affect vulnerable and underserved populations and are subsumed in issues of environmental justice. In the United States, minority populations are more likely to live in the counties with the highest levels of outdoor air pollution (13) and to be exposed to a variety of indoor pollutants, including lead, allergens, and pesticides than white populations (14). In turn, the effects of exposure to environmental chemicals can be exacerbated by injustice, poverty, neighborhood quality, housing quality, psychosocial stress, and nutritional status (14, 15).

Women with occupational exposure to toxic chemicals also are highly vulnerable to adverse reproductive health outcomes (16). For example, levels of organophosphate pesticides and phthalates measured in occupationally exposed populations are far greater than levels measured in the general population (17, 18). Furthermore, low-wage immigrant populations disproportionately work in occupations associated with a hazardous workplace environment (19, 20).

As underscored by a groundbreaking 2009 report by the National Academy of Sciences, the effects of low-dose exposure to an environmental contaminant may be quite different based on vulnerabilities, such as the underlying health status of the population and the presence of additional or “background” environmental exposure (21). Recognition of environmental disparities is essential for developing and implementing successful and efficient strategies for prevention.

Prevention

The evidence that links exposure to toxic environmental agents and adverse reproductive and developmental health outcomes is sufficiently robust, and the American

College of Obstetricians and Gynecologists (the College) and the American Society for Reproductive Medicine (ASRM) join numerous other health professional organizations in calling for timely action to identify and reduce exposure to toxic environmental agents while addressing the consequences of such exposure (1, 22, 23). Reproductive care providers can be effective in preventing prenatal exposure to environmental threats to health because they are uniquely poised to intervene before and during pregnancy, which is a critical window of human development. An important outcome of pregnancy is no longer just a healthy newborn but a human biologically predisposed to be healthy from birth to old age (3, 24).

Providing Anticipatory Guidance

It is important for health care providers to become knowledgeable about toxic environmental agents that are endemic to their specific geographic areas. Intervention as early as possible during the preconception period is advised to alert patients regarding avoidance of toxic exposure and to ensure beneficial environmental exposure, eg, fresh fruit and vegetables, unprocessed food, outdoor activities, and a safe and nurturing physical and social environment. By the first prenatal care visit, exposure to toxic environmental agents and disruptions of organogenesis may have already occurred. Obtaining a patient history during a preconception visit and the first prenatal visit to identify specific types of exposure that may be harmful to a developing fetus is a key step and also should include queries of the maternal and paternal workplaces. A list of key chemical categories, sources of exposure, and clinical implications are provided in the online companion document to this Committee Opinion (www.acog.org/goto/underserved). Examples of an exposure history are available at http://prhe.ucsf.edu/prhe/clinical_resources.html. Once this exposure inventory has been completed, information should be given regarding the avoidance of exposure to toxic agents at home, in the community, and at work with possible referrals to occupational medicine programs or United States Pediatric Environmental Health Specialty Units if a serious exposure is found (25).

Reproductive care professionals do not need to be experts in environmental health science to provide useful information to patients and refer patients to appropriate specialists when a hazardous exposure is identified. Existing clinical experience and expertise in communicating risks of treatment are largely transferable to environmental health. Physician contact time with a patient does not need to be the primary point of intervention; information and resources about environmental hazards can be successfully incorporated into a childbirth class curriculum or provided in written materials to help parents make optimal choices for themselves and their children (26).

Reporting identified hazards is critical to prevention. For example, the reproductive toxicity of a common solvent used in many consumer products was first

described in a case report of a stillbirth (27). Physicians in the United States are required to report illnesses or injuries that may be work related, and reporting requirements vary by state. No authoritative national list of physician-reporting requirements by state exists. Resources for information about how to report occupational and environmental illnesses include local and state health agencies and the Association of Occupational and Environmental Clinics (<http://www.aoec.org/about.htm>). Illnesses include acute and chronic conditions, such as a skin disease (eg, contact dermatitis), respiratory disorder (eg, occupational asthma), or poisoning (eg, lead poisoning or pesticide intoxication) (28).

Patient-centered actions can reduce body burdens of toxic chemicals (ie, the total amount of chemicals present in the human body at any one time) (29–32). For example, research results document that when children’s diets change from conventional to organic, the levels of pesticides in their bodies decrease (29, 30). Likewise, study results document that avoiding canned food and other dietary sources of bisphenol A can reduce measured levels of the chemical in children and adult family members (31), and that short-term changes in dietary behavior may significantly decrease exposure to phthalates (32).

Clinicians should encourage women in the preconception period and women who are pregnant or lactating to eat fruit, vegetables, beans, legumes, and whole grains every day, to avoid fast food and other processed foods whenever possible, and to limit foods high in animal fat, while providing information about how certain types of food affect health and how individuals can make changes. Also, patients should be advised that some large fish, such as shark, swordfish, king mackerel, and tilefish, are known to contain high levels of methylmercury, which is known to be teratogenic. As such, women in the preconception period and women who are pregnant or lactating should avoid these fish. To gain the benefits of consuming fish, while avoiding the risks of methylmercury consumption, pregnant women should be encouraged to enjoy a variety of other types of fish, including up to 12 ounces a week (two average meals) of a variety of fish and shellfish that are low in mercury. Five of the most commonly eaten seafood items that are low in mercury are shrimp, canned light tuna, salmon, pollock, and catfish. White (albacore) tuna has more mercury than canned light tuna and should be limited to no more than 6 ounces per week. Pregnant women and breastfeeding women should also check local advisories regarding the safety of fish caught in local lakes, rivers, and coastal areas. If no advice is available, they should consume no more than 6 ounces per week (one average meal) of fish caught in local waters and no other fish during that week (33).

Primary Prevention: The Role of Reproductive Care Professionals Beyond the Clinical Setting

Ultimately, evidence-based recommendations for preventing harmful environmental exposure must involve

policy change (34). Action at the individual level can reduce exposure to some toxic chemicals (29, 31, 32) and informed consumer-purchasing patterns can send a signal to the marketplace to help drive societal change (35). However, individuals alone can do little about exposure to toxic environmental agents, such as from air and water pollution, and exposure perpetuated by poverty. The incorporation of the authoritative voice of health care professionals in policy arenas is critical to translating emerging scientific findings into prevention-oriented action on a large scale. Accordingly, many medical associations have taken steps in that direction (23).

For example, in 2009, the Endocrine Society called for improved public policy to identify and regulate endocrine disrupting chemicals and recommended that “until such time as conclusive scientific evidence exists to either prove or disprove harmful effects of substances, a precautionary approach should be taken in the formulation of EDC [endocrine disrupting chemical] policy” (36). Consistent with the clinical imperative to “do no harm,” the precautionary principle states, “When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically” (37).

The College and the ASRM join these associations and call on their members to advocate for policies to identify and reduce exposure to environmental toxic agents while addressing the consequences of such exposure. Advancing policies and practices in support of a healthy food system should be pursued as a primary prevention strategy to ensure the health of pregnancies, children, and future generations. The College and ASRM urge the U.S. Environmental Protection Agency and other federal and state agencies to take all necessary actions when reviewing substances to guarantee health and safety. In addition, the College and ASRM fully support rigorous scientific investigation into the causes and prevention of birth defects, including linkages between environmental hazards and adverse reproductive and developmental health outcomes. Timely and effective steps must be taken to ensure the safety of all mothers and infants from toxic environmental agents. Because data are lacking on the safety of most chemicals, careful consideration of the risks posed must be given while the potential immediate and long-term health and genetic risks are evaluated. A chemical should never be released if a concern exists regarding its effect on health.

References

1. Diamanti-Kandarakis E, Bourguignon JP, Giudice LC, Hauser R, Prins GS, Soto AM, et al. Endocrine-disrupting chemicals: an Endocrine Society scientific statement. *Endocr Rev* 2009;30:293–342. [[PubMed](#)] [[Full Text](#)] ↵
2. Woodruff TJ, Janssen S, Guillette LJ Jr, Giudice LC, editors. *Environmental impacts on reproductive health and fertility*. New York (NY): Cambridge University Press; 2010. ↵

3. Boekelheide K, Blumberg B, Chapin RE, Cote I, Graziano JH, Janesick A, et al. Predicting later-life outcomes of early-life exposures. *Environ Health Perspect* 2012;120:1353–61. [PubMed] [Full Text] <
4. Woodruff TJ, Zota AR, Schwartz JM. Environmental chemicals in pregnant women in the United States: NHANES 2003-2004. *Environ Health Perspect* 2011;119:878–85. [PubMed] [Full Text] <
5. Barr DB, Bishop A, Needham LL. Concentrations of xenobiotic chemicals in the maternal-fetal unit. *Reprod Toxicol* 2007;23:260–6. [PubMed] [Full Text] <
6. Rollin HB, Rudge CV, Thomassen Y, Mathee A, Odland JO. Levels of toxic and essential metals in maternal and umbilical cord blood from selected areas of South Africa—results of a pilot study. *J Environ Monit* 2009;11:618–27. [PubMed] <
7. Stern AH, Smith AE. An assessment of the cord blood: maternal blood methylmercury ratio: implications for risk assessment. *Environ Health Perspect* 2003;111:1465–70. [PubMed] [Full Text] <
8. Sutton P, Perron J, Giudice LC, Woodruff TJ. Pesticides matter: a primer for reproductive health physicians. San Francisco (CA): University of California, San Francisco; 2011. Available at: http://prhe.ucsf.edu/prhe/pdfs/pesticides_matter_whitepaper.pdf. Retrieved July 22, 2013. <
9. Bergman A, Heindel JJ, Jobling S, Kidd KA, Zoeller RT, editors. State of the science of endocrine disrupting chemicals - 2012. Geneva: World Health Organization; 2013. Available at: http://www.who.int/iris/bitstream/10665/78101/1/9789241505031_eng.pdf. Retrieved July 22, 2013. <
10. Doherty LF, Bromer JG, Zhou Y, Aldad TS, Taylor HS. In utero exposure to diethylstilbestrol (DES) or bisphenol-A (BPA) increases EZH2 expression in the mammary gland: an epigenetic mechanism linking endocrine disruptors to breast cancer. *Horm Cancer* 2010;1:146–55. [PubMed] [Full Text] <
11. Zota AR, Park JS, Wang Y, Petreas M, Zoeller RT, Woodruff TJ. Polybrominated diphenyl ethers, hydroxylated polybrominated diphenyl ethers, and measures of thyroid function in second trimester pregnant women in California. *Environ Sci Technol* 2011;45:7896–905. [PubMed] [Full Text] <
12. Vogel SA, Roberts JA. Why the toxic substances control act needs an overhaul, and how to strengthen oversight of chemicals in the interim. *Health Aff* 2011;30:898–905. [PubMed] [Full Text] <
13. Woodruff TJ, Parker JD, Kyle AD, Schoendorf KC. Disparities in exposure to air pollution during pregnancy. *Environ Health Perspect* 2003;111:942–6. [PubMed] [Full Text] <
14. Adamkiewicz G, Zota AR, Fabian MP, Chahine T, Julien R, Spengler JD, et al. Moving environmental justice indoors: understanding structural influences on residential exposure patterns in low-income communities. *Am J Public Health* 2011;101(suppl 1):S238–45. [PubMed] [Full Text] <
15. Morello-Frosch R, Zuk M, Jerrett M, Shamasunder B, Kyle AD. Understanding the cumulative impacts of inequalities in environmental health: implications for policy. *Health Aff* 2011;30:879–87. [PubMed] [Full Text] <
16. Figa-Talamanca I. Occupational risk factors and reproductive health of women. *Occup Med* 2006;56:521–31. [PubMed] [Full Text] <
17. Centers for Disease Control and Prevention. Fourth national report on human exposure to environmental chemicals. Atlanta (GA): CDC; 2009. Available at: <http://www.cdc.gov/exposurereport/pdf/FourthReport.pdf>. Retrieved July 22, 2013. <
18. Hines CJ, Nilsen Hopf NB, Deddens JA, Calafat AM, Silva MJ, Grote AA, et al. Urinary phthalate metabolite concentrations among workers in selected industries: a pilot biomonitoring study. *Ann Occup Hyg* 2009;53:1–17. [PubMed] [Full Text] <
19. McCauley LA. Immigrant workers in the United States: recent trends, vulnerable populations, and challenges for occupational health. *AAOHN J* 2005;53:313–9. [PubMed] <
20. Pransky G, Moshenberg D, Benjamin K, Portillo S, Thackrey JL, Hill-Fotouhi C. Occupational risks and injuries in non-agricultural immigrant Latino workers. *Am J Ind Med* 2002;42:117–23. [PubMed] <
21. National Research Council. Science and decisions: advancing risk assessment. Washington, DC: National Academies Press; 2009. <
22. Zoeller RT, Brown TR, Doan LL, Gore AC, Skakkebaek NE, Soto AM, et al. Endocrine-disrupting chemicals and public health protection: a statement of principles from The Endocrine Society. *Endocrinology* 2012;153:4097–110. [PubMed] [Full Text] <
23. University of California San Francisco, Program on Reproductive Health and the Environment. Professional statements database. Available at: <http://prhe.ucsf.edu/prhe/professionalstatements.html>. Retrieved July 22, 2013. <
24. Sutton P, Woodruff TJ, Perron J, Stotland N, Conry JA, Miller MD, et al. Toxic environmental chemicals: the role of reproductive health professionals in preventing harmful exposures. *Am J Obstet Gynecol* 2012;207:164–73. [PubMed] [Full Text] <
25. Sathyanarayana S, Focareta J, Dailey T, Buchanan S. Environmental exposures: how to counsel preconception and prenatal patients in the clinical setting. *Am J Obstet Gynecol* 2012;207:463–70. [PubMed] [Full Text] <
26. Ondeck M, Focareta J. Environmental hazards education for childbirth educators. *J Perinat Educ* 2009;18:31–40. [PubMed] [Full Text] <
27. Solomon GM, Morse EP, Garbo MJ, Milton DK. Stillbirth after occupational exposure to N-methyl-2-pyrrolidone. A case report and review of the literature. *J Occup Environ Med* 1996;38:705–13. [PubMed] <
28. Centers for Disease Control and Prevention. National Institute for Occupational Safety and Health. Available at: <http://www.cdc.gov/niosh>. Retrieved July 22, 2013. <
29. Lu C, Toepel K, Irish R, Fenske RA, Barr DB, Bravo R. Organic diets significantly lower children’s dietary exposure to organophosphorus pesticides. *Environ Health Perspect* 2006;114:260–3. [PubMed] [Full Text] <

30. Smith-Spangler C, Brandeau ML, Hunter GE, Bavinger JC, Pearson M, Eschbach PJ, et al. Are organic foods safer or healthier than conventional alternatives? A systematic review [published errata appear in *Ann Intern Med* 2012;157:532; *Ann Intern Med* 2012;157:680]. *Ann Intern Med* 2012;157:348–66. [PubMed] [Full Text] ↩
31. Rudel RA, Gray JM, Engel CL, Rawsthorne TW, Dodson RE, Ackerman JM, et al. Food packaging and bisphenol A and bis(2-ethylhexyl) phthalate exposure: findings from a dietary intervention. *Environ Health Perspect* 2011;119: 914–20. [PubMed] [Full Text] ↩
32. Ji K, Lim Kho Y, Park Y, Choi K. Influence of a five-day vegetarian diet on urinary levels of antibiotics and phthalate metabolites: a pilot study with “Temple Stay” participants. *Environ Res* 2010;110:375–082. [PubMed] ↩
33. American Academy of Pediatrics, American College of Obstetricians and Gynecologists. Guidelines for perinatal care. 7th ed. Elk Grove Village (IL): AAP; Washington, DC: American College of Obstetricians and Gynecologists; 2012. ↩
34. Sathyanarayana S, Alcedo G, Saelens BE, Zhou C, Dills RL, Yu J, et al. Unexpected results in a randomized dietary trial to reduce phthalate and bisphenol A exposures. *J Expo Sci Environ Epidemiol* 2013;23:378–84. [PubMed] ↩
35. Bailin PS, Byrne M, Lewis S, Liroff R. Public awareness drives market for safer alternatives: bisphenol A market analysis report. Falls Church (VA): Investor Environmental Health Network; 2008. Available at: <http://www.iehn.org/documents/BPA%20market%20report%20Final.pdf>. Retrieved July 22, 2013. ↩
36. Endocrine Society. Endocrine-disrupting chemicals. Chevy Chase (MD): Endocrine Society; 2009. Available at: <https://www.endocrine.org/~media/endosociety/Files/Advocacy%20and%20Outreach/Position%20Statements/All/EndocrineDisruptingChemicalsPositionStatement.pdf>. Retrieved July 22, 2013. ↩
37. Science and Environmental Health Network. The wing-spread statement on the precautionary principle, 1998. Available at: <http://www.sehn.org/state.html#w>. Retrieved July 22, 2013. ↩

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From: mailinglist@capitol.hawaii.gov
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Cc: shannonkona@gmail.com
Subject: Submitted testimony for SB692 on Feb 12, 2015 15:40PM
Date: Tuesday, February 10, 2015 10:12:54 AM

SB692

Submitted on: 2/10/2015

Testimony for HTH/AGL on Feb 12, 2015 15:40PM in Conference Room 414

Submitted By	Organization	Testifier Position	Present at Hearing
Shannon Rudolph	Individual	Support	No

Comments: Strongly support! Finally, residents will get some protection! Mahalo Nui Loa to legislators who are not afraid to protect us.

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February 12, 2015

Testimony To: Senate Committee on Health
Senator Josh Green, Chair

Senate Committee on Agriculture
Senator Russell E. Ruderman, Chair

Presented By: Tim Lyons, CAE
Executive Director

Subject: S.B. 692 - Relating to Pesticides.

Chair Green, Chair Ruderman and Members of the Joint Committee:

I am Tim Lyons, Executive Director of the Hawaii Pest Control Association, an organization that represents those who treat structures for pest control and elimination. We are opposed to this bill.

We think it important to remember that many of the companies that are involved in structural pest control are family businesses and some are even "one man shows". It would appear to us that the warning notice was created in order to allow for some sort of system to advise those who are regulated about violations of the law. Sometimes these are done in ignorance, sometimes these are done without any harm; in other words, an administrative procedure. We

think the warning notice serves a good purpose and should be retained as part of the overall violation and penalty structure.

Just as 149A-41(a)(2) allows for a reduced fine for private applicators, we think the same thing should apply to commercial operators.

In short, we are worried about overreach on this bill and unintended consequences. Under the criminal penalty section we are not quite sure what "physical harm" means and what "negligent application" could mean. Both of these would seem to need definitions. As an example, even though homeowners are not regulated specifically by this chapter, would it be a negligent application and physical harm if a neighbor's spraying caused another neighbor to feel a little nauseous and that appeared to be the only repercussion. If so, is that worth \$10,000.00? Again, we are not quite sure and we only raise these questions because we would like to see a clean application of the law.

Thank you.



46-063 Emepele Pl. #U101 Kaneohe, HI 96744 · (808) 679-7454 · Kris Coffield · Co-founder/Executive Director

TESTIMONY FOR SENATE BILL 692, RELATING TO PESTICIDES

Senate Committee on Health
Hon. Josh Green, Chair
Hon. Glenn Wakai, Vice Chair

Senate Committee on Agriculture
Hon. Russell E. Ruderman, Chair
Hon. Gil Riviere, Vice Chair

Thursday, February 12, 2015, 3:40 PM
State Capitol, Conference Room 414

Honorable Chair Green, Chair Ruderman, and committee members:

I am Kris Coffield, representing IMU Alliance, a nonpartisan political advocacy organization that currently boasts over 300 local members. On behalf of our members, we offer this testimony in support of, with proposed amendments for Senate Bill 692, relating to pesticides.

In the debate over regulating pesticides, there is one thing that everyone should agree to condemn: causing harm to other people. Unfortunately, Hawai'i's pesticide code allows chemical abuse to go unchecked. Today, the Department of Agriculture must warn pesticide abusers before investigating potential legal violations. A farm that fails to take caution when using harmful chemicals, therefore, may suffer no consequences for its actions, since the warning will give owners ample time to hide any evidence of their crimes. Even when caught, chemical criminals face minimal penalties. State law currently grades pesticide abuse as a misdemeanor offense, meaning farm operators who apply dangerous doses of restricted use pesticides are met with a maximum, rarely-enforced one-year prison sentence.

In the islands, pesticide misuse poses major health risks. According to an investigation conducted last year by the *Cascadia Times*, pesticide application by four large agrichemical companies on Kaua'i—Syngenta, BASF Plant Science, DuPont Pioneer, and Dow AgroSciences—is ten times the national average. In their report, Cascadia found that a number of restricted use pesticides were overused, including chlorpyrifos, atrazine, and paraquat. A study published in the medical journal *The Lancet Neurology*, last March, found that the neurotoxin chlorpyrifos led to developmental disabilities in children. Similarly, atrazine and paraquat are banned in the

European Union. Atrazine is known to contaminate groundwater supplies, while paraquat has been linked to the onset of Parkinson's disease. Yet, both herbicides remain widely popular in the United States, where the Environmental Protection Agency has declared with “reasonably certainly” that neither carry a significant risk of harm.

Pesticide abuse is not limited to the outer islands. On O'ahu, anti-trafficking advocates have provided services to cancer-stricken sprayers of restricted use pesticides, some of whom have are also victims of labor trafficking. Not only were clients provided with little to no information about the health risks of the pesticides placed in their hands, they were not given equipment to protect themselves from harm. To clamp down on pesticide abuse, local lawmakers must pass legislation eliminating all warning notice requirements from the state's pesticide code. That way, investigators will be able to fully probe allegations of noncompliance without tipping off their targets. Additionally, policymakers should raise the penalties for restricted use pesticide violations that result in bodily harm or death. Carelessness should not excuse assault or homicide, even if industrial chemicals are the culprit.

Accordingly, we urge you to add an additional subsection to the bill that raises the grade of offense for a person who causes death through the negligent use of a restricted use pesticide. We suggest grading this offense to be consonant with negligent homicide in the first degree as a B-class felony by using the following language: “**Any person who causes the death of another person through the negligent application of a pesticide shall be guilty of a class B felony.**” We also suggest deleting the \$10,000 fine and five-year imprisonment term stated on page 5, lines 2-3 of the bill, since these penalties are already stated in HRS §706-660.

If we wait, our children will breathe in the fallout for generations to come. Mahalo for the opportunity to testify in support of this bill.

Sincerely,
Kris Coffield
Executive Director
IMUAlliance

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SB692

Submitted on: 2/11/2015

Testimony for HTH/AGL on Feb 12, 2015 15:40PM in Conference Room 414

Submitted By	Organization	Testifier Position	Present at Hearing
Adolph Helm	Dow Agrosciences	Oppose	No

Comments:

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SB692

Submitted on: 2/11/2015

Testimony for HTH/AGL on Feb 12, 2015 15:40PM in Conference Room 414

Submitted By	Organization	Testifier Position	Present at Hearing
Warren Watanabe	Maui County Farm Bureau	Oppose	No

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SB692

Submitted on: 2/11/2015

Testimony for HTH/AGL on Feb 12, 2015 15:40PM in Conference Room 414

Submitted By	Organization	Testifier Position	Present at Hearing
Alan Gottlieb	Hawaii Cattlemen's Council	Oppose	No

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SB692

Submitted on: 2/11/2015

Testimony for HTH/AGL on Feb 12, 2015 15:40PM in Conference Room 414

Submitted By	Organization	Testifier Position	Present at Hearing
Mark Phillipson	Syngenta Hawaii	Oppose	No

Comments:

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SB692

Submitted on: 2/11/2015

Testimony for HTH/AGL on Feb 12, 2015 15:40PM in Conference Room 414

Submitted By	Organization	Testifier Position	Present at Hearing
Iris Iwami	Individual	Oppose	No

Comments:

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February 12, 2015

TO: COMMITTEE ON HEALTH
Senator Josh Green, Chair
Senator Glenn Wakai, Vice Chair

COMMITTEE ON AGRICULTURE
Senator Russell E. Ruderman, Chair
Senator Gil Riviere, Vice Chair

FR: Renee Pinel, President and CEO
Western Plant Health Association

RE: S.B. 692 Relating to Pesticides.
Position: Oppose

Dear Chairs Green and Ruderman, Vice Chairs Wakai and Riviere and members,

On behalf of the Western Plant Health Association (WPHA) I am writing to express our concern regarding SB 692 which would mandate certain penalties for pesticide application violations regardless if the violation is a first time violation or accidental. WPHA represents the interests of fertilizer and pesticide manufacturers, agricultural biotechnology providers, and agricultural retailers in Hawaii, California and Arizona.

WPHA and its members take seriously the importance of the safe use and application of pesticide products, and believe users should be held responsible for their management of products. However, we believe additional consideration needs to be incorporated into SB 692. While SB 692 mandates any application that results in physical harm would be categorized as a class C felony; however, no definition of what physical harm would include is included. SB 692 also automatically mandates that a negligent application that results in physical harm automatically will result in a felony charge regardless if it is a first time violation. We believe a higher violation level is going to be implemented that the definition should be a "knowingly negligent" application. We also believe that the department of agriculture should have the discretion of determining whether a higher level of prosecution is appropriate via issues including if the violation is a first time violation, if it was a knowingly negligent application, or other mitigating factors.

While WPHA appreciates the intent of the author to assure the safe use of pesticide products. However, as stated above we believe that SB 692 should not move forward until definitions to clarify standards for negligence and harm are developed. We thank you for your consideration of our comments.

Sincerely,

A handwritten signature in black ink, appearing to read "R. Pinel", written in a cursive style.

Renee Pinel
President/CEO