Testimony in Support of the Child Safe Playing Fields Act

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We are pediatricians and specialists in pediatric environmental health. We are part of the Children’s Environmental Health Center based in Mount Sinai Medical Center in New York City. The mission of the Children’s Environmental Health Center is to educate health care providers and others about the scientific and medical aspects of environmental health problems impacting children and to provide clinical consultation to families, health care professionals, public health officials, and community organizations with concerns regarding children's exposure to environmental health hazards.

**Introduction**

School-aged children can spend anywhere from 35 to 50 hours per week in and around school facilities for at least 12 years of their life. After school, many children are involved in extracurricular activities that take place in public park playgrounds and ball fields.

A good education is essential in preparing children to become active members in their communities. It is crucial that schools and public park areas provide a safe environment for children to foster their growth and development. Unfortunately, schools and local parks may contain environmental hazards that can negatively impact children’s health and learning. Pesticides are a group of hazardous chemicals used in these environments that can have both short-term and long-term effects on children’s health and development.

There are, however, well-studied, effective approaches to pest management that minimize children’s exposure to pesticides. We will review children’s vulnerability to pesticides, health effects from exposure to pesticides, and strategies to minimize pesticide exposure to provide all children with a safer learning and playing environment.

**Children’s and Adolescents’ Vulnerability to Pesticides**

Children of all ages are susceptible to environmental toxins. Children and adolescents are exposed to pesticides through inhalation, ingestion, and dermal absorption. Children have greater exposure to pesticides because they drink more water, eat more food and breathe more air relative to their size than adults. Adolescents may also be disproportionately affected to pesticides exposures on playing fields due to participation in organized sports. Children’s
growth and development and adolescents’ pubertal development may be affected by exposure to pesticides. Children and adolescents have more future years of life and therefore more time to develop chronic diseases that have been triggered by environmental exposures.1,2

**Health Effects of Pesticide Exposure on Children and Adolescents**

Pesticides are a group of diverse chemical compounds that are among the most toxic chemicals that children are commonly exposed to. Pesticides include insecticides, herbicides, fungicides, rodenticides, fumigants, and insect repellants. The mechanism by which pesticides kill pests is frequently similar to that which harms or kills humans.3 For example, a major class of insecticides is the organophosphates. Organophosphate pesticides target the nervous systems of insects and other pests through the inhibition of acetylcholinesterase, an enzyme that degrades the neurotransmitter acetylcholine, resulting in a buildup of acetylcholine in the neuronal junction. Acute poisonings in humans (via the same mechanism) leads to a spectrum of cholinergic symptoms, including excess shedding of tears, abdominal cramps, vomiting, diarrhea, and profuse sweating, with more severe cases progressing to respiratory arrest and death.

Children and adolescents are exposed to pesticides by their use in homes, gardens, food supplies, schools, and playing fields. The resulting cumulative burden of pesticide exposure in children and adolescents is potentially very high given the ubiquity of pesticides in the environment. The National Center for Health Statistics (NCHS) of the Centers for Disease Control and Prevention (CDC) conducts The National Health and Nutrition Examination Survey (NHANES), which assesses the health and nutrition status of the civilian U.S. population. As part of this survey, metabolites of pesticides (breakdown products that are markers of exposure) are measured in the US population. Using this data, Barr et al. found that children and adolescents often had higher levels of organophosphate metabolites than adults; children from 6-

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11 years of age had especially higher levels of organophosphate metabolites than adults. These findings suggest that the general child and adolescent populations have greater levels of exposure to pesticides than the adult population.

Exposure to pesticides can cause both acute and chronic health effects. Acute exposure to pesticides can lead to asthma exacerbations, cough, shortness of breath, nausea, vomiting, eye irritation, and headaches. Pesticide exposures in schools have been documented to cause acute illness among students and school employees. Low dose pesticide exposure in children and in pregnant women has also been linked to some cancers and birth defects, respectively. The effects of low-dose exposure to pesticides, both prenatally and postnatally, have also been shown in many studies to negatively affect children’s development. At this low-dose level of pesticide exposure, no acute affects are seen but nonetheless organ systems (in this case, the nervous system) are still affected. In one study, children of agriculture workers in Oregon and North Carolina were found to have deficits in coordination as well as visual memory, in comparison to children of non-agricultural workers. Another study compared the urinary concentrations of a metabolite of organophosphates in the general population as measured by the National Health and Nutrition Examination Survey (2000–2004) and the prevalence of attention-

deficit/hyperactivity disorder (ADHD) in children 8 to 15 years of age and found that children with higher levels of the metabolite had higher odds of having ADHD.\textsuperscript{16}

Pesticides, such as DDT, methoxychlor and chlordecone, have displayed the ability to disrupt endocrine function in animal studies.\textsuperscript{17} There have been very few studies looking at the effects of pesticides on pubertal development in children, however.\textsuperscript{18} The findings of the studies have also been mixed, highlighting the importance of further examination of the role of pesticides in pubertal development.\textsuperscript{19,20} Rogan et al stated that the “inconsistency seen in the current literature is less evidence of no effect than a consequence of the broadness of the topic and the difficulty in studying it, especially with available epidemiologic tools. Of course, by the time epidemiology can demonstrate effects, people have been exposed and affected, so it is in some sense too late.”\textsuperscript{21}

In summary, research studies have shown a wide range of negative health consequences for children and adolescents from their exposure to pesticides (such as neurologic impairment as well as increased risk of cancer and potential reproductive damage). With knowledge of this scientific evidence, we need to identify and implement policy strategies to reduce children’s exposure to these toxic chemicals. We know that legislative bans are the single most effective intervention in reducing human exposure to chemical toxins. The classic example is the removal of lead from gasoline resulting in a subsequent significant decline in blood lead levels in US children.\textsuperscript{22,23} Similarly, the EPA ban of the pesticide chlorpyrifos resulted in a 10 fold decline in blood levels of chlorpyrifos detected in mother and babies.\textsuperscript{24} In essence, what is toxic to the

\begin{thebibliography}{9}
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pests is also toxic for our children and we need to take steps to reduce children’s and adolescents’ exposure to pesticides.

**Reducing children’s and adolescents’ exposure to pesticides**

An effective, less toxic approach to controlling pests is the implementation of Integrated Pest Management (IPM) programs that reduce children’s exposure to pesticides. IPM is an approach that controls pests by preventing their access to food, water and shelter. IPM programs can be more cost-efficient than traditional pest control techniques using pesticides and as effective as these methods.\(^{25}\) Resources for integrated pest management in schools can be found in the following EPA websites: http://www.epa.gov/pesticides/ipm/ and http://www.epa.gov/pesticides/ipm/schoolipm/.

The Child Safe Playing Fields Act is a critical legislative approach that builds upon IPM programs by further defining and requiring only the safest methods for playground and ball field maintenance. Similar legislation was passed in New York, Massachusetts and Connecticut. By banning synthetic chemical lawn pesticides on playgrounds, ball fields, day cares, schools, and public parks, New Jersey will be taking an essential step forward in protecting children’s health and ensuring children learn and grow in a safe environment.

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