A COLLABORATIVE MODEL FOR CHILDREN'S ENVIRONMENTAL HEALTH POLICY: THE NORTH CAROLINA SCHOOL CHILDREN'S HEALTH ACT OF 2006

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INTRODUCTION

During the academic year, children spend thirty to fifty percent of their time in and around schools. Since public schools are under public control, citizens and elected officials have the power to require that the physical environment of schools is as free of hazards as possible. The United States' Center for Disease Control and Prevention (CDC) promotes Coordinated School Health as part of its "Healthy Youth" campaign, stating: "Schools by themselves cannot, and should not be expected to, address the nation's most serious health and social problems . . . However, schools could provide a critical facility in which many agencies might work together to maintain the well-being of young people."[1] One major component of coordinated school health is the Healthy School Environment including "[f]actors that influence the physical environment [such as] the school building and the area surrounding it, any biological or chemical agents that are detrimental to health, and physical conditions such as temperature, noise, and lighting."[2] A healthy school environment helps to prevent illness, absenteeism, injury, and environmental exposures, and to promote learning. Numerous environmental hazards have been studied in the school setting,

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1. Center for Disease Control and Prevention (CDC), Healthy Youth! Coordinated School Health Program, http://www.cdc.gov/healthyyouth/cshp/ (last visited Jan. 12, 2007).

2. *Id*.

including indoor air pollutants, playground and playing field maintenance, and chemical safety. Programs and procedures have been developed to minimize or eliminate many potentially harmful school-based exposures.[3]

This article describes a successful model approach developed in North Carolina which based actions on up-to-date science and practical approaches in order to create a public policy framework to protect all of the approximately 1.4 million K-12 public school children in the state from exposure to five broad categories of avoidable environmental exposures: pesticides, diesel fumes, elemental mercury, arsenic treated wood, and mold and mildew.[4] The centerpiece and driver of this legislation was a rich experience at the local and school district level with successful implementation of integrated pest management (IPM) in schools as an extremely effective way of both controlling pests and preventing human exposures to toxic pesticides.[5] Below we review the pertinent science related to pesticide exposure in children, sketch the landscape of public policy pertaining to children's environmental health in schools, and describe the process of developing and passing the School Children's Health Act in North Carolina in 2006.[6] We conclude with "lessons learned" from the NC experience which can be applied to other children's environmental health issues, both in this state and other states.

CHILDREN AND PESTICIDES

Since the publication of *Pesticides in the Diets of Infants and Children*[7] in 1993, there has been a growing appreciation that with respect to environmental hazards, "children are not little adults."[8] Rather they often are more vulnerable to harm from environmental exposures than adults, both because their exposures are often greater, and because their immature organs and systems are more susceptible

3. *See, e.g.,* Environmental Protection Agency (EPA), Healthy School Environments, http://www.epa.gov/schools/ (last visited Jan. 12, 2007).

4. Schoolchildren's Health Act of 2005, 2006 N.C. Sess. Laws 2006-143.

5. BILLIE L. KAREL ET AL., AGRICULTURAL RESOURCES CENTER & PESTICIDE EDUCATION PROJECT TOXIC-FREE SCHOOLS PROJECT, CLEAN SCHOOLS, SAFE KIDS: STRIVING FOR SAFER PEST MANAGEMENT IN NORTH CAROLINA PUBLIC SCHOOLS, (2003), *available at* http://www.pested.org/informed/pdfs/CleanSchools.pdf.

6. Schoolchildren's Health Act of 2005, 2006 N.C. Sess. Laws 2006-143

7. NATIONAL RESEARCH COUNCIL, PESTICIDES IN THE DIETS OF INFANTS AND CHILDREN (National Academy Press 1993).

8. *Id.* at 3.

to damage.[9] Because children are rapidly growing and have high energy demands, they eat more food, drink more water and breathe more air per pound of body weight than adults.[10] Thus, toxic contaminants in food, water and air are delivered in higher quantities to small children.[11] Further, because children are curious, they tend to eat non-food items and put hands and objects into their mouths more frequently than adults, also leading to higher exposures. Because their organs and physiologic systems are growing, maturing and changing through the end of adolescence, their ability to detoxify and eliminate toxics is variable, and toxicity may be increased.[12] Further, immature systems are vulnerable to damage from environmental exposure that is unique, potentially severe, and permanent, even at low levels of exposure that would not affect a mature adult.[13]

Pesticides, defined as "substances intended to repel, kill, or control species designated as 'pests' including weeds, insects, rodents, fungi, bacteria, or other organisms,"[14] are among the best-studied classes of environmental chemical exposures in children. Because they are intentional poisons, more is known about the toxic effects of pesticides than most classes of man-made chemicals. Initial research concentrated upon high-dose poisonings, but in recent years there has been increasing interest and concern regarding the effects of low-dose exposures, particularly in children. A growing body of scientific literature indicates that the ubiquitous use of pesticides in agriculture, industry, public places, and households represents an unacceptable threat to children's health.[15]

Study of one class of insecticides, the organophosphates (OPs), has clearly shown that the anticipated increased vulnerabilities of children to environmental toxic exposures are demonstrable. Both through epidemiology (the study of disease/exposure patterns in

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9. *Id.* at 3-4.

10. PHYSICIANS FOR SOCIAL RESPONSIBILITY, REDUCING LOW-DOSE PESTICIDE EXPOSURES IN INFANTS AND CHILDREN 4 (2006), *available* at http://www.pesticidehealthrisks.org/dev/.

11. *Id*.

12. NATIONAL RESEARCH COUNCIL, *supra* note 7 at 42-43.

13. *Id*. 6-7.

14. Environmental Protection Agency (EPA), Pesticides: Pesticide Glossary, http://www.epa.gov/pesticides/glossary/ (last visited Jan. 15, 2007).

15. PHYSICIANS FOR SOCIAL RESPONSIBILITY, REDUCING LOW-DOSE PESTICIDE EXPOSURES IN INFANTS AND CHILDREN 1-2, 12 (2006), *available* at http://www.pesticidehealthrisks.org/dev/ (discussing the high use of pesticides in the US and explaining the risks facing children and the precautions that parents can take to minimize those risks).

human populations) and biomonitoring (the direct measurement of a chemical or its metabolite in human body tissue), children have consistently been shown to have higher exposure to OPs than adults, and the youngest children studied have the highest exposures.[16] OPs kill insects by poisoning their nervous systems, and this mechanism of injury is the same in humans. Symptoms of acute, high-dose poisoning are the same in all age groups, and operate by the same mechanism that makes OPs useful for pest control.[17] New evidence shows that these chemicals are toxic to the developing nervous system at doses well below those that cause obvious symptoms of poisoning, and by very different mechanism of toxicity.[18] In animal studies, lifelong damage to offspring can occur with prenatal exposure for as little as one week at doses that do not harm the pregnant animal.[19] Studies in humans of pregnant women exposed via standard use of chlorpyrifos, once a common household OP, show an association between maternal exposure and babies born with reduced gestational age, head circumference, birth weight or birth length while mothers remain symptom-free.[20] When chlorpyrifos was taken off the market

16. Adgate et al., *Measurement of children's exposure to pesticides: Analysis of urinary metabolite levels in a probability-based sample*, 109 ENVT'L HEALTH PERSPECTIVES 583, 588-89 (2001); Barr et al., *Concentrations of dialkyl phosphate metabolites of organophosphorus pesticides in the US population,* 112 ENVT'L HEALTH PERSP. 186, 199 (2004).. *See also* Fenske et al., *Biologically Based Pesticide Dose Estimates for Children in an Agricultural Community,* 108 ENVT'L HEALTH PERSPECTIVES 515-20 (2000) (examining the high vulnerability of children to toxins);Lu et al., *Biological Monitoring Survey of Organophosphorus Pesticide Exposure Among Preschool Children in the Seattle Metropolitan Area,* 109 ENVT'L. HEALTH PERSPECTIVES 299, 299 (2001) (discussing exposure to OP's in preschools).

17. Barr et al., *Concentrations of Dialkyl Phosphate Metabolites of Organophosphorus Pesticides in the US Population,* 112 ENVT'L HEALTH PERSPECTIVES 186, 186 (2004)

18. Schuh et al., *Noncholinesterase Mechanisms of Chlorpyrifos Neurotoxicity: Altered Phosphorylation of CA2+/cAMP Response Element Binding Protein in Cultured Neurons,* 182 TOXICOLOGY AND APPLIED PHARMACOLOGY 176, 176-77 (2002).

19. S. Brimijoin & C. Koenigsberger, *Cholinesterases in Neural Development: New Findings and Toxicological Implications,* 107 ENVTL. HEALTH PERSPECTIVES 59, 59-60 (Supp. 1999); A.R. Greenlee, T.M. Ellis & R.L. Berg, *Low-dose Agrochemicals and Lawn-care Pesticides Induce Developmental Toxicity in Murine Preimplantation Embryos*, 6 ENVTL. HEALTH PERSPECTIVES. 703, 703-06 (2004); Meyer et al., *Critical periods of Chlorpyrifos-induced Developmental Neurotoxicity: Alterations in Adenylyl Cyclase Signaling in Adult Rat Brain Regions after Gestational or Neonatal Exposure,* 112 ENVTL. HEALTH PERSPECTIVES 295, 295-96 (2004).

20. Berkowitz et al., *In Utero Pesticide Exposure, Maternal Paraoxonase Activity, and Head Circumference,* 112 ENVTL. HEALTH PERSPECTIVES 388, 388-91 (2004); Eskenazi et al., *Association of in utero organophosphate pesticide exposure and fetal growth and length of gestation in an agricultural population,* 112 ENVTL. HEALTH PERSPECTIVES 1116, 1116-17 (2004); Perera et al., *Effects of Transplacental Exposure to Environmental Pollutants on Birth Outcomes in a Multiethnic Population,* 111 ENVTL. HEALTH PERSPECTIVES 201, 201-05 (2003).

in 2001, subsequent studies showed that maternal exposure levels fell and the associated reduced birth measurements disappeared.[21]

The case of chlorpyrifos illustrates how removing a toxic chemical from the marketplace can be an effective tool for preventing childhood exposure. Another common and effective approach to reducing pesticide exposure is a community-wide approach known as Integrated Pest Management, or IPM. IPM is a common-sense, prevention-based approach to pest control that shifts the focus of a pest management program from treating pest outbreaks with chemicals, to preventing pest outbreaks, reserving chemical methods as a last resort.[22] Since 1996, when Congress directed federal agencies to adopt and promote IPM in the Food Quality Protection Act[23], the use of IPM has been growing steadily in agriculture, horticulture, and increasingly in structures to reduce impacts from pesticide pollution. In recent years the use of IPM has grown dramatically in U.S. schools, both because of its effectiveness in managing the wide range of pest problems encountered in schools, and because of the desire on the part of parents and many child health agencies to reduce children's exposures in the institutions where they spend their time.[24]

INTEGRATED PEST MANAGEMENT AT SCHOOL

The Food Quality Protection Act defines IPM as "a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks."[25] IPM effectively manages pests while reducing reliance on toxic pesticides, using a prevention-based system to manage pest populations with the least-toxic methods possible. It can be both more cost-effective than traditional spray-based programs, because of its focus on pest prevention, and safer, since students and staff are much less likely to be exposed to toxic pesticide residues. For example, Greene and Breisch tracked the implementation of IPM throughout federal buildings managed by the

21. Whyatt et al., *Prenatal insecticide exposures and birth weight and length among an urban minority cohort,* 112 ENVTL. HEALTH PERSPECTIVES. 1125, 1125-26 (2004).

22. GODFREY NALYANYA & STEVE LILLEY, PEST CONTROL PRACTICES IN NORTH CAROLINA PUBLIC SCHOOLS, NORTH CAROLINA STATE UNIVERSITY INETGRATED PEST MANAGEMENT CENTER 8 (2002), *available at* http://schoolipm.ncsu.edu/documents/2002 Surveyreport.pdf.

23. 7 U.S.C. § 136(r-1) (2000).

24. U.S. GENERAL. ACCOUNTING OFFICE, PESTICIDES: USE, EFFECTS AND ALTERNATIVES TO PESTICIDES IN SCHOOLS, GAO/RCED-00-27 (1999).

25. 7 U.S.C. § 136(r-1) (2000).

U.S. General Services Administration over a ten-year period (1988-1999), and found a dramatic reduction in both the number of service calls for pest control (a ten-fold decrease in service calls) and the total weight of pesticide active ingredients used (a ninty-five decrease), as well as a total elimination of high-risk aerosol and liquid pesticide formulations.[26] A survey by Karel et al. documented reduced costs, increased client satisfaction and reduction in pesticide use among North Carolina schools implementing IPM.[27] For example, when Wake County Schools (one of North Carolina's largest public school districts) shifted to an IPM program in their schools, the district was able to reduce pesticide use dramatically while improving pest control at the same time. At a public forum in 2003, Assistant Superintendent Mike Burris reported that the district had reduced its annual use of liquid pesticide formulations from about 38,000 gallons of formulated sprays before IPM to about five gallons in 2003. The use of high-risk foggers and dusts—formerly a staple in the district's program—dropped to zero. Burris also stated that the program has saved the district money because of decreased chemical costs and pesticide use trainings.[28]

The components of a comprehensive school IPM program include: monitoring pest levels, the use of multiple pest management strategies (with chemical pest control as a last resort), communication among all facilities users and education about pest prevention methods, notification of pesticide applications to all facilities users, keeping records of pest outbreaks and measures taken, and a written policy that establishes requirements and expectations for the program.[29] This integrated approach replaces an outdated system still used in many schools, referred to in this paper as "conventional pest control." Conventional pest control typically relies on a pest control contractor who visits the facility on a regular schedule (often

26. Albert Greene & Nancy L. Breisch, *Measuring Integrated Pest Management Programs for Public Buildings,* 95 J. ECON. ENTOMOLOGY 1, 10-11 (2002).

27. 27.BILLIE L. KAREL ET AL., AGRICULTURAL RESOURCES CENTER & PESTICIDE EDUCATION PROJECT TOXIC-FREE SCHOOLS PROJECT, CLEAN SCHOOLS, SAFE KIDS: STRIVING FOR SAFER PEST MANAGEMENT IN NORTH CAROLINA PUBLIC SCHOOLS, 4 (2003), *available at* http://www.pested.org/informed/pdfs/CleanSchools.pdf.

28. Statement of Assistant Superintendent Mike Burris to the public at a "Clean Schools, Safe Kids Forum"at Carroll Middle School, Raleigh N.C. ("Nov. 19, 2003). (on file with author).

29. GODFREY NALYANYA & STEVE LILLEY, PEST CONTROL PRACTICES IN NORTH CAROLINA PUBLIC SCHOOLS, NORTH CAROLINA STATE UNIVERSITY INETGRATED PEST MANAGEMENT CENTER 8 (2002), *available at* http://schoolipm.ncsu.edu/documents/2002 Surveyreport.pdf.

monthly) and applies a liquid pesticide formulation to all the baseboards in the building, and often around the outside perimeter.[30] Conventional pest control is heavily chemical-dependent, requires little specialized knowledge of insect, weed or rodent biology, and uses a calendar, rather than evidence of need, to determine when pest control measures are taken (types of pesticide applications are often generalized via indoor and outdoor spraying, crack and crevice treatments, aerosol sprays and/or use of fogs or bombs). IPM, by contrast, requires training in basic pest biology, and is focused on the conditions that give rise to pest problems (generally access to the facility, food, and water). Pest control measures are taken only when determined action thresholds are met, and chemical methods are generally employed only after other methods (such as baits, traps, biological controls or repairs) have not produced the desired result.

The importance of a written IPM policy for schools cannot be overstated. A policy makes clear who is responsible for pest control, what the expectations of an IPM program are, and what requirements contractors or facilities staff must meet. It provides useful guidance to school staff in seeking bids for pest management contracts, and accountability to the elected school board, staff members, students and their parents. A policy can also prevent the loss of a good program when the responsible staff member changes jobs or retires. Several North Carolina school districts, including Pitt[31], Wake[32], Durham[33] and Orange[34] Counties, have adopted written IPM policies.

Different approaches to school IPM are taken in different states. Common to many states are training programs, typically conducted by the Cooperative Extension program at the state's land-grant institution. Such programs exist in Pennsylvania, Arizona, Indiana, Florida, Texas and North Carolina, among others.[35] Some states have passed legislation that recommends IPM, including California, Maine, Montana and New York.[36] States that require schools to use IPM include Texas, Pennsylvania, New Jersey, Minnesota, Maryland, and

30. NORTH CAROLINA SCHOOL BOARDS ASS'N, N.C., POLICY 9205, PEST MANAGEMENT (2005).

31. PITT COUNTY BD. OF EDUC., N.C., POLICY 5.006 (2006).

32. WAKE COUNTY BD. OF EDUC. N.C.,.POLICY 7212 (2005).

33. DURHAM PUB. SCHS. , N.C., POLICY No. 6340 (2005).

34. ORANGE COUNTY BD. OF EDUC., N.C., POLICY 9205 (2005).

35. *See supra*, notes 36-37.

36. KAGAN OWENS & JAY FELDMAN, THE SCHOOLING OF STATE PESTICIDE LAWS – 2002 UPDATE, BEYOND PESTICIDES (2002), http://beyondpesticides.org/schools/publications/School_report_update_2002.pdf.

now North Carolina.[37] Federal legislation that would require all U.S. public schools to develop Integrated Pest Management plans, called the *School Environment Protection Act*, has been introduced in Congress several times but not yet passed.[39]

NORTH CAROLINA'S APPROACH

Perhaps the first IPM program in a North Carolina school district began in Pitt County, an agricultural area in the eastern part of the state with a strong medical sector at its center in the city of Greenville. Parents in the school district became concerned after seeing a spray crew fogging classrooms after school, and when children presumptively exposed reported flu-like symptoms.[40] Parent organizing led to the implementation of an IPM program that was piloted in one school building and eventually became the standard for all county buildings in 1994. That local campaign was the forerunner of many others across the state. Parents in several NC school districts have petitioned their school boards and administrators for the adoption of IPM, assisted in their efforts by public interest organizations like the Agricultural Resources Center/Pesticide Education Project, PTA groups and neighborhood associations.

Concurrently, extension entomologists at NC State University began developing a training program for school facilities staff and pest management professionals (PMP).[41] Since its inception in 1998, this program has trained dozens of professionals in school IPM, and began an awards program for school district IPM efforts in 2005. The availability of a comprehensive, accessible training program has spurred the development of many more IPM programs at schools around the state. As of 2003, approximately twenty percent of North Carolina public school districts responding to a survey reported using IPM as their method of pest control.[42]

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37. *Id*. *See also* N.C. GEN STAT.. §115C-47(45); N.J. STAT. ANN. § 13:1F (West 2003).

39. S. 1619 & H.R. 110, 109th Cong. (2005).

40. Susan Spring & Fawn Pattison, et al., SCHOOL PESTICIDE REFORM BEYOND PESTICIDES, SAFER SCHOOLS: ACHIEVING A HEALTHY LEARNING ENVIRONMENT THROUGH INTEGRATED PEST MANAGEMENT, BEYOND PESTICIDES 32 (2003).

41. NC State University Integrated Pest Management for North Carolina Schools, http://ipm.ncsu.edu/urban/cropsci/SchoolIPM/ (last visited Jan. 12, 2007).

42. BILLIE L. KAREL ET AL., AGRICULTURAL RESOURCES CENTER & PESTICIDE EDUCATION PROJECT TOXIC-FREE SCHOOLS PROJECT, CLEAN SCHOOLS, SAFE KIDS: STRIVING FOR SAFER PEST MANAGEMENT IN NORTH CAROLINA PUBLIC SCHOOLS 4 (2003) *available at* http://www.pested.org/informed/pdfs/CleanSchools.pdf.

The experience of Durham Public Schools is an example of the dynamic nature of IPM implementation in North Carolina. In 2004, parents in Durham public schools began petitioning the school board to reduce its pesticide use through an IPM program. Parents circulated a petition, met one-on-one with school board members to voice their concerns, and met with school staff to inventory pest control practices in the district. Spurred by parent concerns, the school district's facilities staff attended a School IPM training provided by NCSU. In 2005 when parents proposed an IPM policy to the county school board, the policy was met with support from facilities staff, who had already begun implementing what they had learned at the NCSU training. The policy was unanimously approved by the school board in 2005, and school district officials have reported significant cost savings as a result of adopting the IPM policy and program. At a presentation to the Board's Administrative Services Committee in 2005, Director of Maintenance Randy Tant reported that pest control costs in the district had decreased from $63,000 per year before IPM (2002-03) to $14,000 per year (2004-05) since the adoption of the district's IPM program.[43] In 2006 Durham Public Schools were presented with a "School IPM Initiative Award" from NCSU for their successful new program.[44]

Besides a training program, the NCSU School IPM project also provided a forum for the promotion of IPM in NC schools through its advisory committee. The committee is made up of several important stakeholders, including staff members from public school maintenance departments, several state agencies, including the North Carolina Department of Agriculture (the agency charged with the regulation of pesticides in North Carolina), parent representatives, and the Pesticide Education Project, a NC-based non-profit organization. This committee recognized the importance of generating official state support for School IPM, and in 2004 organized a memorandum of understanding among key state agencies to adopt and promote IPM in North Carolina public schools. This memorandum brought regulatory agencies, including the state Department of Agriculture and Department of Public Instruction,

43. Durham Public Schools Director of Maintenance Randy Tant, Remarks to the Durham Board of Education Administrative Services Committee (April 13, 2005)(on file with Author).

44. Press Release, North Carolina State University Integrated Pest Management for North Carolina Schools, North Carolina Schools Recognized for Safer Pest Management (October 24, 2005), *available at* http://ipm.ncsu.edu/urban/cropsci/SchoolIPM/documents/School_IPM_press_release_gn.pdf.

together with professional associations including the North Carolina Pest Management Association and North Carolina School Boards Association. The text reads:

> the above named entities: (a) recognize the value of Integrated Pest Management (IPM), an effective method of controlling pests which can destroy structures and threaten human health; (b) recognize that implementation of IPM will reduce human and environmental exposure to pesticides; (c) will support and promote the use of IPM in North Carolina public schools; (d) and agree that IPM has proven value and that further IPM education and promotion will benefit students in North Carolina public schools, North Carolina citizens and the environment. They will hereafter:
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> 1) Cooperate in conducting educational programs on IPM for North Carolina public school systems; 2) share resources whenever possible in fulfillment of this agreement; and 3) cooperate in an effort to secure additional public support for Integrated Pest Management (IPM) awareness, education and implementation." [45]

Signatories to the memorandum[46] jointly developed a working definition of IPM for schools, as well as a model IPM policy that was adopted by the state School Boards Association.[47] The development of North Carolina's IPM model is instructive in its effectiveness at bringing many types of resources and influencers to the table to achieve significant improvements for child environmental health.

CREATING LEGISLATION

North Carolina's IPM program has until recently relied on voluntary compliance by schools committed to improving environmental quality, with varying results across districts. Some school districts, such as Winston-Salem Forsyth County Schools, maintained a strong IPM program run by school facilities staff, with almost no reliance on high-hazard liquid or aerosol pesticide formulations.[48] Other districts, like Durham, have adopted policies through the local school board that require the use of IPM and prior

45. NC State University Cooperative Extension Service et al., Memorandum of Understanding (March 24, 2004).(on file with with DUKE ENVTL. L. & POL'Y F.).

46. Signatories included the North Craolina State University Cooperative Extension Service, North Carolina Department of Public Instruction, The Agricultural Resources Center, North Carolilna Department of Health and Human ServicesHS, North Carolina Department of Environment and Natural Resources, North Carolina School Board Ass'n, North Carolina School Maintenance Association, and North Carolina Pest Management Pest Control Ass'n.

47. NORTH CAROLINA SCHOOL BOARDS ASS'N, POLICY 9205, PEST MANAGEMENT (AUGUST 1, 2005).

48. *See* http://schoolipm.ncsu.edu/casestudies/winston.htm.(last visited January 21, 2007).

notification of parents and staff as to what chemical pest control methods are used by the school, and when. Many other districts report using some IPM tactics, such as better sanitation, but without giving up the regular liquid pesticide applications that pose risks to students and staff.[49] All these types of programs are heavily reliant on the commitment of facilities staff and the support of the administration for their quality and continued existence.

Pesticides are not the only threat to children's health in the school environment. Several high-profile cases of mercury contamination resulting from elemental mercury removed from science classrooms have made headlines in North Carolina and other states in recent years. Diesel fumes from school buses contain human carcinogens and particulates that can retard lung growth and contribute to asthma attacks.[50] Cancer-causing arsenical pesticides were discontinued for use in pressure-treated wood in 2003,[51] but existing structures (such as playground equipment) built with this product are still in place and can still pose cancer and neurodevelopmental threats to children through the continued leaching of arsenic.[52] Mold and z mildew are also common contaminants in school buildings, and mold contamination was at the center of two lawsuits filed by parents of sick children against the Pender County (NC) Board of Education in recent years.[53,54]

What these contaminants have in common is the potential for straightforward prevention based on scientific data, and practical no-cost or low-cost solutions. Many programs addressing one or more of these contaminants were already in place in individual school districts around the state. The School Children's Health Act (H 1502), filed in 2005, gathered these five contaminants into one package that emphasized prevention for all NC public school children based on

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49. GODFREY NALYANYA & STEVE LILLEY, PEST CONTROL PRACTICES IN NORTH CAROLINA PUBLIC SCHOOLS, NORTH CAROLINA STATE UNIVERSITY INETGRATED PEST MANAGEMENT CENTER 8 (2002), *available at* http://schoolipm.ncsu.edu/documents/2002Surveyreport.pdf.

50. Erica Weir, *Diesel Exhaust, School Buses and Children's Health*, 167 CAN. MED. ASS'N JOURNAL 5,505 (2002).

51. Notice of Receipt of Requests to Cancel Certain Chromated Copper Arsenate (CCA) Wood Preservative Products and Amend to Terminate Certain Uses of CCA Products, 67 Fed. Reg. 8244.(Feb. 22, 2002).

52. G. Zartarian et al., U.S. Environmental Protection Agency, A Probabilistic Exposure Assessment for Children Who Contact CCA-Treated Playsets and Decks2-5 (2005), http://www.epa.gov/heasd/sheds/cca_treated.htm.

53. Spearman v. Pender County Bd. of Educ., 623 S.E.2d 331 (N.C. Ct. App. 2006).

54. Zizzo v. Pender County Bd. of Educ., 623 S.E.2d 328, 329 (N.C. Ct. App. 2006).

existing voluntary and locally-piloted programs such as North Carolina's school IPM program.[55]

At the start of the 2005 North Carolina legislative session, freshman House member Grier Martin introduced legislation on children's environmental health on behalf of the children and families in his constituency. Inspired by the 2004 MOU on Integrated Pest Management,[56] Martin recruited House Education Committee Chair Marian McLawhorn, who represented Pitt County, where IPM was first adopted in North Carolina, to sponsor the bill along with him. He also recruited Marvin Lucas, a retired school principal who represented Cumberland County, where parents had recently begun organizing for an IPM policy. Martin also signed on total of twenty-eight co-sponsors from both parties, including every female member of the North Carolina House, save one.

The bill's content was developed in keeping with the state's traditionally minimalist approach to educational mandates. This is in contrast with legislation in other states, for example New Jersey's School Integrated Pest Management Act, which applies to all schools in the state (not just public schools) and is extremely detailed and proscriptive by comparison.[57] North Carolina's Act has two parts: one section directs local Boards of Education to adopt policies and programs to reduce children's exposures to the five aforementioned toxicants at schools, and a companion section directs the North Carolina State Board of Education to adopt guidelines to assist the schools in meeting these directives. The "guidelines" structure is commonly used in North Carolina; while guidelines are not binding, they are intended to serve as a "best practices" model for Local Educational Authorities (LEA). While this approach may not be desirable in many states, it was appropriate in North Carolina both because it has become so commonly used, and because of the existence of strong model programs upon which the state guidelines would be based.

A diverse coalition of advocates joined Representatives Martin, McLawhorn, and Lucas in constructing and promoting the bill. While this coalition included at least one environmental organization,[58] the bill's focus was explicitly on children's health and the safe

55. 2006 N.C. Sess. Laws 143.

56. *Supra* note 46.

57. N.J. STAT. ANN. § 13:1F (West 2003).

58. Conservation Council of North Carolina.

maintenance of school grounds, rather than protection of the natural environment. The statues modified by the bill dealt only with Elementary and Secondary Education,[59] and so came under the purview of the North Carolina Department of Public Instruction and the North Carolina Board of Education. Martin consulted with these agencies and gained their support before the bill was filed, and worked with important stakeholders including the state School Boards Association and North Carolina Pest Management Association to negotiate the bill's final form and language.

A number of advocacy groups provided the grassroots foundation for the bill. The emphasis on preventing children's exposure to toxicants linked to cancer, neurodevelopmental problems, and asthma drew a large array of supporters, including parents, child advocacy organizations[60] and, notably, the North Carolina Pediatric Society. Pediatricians served as citizen lobbyists on behalf of the bill, participating in writing and phoning local legislators and visiting legislators in their offices in Raleigh.[61] Many of the parents who had worked with their local Boards of Education became advocates for the bill as it made its way through the legislature. Building on this large groundswell of support, the bill passed quickly through the House Education Committee and onto the House floor where it passed unanimously on May 24, 2005.

However, success often invites detractors, and new opposition to the legislation from the wood treatment industry kept the bill from obtaining a hearing in the Senate before the close of the 2005 legislative session. That industry was opposed to the provisions in the bill dealing with arsenic-treated wood on playground equipment. Although that product was no longer manufactured under an agreement with the U.S. EPA,[62] the industry's lobbyists argued, among other things, that the 2003 withdrawal of that product from the market was based on "anticipated market demand" rather than concern about arsenic exposure, and that the legislature should not

59. N.C. GEN. STAT. §§ 115C-12, 115C-47 (West 2006).

60. Covenant with North Carolina's Children, http://travelingmillers.com (last visited Feb. 18, 2007).

61. Author Shea participated in office visits.

62. Notice of Receipt of Requests to Cancel Certain Chromated Copper Arsenate (CCA) Wood Preservative Products and Amend to Terminate Certain Uses of CCA Products, 67 Fed. Reg. 36 (Feb. 22, 2002).

adopt arsenic protections for children because the U.S. EPA had not specifically directed them to do so.[63]

The second term of the 2005-6 North Carolina legislative session saw new life in the campaign for the School Children's Health Act. The N.C. Pediatric Society recruited Senator Bill Purcell (D-Scotland), a retired pediatrician himself, to guide the bill through the Senate. The wood treatment industry maintained its staunch opposition to the legislation, but after hearings in the Senate Health Committee, the bill moved swiftly to the Senate floor, where again it passed unanimously with an eloquent defense by Senator Purcell. Governor Easley signed the bill into law on July 19, 2006, setting a precedent for children's environmental health in the state.[64]

LESSONS FOR ADVOCATES OF CHILDREN'S ENVIRONMENTAL HEALTH

The state of North Carolina passed legislation in 2006 that requires the use of IPM in all public schools in the state, in a bill titled the School Children's Health Act,[65] that also included reduction measures for several other contaminants at school. This bill is not unusual; the public interest organization Beyond Pesticides reported in 2002 that sixteen states require or recommend that schools use IPM as their method of pest control.[66] What makes North Carolina's legislation unique is the mix of toxics addressed by the Act, the grassroots movement that gave rise to the Act, the strong training program in School IPM based in Cooperative Extension at North Carolina State University, and the collaborative approach among state agencies and interested stakeholders to address children's environmental health in schools. This experience provides a model for effective state legislative change that can be used again to improve the environmental health of children.

The success of this legislation and wide support reflected in its unanimous passage by both houses of the N.C. General Assembly was not accidental. We have identified several key elements to this success. First, the stage was set by grassroots activities initiated by

63. R. Bruce Thompson II on behalf of the Wood Preservatives Science Council, *Submission to the Senate Health Care Committee,* June 27 2006.

64. 2006 N.C. Sess. Laws 143.

65. *Id.*

66. Kagan Owens and Jay Feldman, *The Schooling of State Pesticide Laws–2002 Update,* PESTICIDES AND YOU, Spring 2002, *available at* http://www.beyondpesticides.org/infoservices/pesticidesandyou/Spring%2002%20vol.%2022%20no.%201.pdf.

parents interested in children's environmental health, and individual school districts with strong leaders and staff members who are knowledgeable about environmental threats to children's health.[67] Second, collaborative relationships had resulted in a memorandum among key stakeholders in the area of pesticides, providing a foundation of technical definitions and model policy that eliminated potential struggles over concepts and language.[68] Third, the focus and language of the bill centered on child health.[69] This gained the attention and support of medical and public health professionals whose expertise was critical in the development and defense of the bill. Fourth, this bill was based on practical, low-cost or no-cost solutions to environmental problems, which had already been successful around the state, and intentionally built in flexibility for local school districts which are often subject to financial and practical constraints.[70] This approach acknowledges that solutions should be sought by examining what works, and what does not', at the local level; and that the most innovative approaches can come from the practitioners who deal with public health and environmental problems day to day. Promoting practical solutions and lifting them up as models for others provides both well-deserved appreciation for dedicated staffers, as well as natural advocates for the solution among respected public servants.

Finally, and perhaps most importantly, supporters of the bill took the time to build a diverse coalition that was committed to the common vision of child health. Among the supporters of North Carolina's School Children's Health Act were pediatricians, child advocates, school nurses, heart and lung associations, facilities managers, environmentalists and others.[71] Key state agency officials were briefed on the bill, their concerns heard and incorporated in order to prevent any "official" opposition. While the bill sponsors were committed to hearing all stakeholder concerns, they did not compromise with interest groups whose goals were in direct opposition to the overall vision of improving child health. This

67. *See, e.g., supra* notes 32-35.

68. *Supra* note 46.

69. *See* N.C. GEN. STAT. §§ 115C-12, 115C-47 (West 2006), (discussing children's health).

70. *See id.* (developing guidelines for reducing students' pesticide exposure, and permitting notification of pesticide use "to the extent possible").

71. Press Release, Agricultural Resources Center Pesticide Education Project, Legislature Votes Toxics Out of North Carolina Schools (July 6, 2006) *available at* http://www.pested.org/news/pr/july_06.html.

experience highlights the effectiveness of a collaborative decision-making model that draws together interested parties who share a common goal—children's health—rather than a stakeholder process that pits divergent interest groups against one another in the development of a policy that satisfies the lowest common denominator.

While education and voluntary programs are important steps along the path to protecting children from environmental illness, legislation is one of the best ways to protect children's environmental health across the board. Legislation is more equitable than voluntary programs because it does not favor richer or better-educated communities, does not pit local economic and health interests against one another, and is more efficient because it does not rely on the slow dissemination of knowledge and the efforts of individuals in changing behavior. We hope that this model will promote effective legislative change in other states based on grassroots support and the diverse expertise of broad coalitions committed who are to the environmental health of children.