



# Coalition *for* Healthier Schools

*...providing the national platform and  
the forum for environmental health at school, since 2001...*

Coordinated by Healthy Schools Network

## **Collaborative Work Group on Metrics, Research, and Monitoring**

### **Work Group Co-Chairs**

**Janet Phoenix, MD and William Orr**

### **White Paper**

**Fall 2013**

### **Executive Summary**

#### **Introduction - Coalition Mission and History**

Healthy Schools Network, Inc. is the leading national voice for children's environmental health at school and a national-award-winning 501(c) 3 not-for-profit environmental health organization. Since its inception in 1995, the Network has connected information to policy and advocacy to improve children's environmental health. Healthy Schools Network convened the now-1,000-strong national Coalition for Healthier Schools to provide the platform and the forum for environmental health at school and to advance collaborations among NGO's, universities, and federal and state agencies. The Coalition hosts regular conference calls and annual meetings. In 2013, the Network issued ***Towards Healthy Schools 2015***, its third triennial national report with state-by-state data and policy profiles. Over two dozen leaders of the Coalition collaboratively produced and issued the report.

This work group White Paper and associated research, supported by a generous grant from the WK Kellogg Foundation, follows on previous Healthy Schools Network and Coalition for Healthier Schools' reports and policy statements. The White Paper outlines critical gaps in information that stymie efforts to monitor environmental health, enforce regulations, and improve policy and practice. Furthermore, information gaps limit the abilities of schools, state and federal agencies, and others to collaborate on mutual priorities and invest in the most important interventions.

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For permission requests, or to comment, contact: [info@healthyschools.org](mailto:info@healthyschools.org) or Claire L. Barnett, Executive Director, Healthy Schools Network, Inc. (w) 518-462-0632, (m) 202-543-7555. February 2014.

## Context of Problem

55 million or 98% of all school-age children attend school every day in almost 130,000 public and private PK-12 schools. Schools located next to polluted, aging, and decaying facilities, as well as unsafe use of chemicals and pesticides at school create risks and hazards for all those children. There is significant research that documents the damages to children's health and ability to learn. At the same time, studies show that healthy school facilities can help children learn, grow, and stay healthy. However, there is no reliable national information that will allow decision makers to focus on risk priorities and work together on investments.

Why is it so complicated and difficult to improve the nation's schools and address children's exposures?

This is an important time to address these issues. First, several federal initiatives focus on health, environmental health, and children. These initiatives provide momentum but require coordination. Second, federal budget cuts have had particularly harsh effects on programs for vulnerable children.

As the nation implements the Affordable Care Act, with a focus on preventing chronic diseases, program managers and evaluators will need information about children to evaluate impacts. In another initiative, the US Departments of Health and Human Service, Housing and Urban Development, and the Environmental Protection Agency developed a new federal *Pediatric Asthma Disparities Strategy* that calls for more prevention. The EPA published the third edition of the *America's Children and the Environment* (ACE), which notes major gaps in information. Further, the CDC produced its *2012 School Health Policies and Practices* survey report. Finally, the EPA launched a Green and Healthy Schools Initiative with new federal guidelines and grants to states. The Department of Education launched a voluntary Green Ribbon Schools award. These are laudable steps.

However, there needs to be a federal inter agency coordinated strategy to make the federal agency assets work together effectively to help children learn and stay healthy. Examples of lack of coordination abound, just on the topic of asthma disparities:

- EPA eliminated its premier *Indoor Air Quality (IAQ) Tools for Schools* program grants to schools and NGOs, and cut back on Integrated Pest Management (IPM), while offering fewer resources to the states for interagency planning and providing them with no implementation funds.
- CDC decimated its school health grants, merged, then pared back its asthma and lead programs.
- Asthma is the single largest cause of absenteeism and a leading work-related disease of teachers and custodians due to poor IAQ; while personnel may have some recourse, children at risk or with suspected exposures have no federal or state public health services. EPA has yet to use its congressional authorization to provide guidance on how state health agencies might engage with pediatric environmental health specialists for onsite investigations of schools.
- The Education award, while stimulating state education agencies to engage with sister agencies, requires only 15 points of action items each for the complexities of healthy school environments and for school health and nutrition, but requires 30 points each for energy and for environmental education, neither of which are associated in the literature with health and learning outcomes. The effect is that the award, as presently framed, inadvertently undercuts critical public health and environment policy messages to states and to local schools.

Many federal, state, and local agencies have a piece of authority to regulate or guide children and school facilities. However, none of them has complete authority or control and no one is in charge of children's environmental health at school (Paulson 2010).

Furthermore, there are a variety of stakeholders with many interests in education, children, and the built environmental health. With few resources, insufficient strategic collaboration, and limited or no information, it is very difficult for decision makers to design and implement meaningful interventions.

### **Primary Findings: Metrics - But None that Ensure Children's Environmental Health**

This paper highlights significant gaps in the information needed to understand the risks to which children are exposed. Furthermore, the paper illustrates the lack of public health services for children at risk or with suspected exposures. Finally, it demonstrates that without information or services, it is impossible to evaluate the performance of different policies and programs to mitigate hazards. The paper relies on a review of over 55 studies and more than 155 measures that focus on "green buildings", health and learning, environmental health, children's environmental health, and demographic data.

### **Limitations**

The authors did not collect new data, and performed only a high-level review of existing research instruments. The review also did not look at international research or data since the context is so different.

### **Next Steps**

A conference proposal to address gaps and overlaps has been prepared. In preparation for this summit, the work group Co Chairs and facilitator will:

- circulate this final White Paper and associated findings to all work group members, Federal Agency staff, and experts to invite their comments; and,
- host a facilitated discussion to identify simple mechanisms agencies might adopt to begin to synthesize information and develop services to ensure that every child has an environmentally safe and healthy school and that children with disabilities are not further compromised by adverse environmental factors.

## Introduction

The Healthy Schools Network is a 501(c) 3 not for profit environmental health organization that seeks to ensure that every child attends an environmentally healthy school that is clean and in good repair. The Network was founded in 1995. The Network's campaigns address three fundamental environmental health at school goals: 1) child-safe standards for school design, construction, and siting; 2) child-safe standards for school supplies for maintenance, repairs, and instruction; and 3) environmental public health services for children in harm's way.

In 2001, the Network convened the national Coalition for Healthier Schools as a way to unite its national, state, and local advocacy partners. The Coalition for Healthier Schools (CHS) includes over 1000 members. CHS's goal is to provide "the platform and forum for environmental health at school." In 2006, CHS formed a collaborative work group to advance green cleaning in schools, and today, not only did it secure better standards for certifying green products, but the group also spurred new policies to require or promote green cleaning products and practices in P-12 schools in 11 states.

Tackling an emerging concern, in mid-2012 CHS formed a collaborative work group to consider the existing knowledge, monitoring systems, and research for children's environmental health and the PK-12 school facilities where they learn. A list of work group participants is appended.

Recognizing that what gets measured gets done, the Metrics, Research and Monitoring Work Group (hereinafter "Metrics") aims to assess what we know, do not know, and need to know to ensure that every child is in a healthy school that promotes health and learning.

This analysis of the group's findings lays the foundation for the next action step – a science summit to refine these findings and to recommend further innovative research, monitoring, metrics, and/or public health service improvements.

To develop a Technical working paper, the Metrics Work Group compiled existing syntheses, descriptions, and review articles about three areas:

1. children's health and learning indicators,
2. green and healthy school building indicators, and
3. federal, state, and local data routinely collected about children and schools.

The Metrics Work Group reached out to several organizations and experts to expand their understanding of current information. The Work Group produced an outline of a Technical paper that analyzes data sources, data elements, and analyses methods that they summarized in an Excel Spreadsheet (final version appended). In September 2012, the Work Group met with representatives from three federal agencies to clarify the goals for the project, learn about other data sources, and indicators. In particular, the Work Group discussed with Federal Agency staff if and how to make the connections between healthy and green schools, children's health, and children's educational and health outcomes. In January 2013, the Work Group solicited more input and revisions during the Coalition's annual meeting. The Work Group finished its last draft in April 2013, and in May 2013 Healthy Schools Network on behalf of the Coalition Work Group submitted a science summit proposal to CDC. The CDC approved but did not fund the proposal.

The Coalition for Healthier Schools intends to use this White Paper and the underlying Technical Working Paper and Excel Spreadsheet to help direct resources to the most critical children's environmental health risks. Without linked information on risks, exposures, exposure routes, and health information, it is

impossible to know if children are protected in schools and if education or health or environment agencies and or policy makers are targeting scarce funds to the most important priorities for the greatest return on those investments. The next section provides more context on why this project is so critical.

## Definitions

Every academic discipline, government agency, and sector defines its own terms to refer to the information we collect to make decisions. The draft Technical Working Paper included more definitions that the Working Group discovered while researching this paper. However, for this paper we define two purposes for gathering information:

**Monitoring or surveillance** – information routinely collected to track the key elements of a program or system. Usually inputs and outputs (how much money invested and how many students trained, or episodes or prevalence of illnesses, or characteristics of buildings such as age of the roof or heating system) are collected through record-keeping, regular reporting and surveillance systems as well surveys of participants in the program or system.

**Evaluation** - is an analysis conducted periodically to assess whether the goals are being met or if changes can be attributed to the program or the system. The goal of evaluation is to see if the particular output or outcome is related to the intervention (the activity, project, and program) implemented to reduce energy use or improve kid's health.

Other definitions for this paper:

**Indicator, measure, or data**—is the characteristic, element or variable that is monitored or measured.

**Goal, objective, or target**—is the desirable end that the project, program, or system wants to attain which represent improvement or progress.

## Context:

Many government agencies, foundations, and NGO's use empirical evidence to demonstrate the effectiveness of their programs. State and federal agencies often must collect information to monitor compliance and conduct enforcement activities. Connecting research to social policy is always complex, but is particularly difficult in the children's environmental health context. In this section, we outline why the context is dynamic and complex.

### Connections between Child Health and School Buildings

School environments play an important role in the health and academic success of children. Each school day, 55 million children and 7 million adults — 20 percent of the total U.S. population and 98 percent of all children—spend their days inside school buildings. Physical environmental stressors in schools measurably and significantly affect children's achievement (National Academy of Science's National Research Council *Green Schools: Attributes for Health and Learning, 2006.*)

However, many of the 130,000 public and private schools in the U.S. are "unhealthy" buildings that can harm their health and hinder learning. Unhealthy school environments can affect attendance, concentration, and performance, as well as lead to costly, time-consuming cleanup and remediation activities for schools.

In 2011, the National Academies' Institute of Medicine released *Climate Change, the Indoor Environment, and Health*, finding that "poor indoor environmental quality is creating health problems today and impairs the ability of occupants to work and learn." Indoor exposures to pollution can be 100-1,000 times more intense indoors than out. Indoor exposures include poor ventilation and high ambient CO2 levels in schools (an indicator of indoor air pollution), which itself, at elevated levels, decreases adult critical thinking skills, and which can cause other short-term and long-term health problems for children and adults. Indoor environmental hazards can also lead to an increase in chronic, non-communicable diseases.

In addition, the IOM observed well-documented but not widely understood problems with conventional "green" buildings and products that do not consider health. For example, it reported that the highest-rated green buildings do not need to earn any credits in indoor environmental quality to merit a LEED-Platinum status.

### Many Activities and Constant Change

Understanding children's environmental health in schools involves many programs and activities. Constitutionally education is left to the states and all states have compulsory attendance laws: but there are multiple "governance" models (National Association of State Boards of Education) in the states covering PK-12 school systems. Moreover, there are more than 13,000 public school districts in the U.S. At the Federal level, the Department of Education, the Department of Health and Human Services, and the Environmental Protection Agency have an uncoordinated mix of goals, strategies, grant programs, and limited regulatory programs (asbestos, lead, drinking water; special education, civil rights) that may affect environmental health in schools. Many states have standards, guidance, and programs as well as many, many national and regional groups. Furthermore, these activities change frequently under changes in administration, changes in resources available, and changes in health care delivery systems.

For school personnel, in contrast, there are three essential constants regarding environmental hazards in the workplace: 1- the ability to leave or change jobs or work location, 2- the ability to seek occupational health clinical or other technical advice through bargaining contracts, occupational health complaint systems, and clinics, and 3- the ability of the occupational health system to research, evaluate, and monitor adult workplace illnesses and injuries. The occupational and environmental health system available to school employees is not perfect; however, it has addressed fundamental risks.

These occupational health systems do not address school children's' health. Because there is no school children's environmental health system, there is no surveillance data, no complaints data, no analysis of effective interventions, and no coordinated research agenda to prevent exposures at the local level, or even see that they have occurred. No data does not correspond to no problem.

### Many Audiences/Stakeholders

Many sectors, professions, government entities, and stakeholders' activities affect environmental health in schools.

The following is just a brief list of stakeholders and their interests:

- *Parents:*
  - Want assurances their children are healthy at school and risks to health or suspected exposures are identified and prevented or addressed in a timely manner.
- *Children and Environmental Health Advocates*
  - Understand that the built environment has many known effects on health. They focus on addressing risky conditions and practices to reduce adverse health effects.
- *"Green" Building and Facility Advocates*

- Recognize that buildings affect our physical and psychological health. However, conventional green buildings focus on energy efficiency, renewable or recyclable materials, and may not require that buildings be healthy for occupants. As there is limited data to rely on, current metrics for certifying green buildings have not been developed based on children’s environmental health needs.
- *Health Reform Innovators*
  - Understand that preventive health reform programs can save costs and improve population health by bridging the gap between health and education. Health reform innovators may focus on programs that can reduce adverse health outcomes, improve population health and health disparities, and save Medicaid costs.
- *Local, State and National Educators and Advocates*
  - Know that sick children with compromised attentiveness and many class absences may not learn the material and perform well academically and will require additional educational services. Furthermore, impaired attentiveness or absences affect achievement on standardized test scores, graduation rates, and lifelong earnings potential.
- *State and Federal Environmental and Health Agencies*
  - Environmental and health agencies have authority to protect human health. For example, CDC creates expertise, information, and tools that people and communities need to protect their health – through health promotion, prevention of disease, injury and disability, and preparedness for new health threats. The EPA's purpose is to ensure that all Americans are protected from significant risks to human health and the environment. These agencies often collect information to monitor compliance and to improve programs.

Complex Context Affects Research

Unfortunately, it is almost impossible to understand, track, or direct resources at children’s environmental health priorities because we do not have the information.

Because they focus on different environmental health elements, stakeholders tend to have different goals and different approaches to monitoring performance and measuring impact. These differences are summarized, broadly, below.

	Goal/Target/ Outcome	Data (measurement, indicators)	Standard (benchmark, metric)
<b>Children’s Health Advocates</b>	School Health Care Services	School nurse/clinic Visits	No standardized data
	School Health Education	Class time by topic	SHPPS
<b>Env Health Advocates</b>	Advancing new health protective systems and standards for children	Exposure to outdoor air pollutants such as ozone, particulates, hazardous air pollutants, contaminants, or health indicators such as number of children with asthma, ADHD, obesity, etc.	Risk analysis of how much of a substance causes health effect, standards are set by regulation or guidance within a safety margin for each substance
	Monitoring compliance with health and environmental regulations,		
	Evaluating the success of environmental health programs	Data are collected through surveys, bio monitoring, or air quality monitors	
	Preventive PH system/funding	Surveys of state/district policies in place (IAQ, IPM	

	Outcome: eliminating disparities; healthier children	green cleaning, asthma action plans, etc.)	
<b>Education And Learning</b>	Using information to monitor children’s learning at grade level, monitoring progress to meet local, regional or national standards  Evaluating education programs to improve whether programs meet the learning or safety goals specified  Outcome: eliminating disparities; better educational outcomes	Number of children enrolled, performance on standardized tests, student characteristics gathered through standardized report templates Measured by surveys completed by administrators	Population standards set by federal or state education departments, for example; X% of children who can read at grade level, Z% of absences Number of school buildings; Costs to operate Employee characteristics District characteristics
<b>“Green” and Conventional Buildings</b>	Promoting and certifying high performance advanced facilities on specific energy and health elements  Evaluating how well projects or programs increase the use of renewable materials or increase energy efficiency  Capital asset planning and preservation Outcome: buildings with reduced environmental and health impacts that promote healthier children and better educational outcomes	Quantifiable data such as energy and water utilization, ventilation rates, lighting, acoustics, measured by a skilled professional  Cleanliness measures  Adopted policies on integrated pest management, IAQ Management Plan, Capital asset assessments, State or local surveys to determine adequacy of building systems such as roofing, plumbing, lighting, windows, ADA access	Standards may be set by federal energy goals, professional standards (ASHRAE), state or local school building codes, by guidelines or by multi stakeholder certification groups such as CHPS or USGBC  State school construction agencies – no standardized assessment data

The complexity and shifting dynamics of children’s environmental health contributes to major gaps in understanding, monitoring performance and compliance, evaluating strategies and programs, and using this information to improve children’s’ health and education outcomes.

Ensuring that children have environmentally safe and healthy places to learn involves many actors, institutions, regulations, and programs. Facility characteristics affect learning outcomes both directly (acoustics, lighting, etc.) and indirectly (ventilation and pests affect children’s health, which in turn affects their attendance and attentiveness). Without clear, quantifiable links to learning outcomes in the Stakeholder’s local school, building characteristic factors are difficult to see, and therefore their contributions to environmental health are undervalued and overlooked. Moreover, without public health prevention services for children at risk or with suspected exposures, there is no data to track and no way to prioritize the need for resources.

Problems with children’s health in schools are seldom tracked/summarized, and even less frequently reported to a central authority such as a state agency or coordinated with the child’s physician (Paulson, 2010). While some states require schools or districts to report incidents of students’ health-related



complaints, very few programs have an oversight mechanism to ensure that reports are accurate or completed regularly.

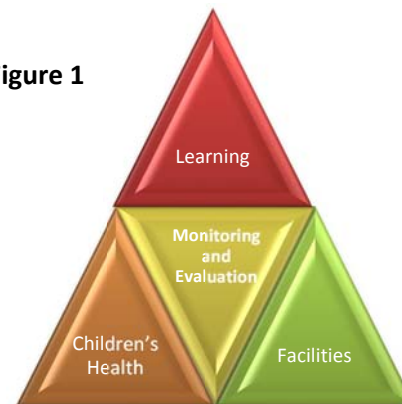
Without a clear link demonstrating the value of health/education/facilities coordination to states and taxpayers, causal factors and solutions are difficult to see, and therefore undervalued and overlooked. Without critical information and services, it is unlikely that school systems will direct resources, especially scarce resources, to remediation.

Different stakeholders have different interests in children. Not all stakeholders benefit equally from having healthier children, although parents and taxpayers will realize substantial benefits, and educational systems will benefit from better attendance and achievement. Valid agreed-upon measures are tools to target high impact improvements and measure progress toward important public health and education goals.

## Technical Paper Summary and Recommendations

The Coalition for Healthier Schools focuses on improving children’s learning and environmental health now. Creating public health services for children at risk or with suspected exposures will establish a highly valuable base of information for the effective use of scarce resources and drive improvements in building design standards. Improving school facilities generally is an important determinate of learning and attendance and children’s environmental health. Therefore, the Working Group focused on identifying monitoring and evaluation programs that will help us:

Figure 1



- Understand the complex dynamics between learning, children’s health, and school facilities, and,
- Focus attention on actions most likely to provide the largest learning and health improvements, in the shortest time, for the least effort.

The climate is tight for any investments; therefore, it is crucial that any investment in improving children’s environmental health and their ability to learn provide the most return on investment. The Work group identified many research studies, data systems, and measures used for current monitoring and evaluation. However, the Work Group found very little that would help parents identify the most cost-effective actions to ensure that children are healthy at school and agencies may not have the authority to act on various guidelines. The limited local data sources the Work Group identified are included in the attached Excel Spreadsheet as examples to focus efforts to fill information and service gaps.

The Work Group believes that the most significant cost-effective improvements in children’s health and their ability to learn would occur through investments on the environmental health of children in schools: no one is doing that systematically.

System investments need to take place at the federal-state levels. Results need to be seen and tracked at the school district, community, and county level. This “sweet spot” is where opportunities are large enough to be meaningful yet local enough so that decision-makers have a personal stake in the benefits of any investments they make and actions they take.

However, this is precisely where there is the least information to inform investments. There are no systems designed to identify, prevent, or assess risks to children’s environmental health or evaluate schoolchildren with suspected exposures.

Beyond that, we also note the three major gaps in the information collected and its ability to inform investments and decisions.

### **Gap One: National Health Monitoring Systems Do Not Collect Comprehensive Information on Children’s Environmental Health**

The Work Group found several studies which survey important conditions for children’s environmental health, particularly the CDC’s School Health Policies and Practices Study (SHPPS), the Behavioral Risk Factor Surveillance System (BRFSS), and various surveys from a number of Health and Human Services (HHS) Agencies,. (See the Excel Spreadsheet for the large national survey measures and sources).

For example, SHPPS asks school officials if they have an indoor air quality management system or an integrated pest management program. SHPPS does correlate the information with school building information. However, the value of that data is compromised by two limitations. First, the survey relies on self-reports from state or district staff. Second, the officials asked to respond to the survey do not always access to accurate information or to any records of complaints or adult occupational studies. In the SHPPS study as well as other large national studies, the Work Group found that the collected data do not enable correlations of health outcomes with the presence or absence of health policies and practices.

The Youth Risk Behavior Surveillance System, YRBS, focuses attention on health risk behavior such as sexual, alcohol, tobacco, or physical exercise information. It does not collect information on environmental health risks.

Other than SHPPS and YRBS<sup>1</sup>, none of the national studies collects information about school district or school buildings. While some have information on region, state, or zip code, they do not allow for monitoring failing school systems. The studies do not correlate the incidence and trend data with policies, practices, and infrastructure improvements in school facilities.

The Work Group did find national studies that tabulated children's health incidences and empirically related those incidences to environmental risks. The National Center for Health Statistics, CDC, compiles parents' answers to survey questions about asthma incidence, physicians' diagnoses of asthma from emergency rooms, and hospitalizations for respiratory diseases. The National Cancer Institute maintains a national representative population tumor registry for children's cancer incidence and mortality. However, those national studies do not correlate information with school building-level information.

Without persuasive evidence, schools facing financial burdens are unlikely to invest in improvements to their systems and practices. Without environmental health services, there is nothing to monitor or survey. Without information from local, regional, or national authorities, there is no research or data analysis that could target scarce resources to children's environmental health risks.

## **Gap Two: Too Few Studies and Small Samples for In-Depth Studies**

While there is a "robust literature" in healthy indoor environments and children's learning (NRC 2006), very few exposure studies have been done of children in schools and there is no mechanism to report ongoing risks or suspected exposures, for example, through random onsite inspections or by tracking NIOSH Health Hazard Program complaints (or state OSHA) by type of workplace. For example, the Environmental Protection Agency sponsored a study of 29 childcare centers in North Carolina and Ohio in 2000-2001. The study focused on adult and children's potential exposures to a wide range of persistent organic pollutants and pesticides. The study showed that more than a majority of adults and children are exposed to pollutants and pesticides. However, the study was only conducted in two states and in 29 childcare centers.

The Department of Housing, Consumer Product Safety Commission, and the EPA cooperated on a study in 2001 of exposures to industrial chemicals. That study collected data from 168 childcare centers in the U.S. The study found that California was the only state that required pesticide applicators to report all pesticide applications at schools. With all the potential investments a school district must make, environmental

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<sup>1</sup> Even the Youth Risk Behavior Survey (YRBS) only reports a subset of data from 43 states and 21 School Districts.

health advocates and parents find it difficult to convince school districts about the need for environmental-health related outlays with such small samples and performed in a different part of the country.

### **Gap Three: Limited Data to Understand Relationship between Healthy and Safe Buildings AND Children's Environmental Health AND Learning Outcomes**

The Work Group found large data sets and in-depth studies that monitored or examine school health programs, and metrics used to certify green, high performance buildings or to report on the adequacy of conventional buildings. The Work Group also found in-depth studies that looked at environmental contaminants and children's health as well as national data and many studies that examined children's learning. None of this data or these studies, however, considers the relationships between school building environmental conditions, children's environmental health outcomes, and learning outcomes.

The Work Group applauds the effort of agencies and institutions to base investments and interventions on the largest impact for the least effort. The current evidence from reform efforts in education and health care suggests that empirical evidence, at all levels, can help prioritize and focus public and private investments on the most critical needs. In particular, focusing on prevention and population health effects can reduce current challenges and improve future performance.

However, the services and data to effectively focus improvement in children's environmental health do not exist. There is no agency that is responsible or accountable for children's environmental health in schools. It is unlikely that the gap will be filled in the near term; therefore, it is more important to communicate effectively, strategize, align, and coordinate improvement efforts to make them more efficient; and share accountability for results.

### **Next Steps**

In preparation for a science summit, and funding permitting, beginning fall 2013 the Work Group Co Chairs will:

- circulate this final White Paper and associated findings to all work group members, selected Federal Agency staff, and a targeted list of additional experts to invite their comments; and,
- host a facilitated discussion to identify simple mechanisms agencies might adopt to build services and information that ensure that every child has an environmentally safe and healthy school and that children with disabilities are not further compromised by adverse environmental factors.
- strategically disseminate the white paper nationally so that groups can incorporate recommendations into environment, health, and education improvement initiatives.