

---

---

# BAYWOOD REPRINTS

---

---

## NEW SOLUTIONS

**A Journal of Environmental and Occupational Health Policy**

*Editors: Craig Slatin, Beth Rosenberg, Eduardo Siqueira*  
*Editor Emeritus: Charles Levenstein*

---

---

Volume 20, Number 1 — 2010

**Who's in Charge of Children's  
Environmental Health at School?**

*Jerome Paulson and Claire Barnett*

---

---

**Publisher of Scholarly Books and Journals Since 1964**  
**THE LATEST RESEARCH TO YOUR DOOR OR YOUR DESKTOP**  
**<http://baywood.com>**

**BAYWOOD PUBLISHING COMPANY, INC.**

26 Austin Avenue, PO Box 337, Amityville, NY 11701

call 631-691-1270 • fax 631-691-1770 • toll-free orderline 800-638-7819

# THE LATEST RESEARCH TO YOUR DOOR OR YOUR DESKTOP

<http://baywood.com>

**Free** online access is available for all Journal print subscribers. This service provides access to the full text of Baywood's journals, fully searchable and downloadable in a clear-type PDF format.

## **New Online Features:**

- **Articles on Demand** through which researchers can gain immediate electronic access to all journal articles on a pay-per-view basis from volume 1 to the latest volume.
- **Table-of-Contents Alerting.** Register online at <http://baywood.com>.
- Journals are part of the **CrossRef** initiative, a collaborative reference linking service, through which researchers can click on a reference citation and gain immediate access to the cited article.
- **FREE** online sample issues.

## **FEATURING BOOKS AND JOURNALS IN:**

*African Affairs*

*Anthropology*

*Archaeology*

*Art*

*Collective Negotiations*

*College Student Retention*

*Community Health*

*Computers in Education*

*Death & Bereavement*

*Drug Education*

*Education*

*Environmental Systems*

*Fire Science*

*Gerontology*

*Health Policy*

*Imagery*

*Psychiatry*

*Recreational Mathematics*

*Technical Communications*

*Workplace Rights*

## **BAYWOOD PUBLISHING COMPANY, INC.**

26 Austin Avenue, PO Box 337, Amityville, NY 11701

call 631-691-1270 • fax 631-691-1770 • toll-free orderline 800-638-7819

e-mail [baywood@baywood.com](mailto:baywood@baywood.com) • website <http://baywood.com>

*Features*

**WHO'S IN CHARGE OF CHILDREN'S  
ENVIRONMENTAL HEALTH AT SCHOOL?**

**JEROME PAULSON  
CLAIRE BARNETT**

**ABSTRACT**

Children spend many hours each week in and around school buildings. Their short- and long-term health outcomes and ability to learn are affected by numerous environmental factors related to the school buildings, the school grounds, the school transportation system, and the use of various products and materials in and around the school. Many school buildings are old, and they—and even newer buildings—can contain multiple environmental health hazards. While some districts self-report they have environmental health policies in place, no independent verification of these policies or their quality exists. Teachers and other staff, but not children who are more vulnerable to hazards than adults, are afforded some protections from hazards by Occupational Safety and Health Administration (OSHA) regulations, by their employment contracts, or through adult occupational health services. Major environmental problems include: indoor air quality, lighting, pests and pesticides, heavy metals and chemical management issues, renovation of occupied buildings, noise, and cleaning processes and products. No agency at the federal or state levels is charged with ensuring children's health and safety in and around school buildings. No systematic means exists for collecting data about exposures which occur in the school setting. Recommendations are made for dealing with issues of data collection, federal actions, state and local actions, and for building the capacity of the Environmental Protection Agency and the Centers for Disease Control and Prevention-designated and funded Pediatric Environmental Health Specialty Units (PEHSU) in responding to and evaluating risks to children's environmental health in schools.

## INTRODUCTION

Just as adult health is impacted by exposures and injuries in the workplace, the environments in which children spend time can influence their health. Children spend many hours each week in and around school buildings, and their short- and long-term health outcomes and their learning are affected by numerous environmental factors related to the school buildings, the school grounds, the school transportation system, and the use of various materials in and around the school. Teachers' health and productivity may also be affected.

It is widely recognized that children are generally more vulnerable to environmental health hazards than adults [1-3]. For example, children breathe more air and drink more water per unit of body mass than adults do. Therefore, if the air or water that they are consuming is polluted, they receive a larger dose of that pollution. Children also have a "longer shelf life" than adults. If time from exposure to manifestation of toxicity is 40 years, a child is more likely to live long enough to develop the toxicity. Children are more likely to be closer to the ground or on the ground than adults. Their exposure to pesticides, for example, which have precipitated or been sprayed at ground level will be greater than an adult's exposure. Infants in child care centers will not be able to move themselves out of harm's way. For example, young children have a limited capacity to protect themselves from exposure to the sun to avoid sunburn. Toddlers are much more likely to put objects in their mouth than an older child or an adult, again increasing their risk of exposure. While children are school aged—from preschool to grade 12—cells in the body are migrating, metabolic pathways are forming, and hormonal systems are changing. All of these differences between children and adults, singularly and cumulatively, make children's responses to environmental toxicants different than that of adults.

The following issues need to be addressed regarding children's environmental health issues in American schools:

1. Numerous environmental health hazards are present in U.S. schools including, but not limited to, indoor air quality, lighting, pests and pesticides, noise, radon, asbestos, lead, PCBs, drinking water contamination, cleaning processes and products, and siting problems.
2. The protection of adults and children from these environmental health hazards is:
  - a. inadequate for both children and adults, although adult employees of schools will have a patchwork of various regulatory and other protections; and
  - b. not designed to take the needs of children who outnumber adults in schools or often, pregnant teens and women, into account.
3. The present system for gathering data about school-related environmental health problems is inadequate or nonexistent.

4. There is no baseline data on children's illnesses, injuries, and exposures in schools and on school facilities that include environmental conditions.

The nation must build a system for collecting and analyzing data relevant to children's environmental health, one that will protect and intervene for children at risk of harm. Improvements to adult environmental health protections are also required, although that is not the focus of this article.

## REVIEW OF CURRENT STATUS

In the United States, about 125,000 public and private schools are operated by more than 15,000 school districts (as well as independent entities) and serve 55 million children. Around 70% of schools enroll elementary students; 24%, secondary students; and the remainder, both [4]. Schools are also the work site for about seven million adults serving as teachers, administrators, and support staff.

In the late 1990s, the average age of school buildings in the United States was 42 years; some of the buildings were over 100 years old [5]. Even the best facilities that are well sited, designed, and constructed need continuing maintenance and repair, but schools have deferred these items for years [1]. All buildings can have a myriad of problems: poor indoor air quality, lighting, and noise control; routine use of highly toxic pesticides; presence of radon, asbestos, lead, or PCBs; inadequate heating, lighting, and plumbing systems; poor drinking water quality; unsafe playgrounds; or poor siting [6, 7].

The most detailed information about the status of American school buildings in the states is the Government Accounting Office's (GAO) study on "The Condition of American Schools" which was undertaken in the mid-1990s and is based on self-reports which were not independently verified. There is no evidence to suggest that the environmental health status of the schools has improved markedly since that time. In fact, the National Center for Education Statistics (NCES) produced a report in 2000, also based on self-reports and not independently verified, that found similar needs and underscored the need for funding [8]. The GAO found that "[a]bout 50 percent of the schools reported at least one unsatisfactory environmental condition; while 33 percent reported multiple unsatisfactory conditions. Of those, half reported four to six unsatisfactory conditions." Those conditions most frequently reported to be unsatisfactory were acoustics for noise control, ventilation, and physical security. Additionally, three-quarters of schools responding had "... spent funds during the [early 1990s] on requirements to remove or correct hazardous substances such as asbestos (57 percent), lead in water or paint (25 percent), materials in [underground storage tanks] such as fuel oil (17 percent), radon (18 percent), or other requirements (9 percent)." The GAO found that an additional "... two-thirds [of schools] must spend funds [between 1994 and 1997] to comply with these same requirements—*asbestos (45 percent), lead (18 percent), [underground*

storage tanks] (12 percent), radon (12 percent), or other requirements (8 percent)" [1]. This amounted to about \$2.3 billion to correct or remove hazardous substances, primarily asbestos, and a need to expend about \$5 billion more to bring all schools up to the then-existing federal requirements [1]. The NCES survey found that three-fourths of schools needed to repair, renovate, or modernize buildings to put them into good condition, and the survey also found 43% of schools reported that at least one of the six environmental conditions was unsatisfactory. Ventilation was most often reported (26%) as inadequate, and the estimate of repairs costs was put at \$127 billion [5].

While there is information on the total dollar volume of school construction nationwide, there is no reliable information on whether environmental issues are being systematically addressed and resolved. In the same study, the GAO found that ". . . 28 million [students] attend schools nationwide that need one or more building features extensively repaired, overhauled, or replaced or that contain an environmentally unsatisfactory condition . . ." (Environmental factors include lighting, heating, ventilation, indoor air quality, acoustics for noise control, energy efficiency, and physical security of buildings) [1] (see Table 1).

Schools more recently self-reported on a CDC survey that they have policies in place to deal with many environmental health issues: about one-third of districts and one-half of schools report having an indoor air quality management program; about one-third report school bus engine idling reduction policies; 80-plus percent of school districts had policies related to hazardous materials; around 90 percent of schools reported plans for hazardous materials; and a quarter of state education officials surveyed reported they required districts to have an integrated pest management plan [9].

Issues that have not been systematically addressed encompass:

- infiltration of fumes and carbon monoxide from idling vehicles into classrooms (although it should be noted that the EPA has a voluntary school bus program to reduce diesel emissions) [10];
- toxic debris from construction or demolition inside occupied schools and toxic fumes from paints, glues, and new carpets [11];
- schools located in former commercial spaces, on unremediated brownfields, or on or near Superfund sites [12];
- use of toxic and explosive products in classrooms or stored in schools (although the EPA has a small, voluntary school chemical clean-out program) [13];
- chemical spills or misuses that have closed schools and sent children to local emergency rooms [4];
- outbreaks of infectious diseases [15]; and
- air toxics from nearby sources such as industries or highways [16].

Federal or state programs have directed schools to deal with asbestos [17], lead in water or paint [18], underground storage tanks [19] and radon [20].

Nevertheless, not all of these problems are resolved, and there are myriad other problems that need to be addressed: indoor air quality (IAQ) problems, water damage (with resulting mold and bacterial growths as well as deterioration of building materials), carbon monoxide, persistent organic pollutants, inadequate sanitation and ventilation, chemical mismanagement, and poor lighting and noise controls. Shendell et al. reviewed the available science and potential exposures these factors present [21]. It should be noted that there is no federal mandate to remove asbestos or radon or lead from schools and no mandate on testing and remediating school drinking water. No governmental agency, federal, state or local regulates indoor air pollutants with the exception of laws pertaining to smoking in public places; some states have enacted laws on IAQ in schools that direct districts to implement elements of the U.S. EPA's IAQ Tools for Schools voluntary protocol for good IAQ [22].

### **FORMULATING PUBLIC POLICY RELATED TO SCHOOLS IN THE UNITED STATES**

The processes for formulation of laws and policies for schools at the national, state, or local levels are different than the processes for the formulation of most other policies. There is a complex network of laws and regulations at all three levels of government [23]. The U.S. Constitution leaves the responsibility for education to the states. Since 1980, however, there has been a Department of Education at the federal level whose primary foci are in supporting state and local educational quality, fostering achievement standards, and promoting and enforcing educational services and access for children with identified disabilities. Neither the federal Department of Education nor the federal Centers for Disease Control and Prevention, however, have the authority to regulate children's health and safety issues in schools [19]. The EPA has been authorized by Congress to create federal guidelines on specific school environmental factors and to offer voluntary grants to states to accelerate healthy school environments [24].

Nominally, states are responsible for providing public education to their citizens. Historically they have delegated much of that responsibility to local school districts [19]. There is no single system of governance for state educational systems. The National Association of State Boards of Education describes at least four models of state education governance, and exceptions to the models [25]. Therefore, it is impossible to generalize about the control of education. Moreover, environmental health issues may be addressed by the state's environment, health, energy, agriculture, or labor departments and, sometimes, by education. Individuals and organizations should acquaint themselves with the situation in their own states. With the exception of implementing state-wide immunization requirements, standardized testing, and the conduct of education, state departments of education do not function as regulatory agencies. They

Table 1. Percent of Public Schools Rating the Condition of Building Features as Less than Adequate, by School Characteristics: 1999 [5]

School characteristics	At least one building feature is in less than adequate condition	Exterior				Plumbing	Heating ventilation, air conditioning	Electric power	Electrical lighting	Life safety features
		Roofs	Framing, floors, foundations	walls, finishes, windows, doors	Interior finishes, trim					
All public schools	50	22	14	24	17	25	29	22	17	20
School instructional level										
Elementary school	49	22	14	23	17	24	28	21	17	19
High school	56	26	16	27	20	28	34	25	19	22
Combined	54	18	15	31	14	25	34	20	20	29
School enrollment size										
Less than 300	55	24	19	31	20	28	29	23	19	26
300 to 599	50	22	12	21	16	27	32	21	17	21
600 or more	49	22	14	23	18	20	20	22	16	16
Locale										
Central city	56	23	12	27	20	28	30	26	18	21
Urban fringe/large town	44	19	13	21	16	21	27	21	15	17
Rural/small town	52	25	17	25	17	26	31	19	20	23



Region	39	16	10	18	14	19	22	14	10	11
Northeast	51	20	15	28	15	25	27	19	15	19
Midwest	51	25	15	22	16	24	28	22	20	22
South	57	27	16	26	25	32	40	32	22	27
West										
Percent minority enrollment										
5 percent or less	48	21	15	26	14	22	28	18	16	18
6 to 20 percent	49	25	15	23	17	26	29	18	16	22
21 to 50 percent	46	17	12	17	14	23	25	19	15	18
More than 50 percent	59	28	14	29	24	29	34	32	23	24
Percent of students in school eligible for free or reduced-price school lunch										
Less than 20 percent	45	18	14	21	17	23	28	18	14	16
20 to 39 percent	45	21	11	21	14	23	26	20	15	18
40 to 69 percent	53	22	16	25	14	23	29	21	18	22
70 percent or more	63	32	17	30	26	32	35	30	24	27

**Note:** Ratings of "less than adequate" encompass the ratings of "fair," "poor," and "replace."

**Source:** U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on the Condition of Public School Facilities," 1999.

may have some authority to close local schools which are academically low-performing or in cases of certain emergencies [26]. Some may have specific policies or regulations that apply to facilities.

In most cities and counties around the country, schools are directed by a local board of education. Local school board members are elected independently and independent school boards have taxing authority. School boards are often independent of city or county councils and local chief executives; dependent boards report to their county or city officials.

Thus it can be a district-by-district and a state-by-state challenge to determine how to ensure that all schools—public and private—provide healthy indoor environments, in other words, are clean, dry, and quiet with good indoor air quality and thermal comfort and well-maintained systems, as recommended by the National Research Council's Committee to Review and Assess the Health and Productivity Benefits of Green Schools [27].

Because the federal government has not had the authority to regulate most environmental issues in schools, it has created multiple voluntary programs to assist schools.

EPA's Healthy School Environments Assessment Tool (HealthySEAT) is a relatively new voluntary tool designed to help states and large districts assess and rate individual buildings for priority actions and repairs. It offers EPA and Occupational Safety and Health Administration (OSHA) guidance and regulations on multiple environmental factors: hazardous waste, hazardous materials, non-hazardous waste, chemical management, water, pest control, energy, mold/moisture, UV radiation, outdoor air pollution, and renovation/construction [28]. The customizable tool: 1) includes a database file to manage all aspects of a self-assessment program; 2) includes a comprehensive and customizable sample checklist for environmental hazards and compliance; 3) fully integrates all of EPA's programs for schools; and 4) includes information on health, safety, and injury prevention programs of all other pertinent federal agencies. The cost of state and local implementation is a barrier for this non-mandated, but highly, useful tool.

Another voluntary tool is the National Institute for Occupational Safety and Health's (NIOSH) "Safety Checklist Program for Schools" which helps school administrators, coordinators, and teachers comply with federal or state Occupational Safety and Health Administration (OSHA) regulations. NIOSH's "Safety Checklist" focuses on classrooms, shops, and laboratories in career and technical education settings [29]. It should be noted that NIOSH focuses only on the health of adults in a workplace. It has no authority to make recommendations for protecting children who are in the same building, and its recommendations for the adults may, or may not, be protective of the children.

There has been no independent analysis of HealthySEAT or NIOSH's "Safety Checklist Program for Schools" to demonstrate that they are effective in changing behavior of facilities management personnel or other school personnel.

## INDOOR AIR QUALITY (IAQ)

IAQ can be affected by external and internal sources of air pollutants. Because school buildings are generally quite old, they may have windows that are broken or that do not fit well in their casings. This may actually lead to more air flow, as compared to a tight, sealed building without operable windows. But it can also lead to the intrusion of unfiltered outdoor air pollutants and allergens—oxides of sulfur, oxides of nitrogen, particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), air toxics, and tree and grass pollens—into the school building. Air pollutants are increased when diesel trucks or buses idle next to the air intake for the buildings heating, ventilation, and air conditioning (HVAC) systems and exhaust materials are sucked into the school building.

School buildings, both old and new, can have problems with dampness. This can occur as a result of building materials that have been water damaged during construction, rain incursion through ill-fitting or damaged windows, leaks from the roof and through the floors, leaks from pipes and HVAC systems, flooding, or seepage from groundwater. The presence of excess moisture or relative high humidity indoors can lead to mold and bacterial growth and the degradation of building materials. Some of the chemicals released from the molds, bacteria, and building materials are allergens, irritants, and toxins. The presence of these and other pollutants in the air can lead to multiple health symptoms and complaints among occupants. These complaints may be diagnosed as Sick Building Syndrome or Building-Related Illness, two separate but related conditions. There have been numerous reports of Sick Building Syndrome in schools [30, 31].

Off-gassing of volatile organic compounds (VOCs) from building materials or maintenance and instructional activities contribute to indoor air pollution in schools. This can include formaldehyde [32] from plywood and other volatiles from markers, from glue used under carpets, and from cleaning materials, as well as from instructional products and personal care products. VOCs can be irritants and toxins. Vapor intrusion from underground plumes of chemicals or from contamination of ground water can also be a source of VOCs in schools.

Allergens are present in the indoor air of schools [33]. Some migrate into buildings from the outside, such as tree, grass, and other pollens. In addition, animal dander can be brought into schools on the clothing of children and adults or when pets are kept in classrooms. The allergens can exacerbate allergic symptoms in sensitized children and adults, including asthma.

Classroom ventilation is frequently inadequate, which can result in unacceptably high levels of CO<sub>2</sub> which can adversely affect both teacher and student performance. The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) recommends a minimum ventilation rate of 8 liters/second/person for classrooms. This ventilation level is frequently not achieved. ASHRAE also sets a standard for CO<sub>2</sub> of 1000 ppm in classrooms.

Studies have shown statistically significant correlations between clinical symptoms of headaches, dizziness, tiredness, difficulties concentrating, unpleasant odor, and high CO<sub>2</sub> concentrations (1500 to 4000 ppm compared with concentrations below 1500 ppm) [34, 35].

Although there are no standards for IAQ in schools, it is one of the few areas where the federal government has been active in promoting voluntary programs. The U.S. EPA created the IAQ Tools for Schools program [36] in the mid-1990s and since that time has funded extensive nationwide outreach and an annual conference. This program provides guidance for do-it-yourself promotion of indoor air quality in schools. Based on the self-reported School Health Policies and Program Study, it is estimated that over 51% of schools (60,000 schools) in the U.S. have IAQ management plans, with 85% of those schools reporting that their plans are based on the IAQ Tools for Schools model. It is also estimated that about two-thirds of those schools, or 38,000 schools, have effective IAQ management plans [37]. The EPA has not, however, required schools using EPA-funded technical assistance to track or report child health or learning improvements following IAQ interventions [38].

## LIGHTING

Children require adequate lighting to be able to perform well in school. Many schools, however, have reported inadequate lighting, and many more have facilities that were never designed to "harvest" natural daylight into learning spaces. This is one instance where old buildings, such as those built at the turn of the last century which relied on high ceilings and tall, operable windows to provide natural daylight and ventilation, may be better. When children work in daylight or under full spectrum artificial light (light that mimics daylight), early findings suggest they have higher test scores, better behavior, and are healthier [39, 40].

## PESTICIDES

School buildings, especially those with poor maintenance, have the potential for pest infestations because they offer moisture, food, and places to nest. For example, schools often serve meals and snacks in classrooms; children and adults may bring food to school that is kept in desks, lockers, or teachers lounges. The books and other educational materials may also provide nutrients and habitat for pests. When pests are present, schools often mistakenly request routine application of pesticides as the primary means of control. Herbicides are also used on school grounds to control weeds. Because pesticides are designed to kill or repel animals (rodenticides), insects (insecticides), and certain plants (herbicides and fungicides), they also have the potential to be toxic to children and adults. They can cause both acute and chronic symptoms [41]. Exposure to some

pesticides on a chronic basis is associated with abnormal brain development [42]. More than three dozen states have enacted laws to restrict pesticide use in or around schools and encourage natural control methods over more expensive routine chemical applications [43, 44].

## **NOISE**

Noise is any unwanted, extraneous sound. Sources contributing to noise in the classroom include outside sounds from traffic, construction, and the playground as well as inside sounds from other classrooms, audio, video and computer equipment, lighting ballasts, and dimmers. Noise levels greater than 60 dBA can interfere with cognitive activities. In order to learn well, children require better acoustic quality than adults in classrooms [45]. Good speech recognition is necessary for optimal comprehension and learning during language and reading acquisition [46].

## **PROBLEMS OF UNKNOWN ETIOLOGY THAT MAY BE RELATED TO THE SCHOOL ENVIRONMENT**

Children may develop illnesses in schools that are of unknown etiology, but may be related to their environment. For example, the Centers for Disease Control and Prevention (CDC) reported on school children in 27 states who developed noncontagious rashes at school. These children were in approximately 110 elementary, middle, and high schools. The rash was generally transient and not associated with many other symptoms. Gathering data about the extent of the problem, for example, whether children in other schools in the nation were involved, was impossible. The Healthy Schools Network, in cooperation with the American Public Health Association, the Natural Resources Defense Council, Children's Environmental Health Network, and Beyond Pesticides requested that CDC report to Congress on its findings and on how to develop a system to establish a baseline for children's health at school [47]. No such report was ever invited by Congress.

## **OVERWHELMING CONTAMINATION OF SCHOOL BUILDINGS IN DISASTERS**

During disasters such as hurricanes, earthquakes, terrorism, and floods, school buildings can be used as community shelters or can be overwhelmingly contaminated with environmental hazards. Hazards can occur, for example, when flood waters bring not only moisture leading to mold growth, but also hydrocarbons from fuel tanks and pesticides and fertilizers from farm fields. Inundated local Superfund sites, human and animal wastes from overwhelmed sewer systems and breached containment ponds, and other materials from upstream

industrial sites can also spread contamination. Another example of overwhelming contamination was the inundation of seven public schools and other buildings in the World Trade Center impact zone with air pollutants after the buildings collapsed on September 11, 2001, as documented in "Schools of Ground Zero." This dust contained asbestos, lead, and other respirable particles [48]. During the recovery period, concerns were also raised about elevated CO<sub>2</sub> levels, volatile organic compounds, and polychlorinated biphenyls [49]. The case dramatically underscores the lack of any system for children: There was no accessible and timely information about actual contaminants, information about risks associated with exposures specifically of this nature, lack of federal or state guidelines on "building clearances" for children, and lack of monitoring and reporting of children's health complaints.

NIOSH prepared a report on adults at schools near Ground Zero showing the onset of new diseases [50], but no agency prepared a report on school children occupying the same facilities. "Schools of Ground Zero" is the only child-centered and peer-reviewed contemporaneous account of the evacuations and contamination ever done; a take-home survey conducted with parents also indicated new illnesses among elementary-age school children.

### **Differences Between Protection of Children and Protection of Adults in Schools**

Private sector workers are afforded some protection from workplace hazards by the Occupational Safety and Health Act of 1970 [51]. Public sector workers, such as school employees, are either covered by their state Occupational Safety and Health programs (in 25 states) or are not covered at all [52]. The Occupational Safety and Health Act was developed, however, to protect the proverbial 160-pound white male industrial worker, not kindergartners or their teachers, and especially not women of child-bearing age.

There are member supports available for union members, and community support services are available to other employees that aid and abet the effective implementation of specific OSHA laws and regulations. In addition, worksite negotiations can protect employees. These related regulations or ancillary or support services are not available to children, including:

- local union bargaining units;
- union health and safety expertise centrally and sometimes regionally;
- training about environmental, health, and safety issues (supported by health or labor department grants or union dues);
- (in some states) department of health-funded occupational health clinics for employees with work-related concerns (although private occupational health clinics may be available elsewhere);
- (in some states) free-standing regional nonprofit committees for occupational safety and health;

- state departments of labor;
- OSHA-National Institute for Occupational Safety and Health;
- worker's compensation for illness or injury on the job;
- state right to know laws for employees or the right to form health & safety committees;
- the ability to accumulate and use sick leave or to call in a "substitute" for a day or an extended absence;
- the ability to switch job locations; and
- (for some school jobs) the ability to work part-time or to carry out part of the job from home [53, 54].

Yet, even in situations where adult employees may recognize and ask about a health problem related to an exposure at work or in school, much of the effort to try to demonstrate that link and to get the situation resolved falls on the individual employee. OSHA also does not necessarily protect workers from commonly encountered indoor environmental hazards—such as indoor air or molds or the intrusion of outdoor pollutants—that are not specifically linked to the employee's job of handling hazardous materials or engaging in hazardous work activities, such as operating heavy equipment, construction, or assembly line work.

Schools are also extremely reluctant to recognize that children could be affected by the same health hazards that are affecting adults in the building. New York State has a network of state-funded occupational health clinics that adults can access. These are not, however, set up to respond to queries regarding children. Such clinics have the capability to do on-site evaluations, but they must obtain permission from the schools to do so [55, 56]. There are no programs anywhere in the country specifically authorized, trained, and staffed to do health hazard evaluations for children in child care centers or schools, despite the fact that the adults in those workplaces have continuing occupational safety and health concerns.

It is said that two major advantages that parents have in dealing with school environmental issues are that their jobs are not on the line and that they can readily communicate with community and with media. It is also said that children may have actionable rights under federal law for an "accessible" facility and program, for example, under Section 504 of the Rehabilitation Act, Americans with Disabilities Act, or Individual with Disabilities Education Act. In turn, parents have countered, especially those with children with disabilities and other special needs, that they are utterly dependent on negotiating with the local school district to fulfill its obligations under federal law for the education of children with disabilities, including health impairments and are, therefore, reluctant to upset the negotiations with additional requests for a healthy environment [57].

The lack of formal systems to protect children shortchanges all parties. As a result, parents must fall back on their own informal resources if they suspect

their children are having environmentally-related health problems due to the school environment. Schools are deprived of independent assessments that take their most vulnerable occupants, and most important output, into account. *Skilled resources appropriate to the need, are simply not trained and available, nor are agency authorizations in place.* Most primary health care offices and/or pediatricians do not have the knowledge necessary to evaluate the situations [58-60]. Moreover, the evaluation of school-related environmental health problems requires a multidisciplinary approach. A physician should evaluate the individuals involved and industrial hygienists with knowledge about how children interact with their environment and buildings, along with a working knowledge of relevant federal, state, and city laws and regulations or best practices. Other specialists with knowledge of building sciences, chemical policies, or about HVAC systems or other systems may also be needed. Parents need formal back up and ongoing advice. As presently organized, of course, the school must be willing to invite an onsite investigation that benefits children.

### DATA COLLECTION

The example about the rash illnesses given above indicates some of the issues around data collection. There is no systematic method for collecting health data on children in schools. Neither the CDC nor the National Center for Education Statistics of the U.S. Department of Education collects information specifically related to school environmental health issues.

The Environmental Health Tracking Program of the CDC also does not provide a means to collect data about the health of children in schools. First, it was designed to compare existing health and environmental data bases; and, second, there are no databases on school environmental health. With the exception of Florida, Massachusetts, Connecticut, and California where some information about asthma was collected [61], all attempts to collect environmental public health tracking data from schools have been stymied by the Family Education Rights and Privacy Act (FERPA). FERPA limits access to educational data unless there is express permission for parents, guardians, or the child (if old enough). By lumping school health data with other educational information, FERPA has made school children's health data inaccessible for public health research purposes [62].

School nurses, unfortunately, also are not a reliable source of environmental information related to children. First, they may not be permitted to share information or to speak with parents about building conditions impacting children. Second, school nurses are not mandated staff positions. And third, there is no standardized system into which school nurses can report data. One small informal survey that should be replicated raised serious concerns about whether school nurses can or would participate, given their lack of independence and stated job retaliation fears [63].



Pediatric Environmental Health Specialty Units (PEHSUs) were created about a decade ago, co-funded through The Association of Occupational and Environmental Clinics (AOEC) by the EPA and the CDC [64]. There is no uniform approach or knowledge base on school-based problems among the PEHSUs. By design, the PEHSUs are reactive rather than proactive. Some of the PEHSUs, however, have taken a proactive approach to glaring problems in their home communities. PEHSUs, therefore, while they are an educational resource about children's vulnerabilities, they are not a source of data about children's environmental health in schools.

## RECOMMENDATIONS

In the current world, there are numerous environmental health hazards that can affect the health of school personnel and school children. Though the laws, regulations, policies and programs that protect adults are not as comprehensive or as effective as they could be, such laws, regulations, and policies are utterly nonexistent for children. The publicly supported environmental public health programs to serve children and their families are woefully inadequate.

Based on these findings, we recommend that children in child care centers and schools through grade 12 have access to a range of environmental public health services similar to, but independent of, the array of research, training, information, support, and clinical services available to protect adults in their workplaces. One public health agency at the federal level, advised by EPA, child environmental health advocates, and experienced parents, must be authorized and funded to establish a program. This program should be independent of the educational system at the state and local level. The program might include some or all of the following individual key elements:

1. That a data collection system for school environmental health problems be established. Such a model school health tracking data collection system should describe what parameters should be tracked, what type of database should be used, who should do the data entry, where the data should go, and how it should be made public.
2. That an environmental public health tracking system be implemented in at least sentinel school systems throughout the country. (*See #10 for the recommendations about overcoming barriers to implementing EPHT in schools.*)
3. That federal agencies develop a coordinated federal strategy for the states to help their schools rapidly improve facility design, construction, and maintenance, as well as set up programs to test and remediate for hazards and to phase in safer products.
4. That adequate research be funded, conducted, and published so that standards for indoor environmental quality can be promulgated that are

appropriate to children's higher respiration rates and enhanced vulnerability to toxins.

5. That, where adequate information currently exists, states develop enforceable regulations regarding indoor environmental quality for schools; and that, as new information is developed, those regulations be updated. An agency other than the education agency should be responsible for oversight and enforcements.
6. That federal and state agencies provide direction to and supplementary funding for the PEHSUs so that they can be staffed and personnel specifically trained to address environmental health risks in child care centers and schools.
7. That PEHSUs be authorized to facilitate on-site inspections of child care centers and schools when necessary.
8. That a review of school closures that have been taken for health and safety reasons be published and used to determine if current laws and regulations are sufficient for protection of public health or need to be amended or replaced.
9. That EPA regional offices be charged with and funded to adapt the HealthySEAT guidelines for state-by-state use. This would allow health care providers, PEHSUs, parents, and communities to have access to relevant federal, state, and local laws as well as regulations and pest practices related to environmental health in schools.
10. That a meeting be convened between representatives of the Department of Health and Human Services (NIH, CDC) and the Department of Education, the Department of Justice, outside legal experts, and child health advocates to discuss the issue of research and data collection in and about schools and about school children. This meeting should review the barriers that FERPA represents in the context of EPHT and research on school environmental health.

## REFERENCES

1. P.S. Guzelian, C.J. Henry, and S.S. Olin, eds., *Similarities and Differences between Children and Adults: Implications for Risk Assessment* (Washington, DC: ILSI Press, 1992).
2. S.G. Selevan, C.A. Kimmel, and P. Mendola, "Identifying Critical Windows of Exposure for Children's Health," *Environmental Health Perspectives* 108-3 suppl (2000): 451-455.
3. R.L. Brent and M. Weitzman, "The Current State of Knowledge about the Effects, Risks, and Science of Children's Environmental Exposures," *Pediatrics* 113-4 suppl (2004): 1158-66.

4. Government Accounting Office, "School Facilities: Condition of America's Schools" (GAO/HEHS-95-61, Feb. 1, 1995), <http://www.gao.gov/archive/1995/he95061.pdf> accessed July 20, 2009.
5. U.S. Department of Education. *The Condition of Education 2000* (Report NCES 2000-062). (Washington, DC: National Center for Education Statistics, 2000).
6. Center for Health, Environment, and Justice, "Poisoned Schools: Invisible Threats, Visible Actions," <https://www.chej.org/publications/health.htm> accessed November 20, 2009.
7. Agency for Toxic Substances and Disease Registry with U.S. EPA and Morehouse School of Medicine Regional Research Center for Minority Health (oral presentation at American Public Health Association, October 2001).
8. L. Lewis, K. Snow, E. Farris, B. Smerdon, S. Cronen, J. Kaplan, and B. Greene, "Condition of America's Public School Facilities: 1999," National Center for Education Statistics. U.S. Department of Education. Office of Educational Research and Improvement NCES 2000-032 <http://nces.ed.gov/pubs2000/2000032.pdf> accessed July 30, 2009.
9. S.E. Jones, R. Axelrad, and W.A. Wattgney, "Healthy and Safe School Environment. Part II. Physical School Environment: Results from the School Health Policies and Program Study 2006," *Journal of School Health* 77 (2007): 544-556.
10. U.S. Environmental Protection Agency, "Clean School Bus USA," <http://www.epa.gov/clceanschoolbus/> accessed July 20, 2009.
11. U.S. Environmental Protection Agency, "IAQ Design Tools for Schools (DTfS): Construction," <http://www.epa.gov/iaq/schooldesign/construction.html> accessed July 20, 2009.
12. B.D. Brewer, R.M. Wagner, W.D. Henriques, R. C. Warren, M. L. Booker, G.D. Green, and M.C. White. "2001 Characteristics of schools on or near hazardous waste sites in Brownfields communities," Abstract 23956 (presented October 24, 2001 at the meeting of the American Public Health Association) [http://apha.confex.com/apha/129am/techprogram/paper\\_23956.htm](http://apha.confex.com/apha/129am/techprogram/paper_23956.htm) accessed July 20, 2009.
13. U.S. Environmental Protection Agency, "Healthy School Environment Resources: On-Site Chemical Management," [http://cfpub.epa.gov/schools/top\\_sub.cfm?t\\_id=361&s\\_id=364](http://cfpub.epa.gov/schools/top_sub.cfm?t_id=361&s_id=364) accessed July 24, 2009.
14. Centers for Disease Control and Prevention, "Hazardous Substances Emergency Events Surveillance," <http://www.atsdr.cdc.gov/HS/HSEES/> accessed July 20, 2009.
15. Anonymous, "Update: measles—United States, January-July 2008," *Centers for Disease Control and Prevention (CDC) MMWR - Morbidity & Mortality Weekly Report* 57 (2008): 893-896.
16. U.S. Environmental Protection Agency "Assessing Outdoor Air Near Schools," <http://www.epa.gov/schoolair/> accessed July 20, 2009.
17. U.S. Environmental Protection Agency, "Asbestos in Schools," [http://www.epa.gov/asbestos/pubs/asbestos\\_in\\_schools.html](http://www.epa.gov/asbestos/pubs/asbestos_in_schools.html) accessed July 27, 2009.
18. U.S. Environmental Protection Agency, "Drinking Water in Schools and Child Care Facilities," <http://www.epa.gov/safewater/schools> accessed July 27, 2009.
19. U.S. Environmental Protection Agency, "Underground Storage Tanks," <http://www.epa.gov/swrust1/> accessed July 27, 2009.

20. U.S. Environmental Protection Agency, "Radon in Schools (2nd Ed.)," <http://www.epa.gov/radon/pubs/schoolrn.html> accessed July 27, 2009.
21. D.G. Shendell, C. Barnett, and S. Boese, "Science-Based Recommendations to Prevent or Reduce Potential Exposure to Biological, Chemical, and Physical Agents in Schools," *Journal of School Health* 74 (2004): 390-397.
22. Environmental Law Institute, "Database of State Indoor Air Quality Laws," [http://www.eli.org/Program\\_Areas/iaq\\_databases.cfm](http://www.eli.org/Program_Areas/iaq_databases.cfm) accessed July 20, 2009.
23. Centers for Disease Control and Prevention Division of Adolescent and School Health, "A CDC Review of School Laws and Policies Concerning Child and Adolescent Health," *Journal School Health* 78 (2008): 69-128.
24. U.S. Department of Energy, "The Energy Independence and Security Act of 2007, Section 504," <http://www1.eere.energy.gov/femp/regulations/eisa.html#top> accessed July 30, 2009.
25. National Association of State Boards of Education, "2009 State Education Governance Models," <http://nasbe.org/index.php/file-repository/func-startdown/960/> accessed November 2, 2009.
26. J.G. Hodge, D. Bhattacharya, and J. Gray, "Legal Preparedness for School Closures in Response to Pandemic Influenza and Other Emergencies: A Review and Report," (submitted to the Centers for Disease Control and Prevention Center for Law and the Public's Health, Baltimore, Maryland) <http://www2a.cdc.gov/phlp/docs/Legal%20Preparedness%20for%20School%20Closures%20in%20Response%20to%20Pandemic%20Influenza.pdf> accessed July 24, 2009.
27. National Research Council's Committee to Review and Assess the Health and Productivity Benefits of Green Schools. *Green Schools: Attributes for Health and Learning*. (Washington, DC: National Academies Press, 2006).
28. U.S. Environmental Protection Agency, "Healthy School Environments Assessment Tool," <http://www.epa.gov/schools/healthyseat/> accessed July 20, 2009.
29. National Institute for Occupational Safety and Health, "Safety Checklist Program for Schools," <http://www.cdc.gov/niosh/docs/2004-101/> accessed July 27, 2009.
30. C.M. Scheel, W.C. Rosing, and A.L. Farone, "Possible Sources of Sick Building Syndrome in a Tennessee Middle School," *Archives of Environmental Health* 56 (2001): 413.
31. Institute of Medicine of the National Academies' Committee on Damp Indoor Spaces and Health. *Damp Indoor Spaces and Health*. (Washington, DC: The National Academies Press, 2004).
32. C. van Netten, "Analysis of Sources Contributing to Elevated Formaldehyde Concentrations in the Air in a New Elementary School," *Canadian Journal of Public Health (Revue Canadienne de Sante Publique)* 74 (1983): 55-59.
33. S.L. Abramson, A. Turner-Henson, L. Anderson, M.P. Hemstreet, L.K. Bartholomew, C.L. Joseph, S. Tang, S. Tyrrell, N.M. Clark, and D. Ownby, "Allergens in School Settings: Results of Environmental Assessments in 3 City School Systems," *Journal of School Health* 76 (2006): 246-249.
34. A.N. Myhrvold, E. Olsen, and O. Lauridsen, "Indoor environment in schools—pupils' health and performance in regard to CO<sub>2</sub> concentrations," (proceedings of

- Indoor Air '96: The 7th International Conference on Indoor Air Quality and Climate, Nagoya, Japan, July, 1996 Vol. 4, 369-374) as quoted in J.M. Daisey, W.J. Angell, and M.G. Apte, "Indoor air quality, ventilation and health symptoms in schools: an analysis of existing information," *Indoor Air* 13 (2003): 53-64.
35. J.M. Daisey, W.J. Angell, and M.G. Apte, "Indoor Air Quality, Ventilation and Health Symptoms in Schools: An Analysis of Existing Information," *Indoor Air* 13 (2003): 53-64.
  36. U.S. Environmental Protection Agency, "Tools for Schools Program," <http://www.epa.gov/iaq/schools/> accessed July 20, 2009.
  37. Centers for Disease Control and Prevention, "School Health Policies and Programs Study 2006. Physical School Environment," [http://www.cdc.gov/HealthyYouth/shpps/2006/factsheets/pdf/FS\\_PhysicalSchoolEnvironment\\_SHPPS2006.pdf](http://www.cdc.gov/HealthyYouth/shpps/2006/factsheets/pdf/FS_PhysicalSchoolEnvironment_SHPPS2006.pdf) accessed July 30, 2009.
  38. U.S. Environmental Protection Agency, "Letter to the U.S. EPA Administrator from the Federal Advisory Committee at the EPA Office of Children's Health Protection, May 2002," [http://yosemite.epa.gov/ochnp/ochpweb.nsf/content/52202.htm/\\$file/522002.pdf](http://yosemite.epa.gov/ochnp/ochpweb.nsf/content/52202.htm/$file/522002.pdf) accessed July 20, 2009.
  39. Healthy Schools Network, Inc., "Healthy Schools Network Guide: Better Lighting for Healthier Students," [http://www.healthyschools.org/downloads/Lighting\\_Guide.pdf](http://www.healthyschools.org/downloads/Lighting_Guide.pdf) accessed July 20, 2009.
  40. B. Erwine, "Lighting," in *Safe and Healthy School Environments*, ed. H. Frumkin, R. Geller, I.L. Rubin, and J. Nodvin, 20-33. (Oxford: Oxford University Press, 2006).
  41. U.S. Environmental Protection Agency, "Recognition and Management of Pesticide Poisonings," <http://www.epa.gov/opp00001/safety/healthcare/handbook/handbook.htm> accessed July 20, 2009.
  42. B. Weiss, S. Amler, and R.W. Amler, "Pesticides," *Pediatrics* 113 (2004): 1030-1036.
  43. Kagen Owens and Jay Feldman, "The Schooling of State Pesticide Laws—2002 Update: A Review of State Pesticide Laws Regarding Schools (Beyond Pesticides/ National Coalition Against the Misuse of Pesticides, 2002)," [http://www.beyondpesticides.org/schools/publications/School\\_report\\_update\\_2002.pdf](http://www.beyondpesticides.org/schools/publications/School_report_update_2002.pdf) accessed July 27, 2009.
  44. L. Kann, N.D. Brener, and H. Wechsler, "Overview and Summary: School Health Policies and Programs Study 2006," *Journal of School Health* 77 (2007): 385-397.
  45. L.E. Maxwell, "Noise" in *Safe and Healthy School Environments*, ed. H. Frumkin, R. Geller, I.L. Rubin, and J. Nodvin, 34-45. (Oxford: Oxford University Press, 2006).
  46. D.G. Shendell, C. Barnett, S. Boese, "Science-Based Recommendations to Prevent or Reduce Potential Exposure to Biological, Chemical, and Physical Agents in Schools," *Journal of School Health* 74 (2004): 390-394.
  47. Anonymous, "Update: Rashes among schoolchildren—27 states, October 4, 2001-June 3, 2002," *Centers for Disease Control and Prevention (CDC) MMWR—Morbidity & Mortality Weekly Report* 51 (2002): 524-527.
  48. S. Bartlett, J. Petrarca, *Schools of Ground Zero. Early Lessons Learned in Children's Environmental Health*, American Public Health Association and Healthy Schools Network, Inc., 2002.

49. "World Trade Center Fact Sheets," Pediatric Environmental Health Specialty Unit, Mt. Sinai Medical Center <http://www.mountsinai.org/Research/Centers%20Laboratories%20and%20Programs/Pediatric%20Environmental%20Health%20Specialty%20Unit/Overview/Fact%20Sheets> accessed July 24, 2009.
50. B. Bernard, R. Driscoll, S. Baron, K. Wallingford, and C. Mueller, "2006 Health Hazard Evaluation Report 2002-0090, 2002-0096, 2002-0101-3028: Buildings in the Vicinity of the World Trade Center, New York," National Institute for Occupational Safety and Health, <http://www.cdc.gov/niosh/hhe/reports/pdfs/2002-0101-3028.pdf> accessed July 24, 2009.
51. U.S. Department of Labor Occupational Safety & Health Administration, "Occupational Safety and Health Act of 1970," [http://www.osha.gov/pls/oshaweb/owasrch.search\\_form?p\\_doc\\_type=oshact](http://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=oshact) accessed July 20, 2009.
52. U.S. Department of Labor Occupational Safety and Health Administration, "State Occupational Safety and Health Plans," <http://www.osha.gov/dcsp/osp/index.html> accessed July 30, 2009.
53. Greg Siwinski (Industrial Hygienist, New York State Central New York Occupational Health Clinic, Syracuse, NY) preceding list from HSN and in discussion with author, January 2005.
54. David Newman (Industrial Hygienist, New York Committee for Occupational Safety and Health) preceding list from HSN and in discussion with author, February 2005.
55. Greg Siwinski (Industrial Hygienist, New York State Central New York Occupational Health Clinic, Syracuse, NY) in discussion with author, January 2005.
56. David Newman (Industrial Hygienist, New York Committee for Occupational Safety and Health) in discussion with author, February 2005.
57. Healthy Schools Network, Inc. "2006: Who's In Charge of Protecting Children's Health at Schools?" <http://www.healthyschools.org/documents/WhosInCharge.pdf> accessed July 30, 2009.
58. J.R. Roberts and B.A. Gitterman, "Pediatric Environmental Health Education: A Survey of U.S. Pediatric Residency Programs," *Ambulatory Pediatrics* 3 (2003): 57-59.
59. L. Trasande, J. Boscarino, N. Graber, R. Falk, C. Schechter, M. Galvez, G. Dunkel, J. Geslani, J. Moline, E. Kaplan-Liss, R.K. Miller, K. Korfmacher, D. Carpenter, J. Forman, S.J. Balk, D. Laraque, H. Frumkin, and P. Landrigan, "The Environment in Pediatric Practice: A Study of New York Pediatricians' Attitudes, Beliefs, and Practices towards Children's Environmental Health," *Journal of Urban Health* 83 (2006): 760-772.
60. L. Trasande, N. Graber, and P.J. Landrigan, "Does New York State Need a System of Referral Centers for Children with Environmental Health Concerns?" Pediatric Academic Societies meeting, Washington, DC, 2005.
61. Lisa Hines, (National Center for Environmental Health, Centers for Disease Control and Prevention) in discussion with author, July 08, 2009.
62. J.G. Hodge and L.F. Wiley, "An Assessment of Legal Issues Concerning Public Health Disclosures Pursuant to Proposed Rulemaking Re: the Family Education Rights and Privacy Act (FERPA), Council of State and Territorial Epidemiologists, 2008, <http://www.cste.org/dnn/LinkClick.aspx?fileticket=hXbae9TZBJg%3D&tabid=184&mid=733> accessed July 24, 2009.

63. "What School Nurses Know: We Need New Laws to Clean-up Schools," a survey report from New York State Association of School Nurses with Healthy Schools Network, May 2000.
64. J.A. Paulson, C.J. Karr, J.M. Seltzer, D.C. Cherry, P.E. Sheffield, E. Cifuentes, I. Buka, and R. Amler, "Development of the Pediatric Environmental Health Specialty Unit Network: The North American Experience," accepted for publication *AJPH*, December 2009.

Direct reprint requests to:

Jerome Paulson, MD, FAAP  
George Washington University  
2233 Wisconsin Avenue, NW, Suite #317  
Washington, DC 20007  
e-mail: [jpaulson@cnmc.org](mailto:jpaulson@cnmc.org)

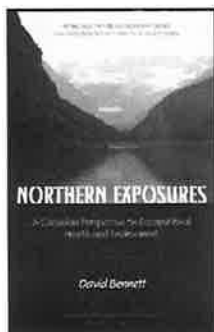
## WORK, HEALTH AND ENVIRONMENT SERIES

Series Editors: Charles Levenstein, Robert Forrant and John Wooding

# NORTHERN EXPOSURES

*A Canadian Perspective on Occupational  
Health and Environment*

*David Bennett*



David Bennett is the retired National Director of Health, Safety and Environment of the Canadian Labour Congress and the Book Review Editor of the journal *New Solutions*. *Northern Exposures* is the result of thirty years of work in the labor movement on workplace health and safety and environmental protection. In the 1990s, the author had a central responsibility in moving the Canadian Labour Congress from its established work in health and safety into environmental protection, a story detailed in *Northern Exposures*. The book is a collection of published articles and reviews, linked by a new Introduction that shows the development of the thinking and actions of the Canadian labor movement in areas that were in constant flux.

In health and safety and in environment, there was a major move away from remedial action and mitigation measures toward the new disciplines of prevention and their relation to sustainable development and green job creation. In both areas, there were impacts on the health disciplines of free trade agreements, risk analysis, and management systems, all of which are examined at length in *Northern Exposures*. The aim all along was not merely to respond to external pressures but to create an alternative vision and program that were coherent and well-articulated and also conducive to economic progress, green employment, cleaner technology, and healthy work. The scope of the book is wide ranging, including chemical policy regimes, cancer prevention, energy, resource and materials policy, and sustainable development.

### FORMAT INFORMATION

6" x 9", Cloth, approx. 194 Pages

ISBN 978-0-89503-401-4

**Pre-publication Price: \$39.90\***; List Price: \$46.95\*

*\*postage required; please inquire for rates*

*This book is still in production — order now at discounted pre-pub price and save.*



**BAYWOOD PUBLISHING COMPANY, INC.**

26 Austin Ave., PO Box 337, Amityville, NY 11701

phone (631) 691-1270 • fax (631) 691-1770 • toll-free orderline (800) 638-7819

email baywood@baywood.com • website <http://baywood.com>



# BAYWOOD JOURNALS

Benefit from the experience of experts  
Order through our website: <http://baywood.com>  
**FREE SAMPLE ISSUE AVAILABLE FOR DOWNLOAD!**

*ABSTRACTS IN ANTHROPOLOGY*

*A CURRENT BIBLIOGRAPHY ON AFRICAN AFFAIRS*

*EMPIRICAL STUDIES OF THE ARTS*

*HALLYM INTERNATIONAL JOURNAL OF AGING*

*ILLNESS, CRISIS & LOSS*

*IMAGINATION, COGNITION AND PERSONALITY*

*INTERNATIONAL JOURNAL OF HEALTH SERVICES*

*INTERNATIONAL JOURNAL OF SELF HELP & SELF CARE*

*INTERNATIONAL QUARTERLY OF COMMUNITY HEALTH EDUCATION*

*JOURNAL OF APPLIED FIRE SCIENCE*

*JOURNAL OF COLLECTIVE NEGOTIATIONS*

*JOURNAL OF COLLEGE STUDENT RETENTION*  
*Research, Theory & Practice*

*JOURNAL OF DRUG EDUCATION*

*JOURNAL OF EDUCATIONAL COMPUTING RESEARCH*

*JOURNAL OF EDUCATIONAL TECHNOLOGY SYSTEMS*

*JOURNAL OF ENVIRONMENTAL SYSTEMS*

*JOURNAL OF RECREATIONAL MATHEMATICS*

*JOURNAL OF TECHNICAL WRITING & COMMUNICATION*

*JOURNAL OF WORKPLACE RIGHTS*

*NEW SOLUTIONS*

*A Journal of Environmental and Occupational Health Policy*

*NORTH AMERICAN ARCHAEOLOGIST*

*OMEGA—JOURNAL OF DEATH AND DYING*

*THE INTERNATIONAL JOURNAL OF AGING & HUMAN DEVELOPMENT*

*THE INTERNATIONAL JOURNAL OF PSYCHIATRY IN MEDICINE*

## **BAYWOOD PUBLISHING COMPANY, INC.**

26 Austin Avenue, PO Box 337, Amityville, NY 11701

call 631-691-1270 • fax 631-691-1770 • toll-free orderline 800-638-7819

e-mail [baywood@baywood.com](mailto:baywood@baywood.com) • website <http://baywood.com>

# NEW SOLUTIONS

*A Journal of Environmental and Occupational Health Policy*

*Editors: Craig Slatin, Beth Rosenberg, Eduardo Siqueira  
Editor Emeritus: Charles Levenstein*

## AIMS & SCOPE

*New Solutions* explores the growing, changing common ground at the intersection of health, work, and the environment. The *Journal* makes plain how the issues in each area are interrelated and sets forth progressive, thoughtfully crafted public policy choices. It seeks a conversation on the issues between grassroots labor, environmental activists, and professionals with the understanding that lack of scientific knowledge is no excuse for doing nothing, and inaction is itself a choice.

*New Solutions* enhances the agenda of labor with knowledge from academia. In recognition of the globalization of health problems, environmental issues and economic activity, the *Journal* strives for an international focus. It investigates problems of occupational and environmental health with the people at risk—the workers and the community—uppermost in mind. And *New Solutions* takes the discussion beyond merely explaining the extent of hazard, the parameters of debate, and the limitations of scientific knowledge to offer actions—solutions—to deal with the dilemmas of workplace, community, and environmental threat.

Print ISSN 1048-2911; Online ISSN 1541-3772

**RATES:** Print + Online Institutional Rate: \$248.00; Online Only Institutional Rate: \$235.00  
Print + Online Individual Rate: \$97.00; Online Only Individual Rate: \$92.00

**TERMS:** Subscriptions sold by volume only, 4 issues per volume. Prepayment in U.S. dollars, drawn on a U.S. bank required. Prices subject to change without notice. **Complimentary sample issue available online at <http://baywood.com>. Printed in U.S.A.**

## order form

Qty.	Title	Price	Postage	Total
		\$	\$	\$
	<b>NEW SOLUTIONS</b> A Journal of Environmental and Occupational Health Policy Name/Title			
	Institution			
	Address			
	City/State/Province			
	Country	Postal Code		
	E-mail			
	<input type="checkbox"/> Payment Enclosed	<input type="checkbox"/> MasterCard	<input type="checkbox"/> Visa	
	Account Number	Exp. Date		
	Signature			

**Terms:** Prices are subject to change without notice. Prepayment on a U.S. bank required. Individual subscriptions must be prepaid by personal check, credit card, or money order. Printed in U.S.A.

## BAYWOOD PUBLISHING COMPANY, INC.

26 Austin Avenue, PO Box 337, Amityville, NY 11701

call 631-691-1270 • fax 631-691-1770 • toll-free orderline 800-638-7819

e-mail [baywood@baywood.com](mailto:baywood@baywood.com) • website <http://baywood.com>