

## INTRODUCTION

Environmental health is a branch of public health that is concerned with all aspects of the natural and built environment. The World Health Organization (WHO) defines environmental health as those aspects of human health and disease which are determined by factors in the environment. It also refers to the theory and practice of assessing and controlling factors in the environment that can potentially affect health (WHO, 2011).

In the school setting, environmental health is affected by the complex interaction of the school's location, occupants, and school activities, which include -- but are not limited to -- building materials, insulation, carpets, art, music and science rooms, computer labs, health rooms, playground equipment, food preparation areas, waste management, cleaning products, pest management, fragrances, parking lots, bus areas, heating/cooling equipment and ventilation, gymnasiums, sports fields, and custodial and maintenance areas.

## BACKGROUND

Historically, our understanding of the impact of environmental pollutants on health began in the 1960s and 1970s. In 1977 it was discovered that 20,000 tons of hazardous chemical wastes were buried beneath an elementary school in Niagara Falls, NY. Love Canal, the local dumpsite, was declared as a State of Emergency in 1978. The incident drew international attention to the threat of unregulated hazardous waste dumping in communities and began the discussion of toxin exposure and children's health (Centers for Disease Control and Prevention [CDC], 2010). According to the WHO, approximately 25% of the human diseases are a result of prolonged exposure to environmental toxins (WHO, 2011). Known health effects of toxin exposure include asthma, cancer, cardiovascular failure, developmental defects and delays, effects on vision, hearing, growth, intelligence, and learning (Institute of Medicine [IOM], 2011).

It is estimated that 55 million students spend at least six hours a day, five days a week, in the nation's 115,000 public schools (Environmental Protection Agency [EPA], 2012a). Current environmental studies have shown that at least half of these schools have poor indoor air quality (Healthy Schools Network, 2009). Additionally, there are almost 6 million students in non-public schools (National Center for Education Statistics [NCES], 2011) and 50,000 students in Bureau of Indian Education (BIE) Schools (2011). A 2007 report by the Inspector General, Department of the Interior, stated there is a need for "immediate action to protect the health and safety of students and faculty" in BIE schools. He described "severe deterioration that directly affects ... their ability to receive an education" (Devaney, 2007, pg. 1).

"Healthy school buildings contribute to student learning" (Healthy Schools Network, 2009, p. 5). The WHO recognizes that "Clean air is a basic requirement of life. The quality of air inside homes, offices, schools, day care centers, public buildings, health care facilities or other private and public buildings where people spend a large part of their life is an essential determinant of healthy life and people's well-being" (WHO, 2011, Foreword pg. xv). Poor indoor environmental quality has been linked to increased student illness (IOM, 2011). Symptoms include allergic reactions, upper and lower respiratory infections, headaches, dermatitis and fatigue (Environmental Law Institute, 2009; Selekman & Coates, 2013). Outdoor air pollution has been shown to contribute to numerous health effects, ranging from minor lung irritation to acute and long term lung impairments (Suwanwaiphatthana, 2010). Any of these symptoms can impair the ability of the student to learn.

According to the EPA, “Children are inherently more vulnerable to environmental hazards because their bodies are still developing. Substandard environmental conditions in schools, such as insufficient cleaning or inadequate ventilation, can cause serious health problems for children” (EPA, 2010, p. 1). Children experience higher exposure rates to environmental pollutants than adults because, per pound of body weight, they breathe more air and ingest more food and water than adults, increasing their exposure to potentially harmful chemicals (IOM, 2011). These chemicals may be the very products used by the school to keep the environment clean and/or pest free. Children also have more hand-to-mouth contact, which can lead to increased ingestion of toxins. Likewise, adolescence is a time of rapid cell growth during puberty, and many youth may be exposed to toxic chemicals at school and in work environments (Sattler & Davis, 2008).

Noise quality is also an important factor in environmental health. It is well recognized that the acoustical qualities in a classroom or other educational environments are a critical variable in the academic and psychosocial development of children. Inappropriate levels of reverberation and/or noise can deleteriously affect speech perception, reading/spelling ability, classroom behavior, attention, concentration, and educational achievement. In addition to compromising student function, poor classroom acoustics may also negatively affect teacher performance and increase voice problems (American Speech-Language-Hearing Association, 2005).

## **RATIONALE**

The registered professional school nurse (hereinafter referred to as school nurse) is the health expert in the school setting. With a public health focus, the school nurse has the educational and clinical background needed to understand the issues of environmental health and advocate for a physically and emotionally healthy school community (American Nurses Association [ANA] and National Association of School Nurses [NASN] (2011). The school nurse can assess the school environment for risk factors, advocate for the school community to address environmental pollution issues, and educate the community to the impacts of environmental issues and exposures. As a first responder in the school setting, the school nurse is able to identify trends and abnormal illnesses that may be related to environmental toxin exposure. The school nurse has the credibility to provide scientifically sound information to school and community leaders about environmental issues and toxin exposures (Agency for Toxic Substances & Disease Registry [ATSDR], 2012).

The Occupational Health and Safety Administration (OSHA) has been given the responsibility to ensure that employers provide a safe and healthy working environment, including schools. It accomplishes this through many regulations that relate to occupational exposure to environmental toxins (OSHA, 2012a). The school nurse can assist in implementing safety standards and in making the standards understandable and applicable in the school setting.

“Environmental preferability, sustainability, ‘green’, reducing your environmental footprint . . . these terms have become part of our everyday lexicon as schools, businesses, households, and the public sector have increasingly focused on strategies and tactics designed to reduce their negative impacts on the environment and human health” (Balek, 2012, pg. 16). Many activities to control school environmental exposures, including cleaning products used, will be the responsibility of the districts’ building or maintenance departments. The school nurse can serve on committees or as a consultant regarding activities that impact safe environmental practices, such as products to be used in the school setting.

## **THE ROLE OF THE SCHOOL NURSE**

The school nurse can promote environmental health by the following:

---

[www.nasn.org](http://www.nasn.org)  
National Association of School Nurses  
8484 Georgia Avenue Suite 420  
Silver Spring, Maryland 20910  
1-240-821-1130

1. Participate in and /or lead school committees for improving and maintaining good indoor air quality (Resource: EPA's *Tools for Schools IAQ Management* program, 2009).
2. Participate in the school and/or district committees for workplace safety and participate in the development of policies and practices that reduce exposure to environmental hazards.
3. Conduct or review annual environmental risk assessment (Resource: EPA's *Risk Screening Environmental Indicators*, 2011a). (Check the state's education code to see if it requires schools to be inspected regularly to insure minimal health and safety regarding the roof, interior and exterior of the building structure, plumbing, heating/cooling, ventilation, and wiring ( Environmental Law Institute, 2009). Follow the guidelines for animals in the school setting (Resource: CDC, 2011).
4. Promote use of an Integrated Pest Management system for pest control (Resource: EPA's *Integrated Pest Management Principles*, 2012b).
5. Advocate for building maintenance projects to be completed outside of school operating hours when possible, in order to reduce or limit staff and student exposure to possible fumes or chemicals (for example: painting and caulk that contains latex).
6. Educate staff and students on current environmental health concerns; participate in community programs for environmental safety.
7. Follow hazardous waste management policies at the local school and district level (Resource: EPA's *Managing Hazardous Waste in Your Community*, 2011b).
8. Follow guidelines concerning bloodborne pathogens in the school setting (Resource: OSHA's *Bloodborne Pathogens and Needlestick Prevention*, 2012b).
9. Support and enforce smoke-free school environments.
10. Assist with emergency response plan development for environmental toxin/hazardous chemical exposure accidents.
11. Understand and advocate for implementation of policies that encourage use of "green" cleaning products to further reduce toxin exposure in the school setting.
12. Understand the connection between daily noise exposure and learning and advocate for school buildings to meet current acoustical standards (Acoustical Society of America, 2010).
13. Educate students and staff on causes of noise-induced hearing loss and the importance of hearing protection at home and school, and advocate for continued routine hearing screenings with appropriate referral and follow up.
14. Document health events that may be caused by environmental exposures and report to administration.

## REFERENCES

Acoustical Society of America. (2010). *American national standard acoustical performance criteria, design requirements, and guidelines for schools*. ANSI/ASA S12.60-2010.

Agency for Toxic Substances & Disease Registry. (2012). *Environmental health nursing initiative*. Retrieved from [www.atsdr.cdc.gov/EHN/](http://www.atsdr.cdc.gov/EHN/)

American Nurses Association (ANA) and National Association of School Nurses (NASN). (2011). *School nursing: Scope and standards of practice* (2<sup>nd</sup> ed.). Silver Spring, MD: Nursebooks.org.

American Speech-Language-Hearing Association. (2005). *Acoustics in educational settings- Position Statement*. <http://www.asha.org/docs/html/PS2005-00028.html>

- Balek, B. (2012). Taking green cleaning to schools. *ISSA Today, February 2012*, 16-19. Retrieved from <http://issatoday.issa.com>
- Bureau of Indian Education). (2011). *School statistics*. <http://www.bie.edu/Schools/index.htm>
- Centers for Disease Control and Prevention. (2011). Compendium of measures to prevent disease associated with animals in public settings, 2011. *Morbidity and Mortality Weekly Report, 60(4)*, 1-24. Available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6004a1.htm>
- Centers for Disease Control and Prevention. (2010). Agency for toxic substances and disease registry. Retrieved from <http://www.cdc.gov/Features/PreventExposure/>
- Devaney, E. (2007). *Health and safety deficiencies at bureau of Indian education elementary and secondary schools* (No. C-IN-BIA-0008-2007) Retrieved from <http://www.doioig.gov/images/stories/reports/doc/2007-G-0023.txt>
- Environmental Law Institute. (2009). *School indoor air quality: State policy strategies for maintaining healthy learning environments*. Washington D.C.: Author.
- Environmental Protection Agency. (2012a). *Healthy school environment*. Retrieved from [www.epa.gov/schools](http://www.epa.gov/schools)
- Environmental Protection Agency. (2012b). *Integrated pest management principles*. Retrieved from [www.epa.gov/pesticides/factsheets/ipm.htm](http://www.epa.gov/pesticides/factsheets/ipm.htm)
- Environmental Protection Agency. (2011a). *Risk screening environmental indicators*. Retrieved from [www.epa.gov/oppt/rsei](http://www.epa.gov/oppt/rsei)
- Environmental Protection Agency. (2011b). *Managing hazardous waste in your community*. Retrieved from [www.epa.gov/osw/wycd/manag-hw](http://www.epa.gov/osw/wycd/manag-hw)
- Environmental Protection Agency. (2010). *How does indoor air quality impact student health and academic performance*. Retrieved from [http://www.epa.gov/iaq/schools/pdf/student\\_performance\\_findings.pdf](http://www.epa.gov/iaq/schools/pdf/student_performance_findings.pdf)
- Environmental Protection Agency. (2009). IAQ tools for schools action kit. Retrieved from <http://www.epa.gov/iaq/schools/actionkit.html>
- Healthy Schools Network. (2009). *Sick schools: America's continuing environmental health crisis for children*. Retrieved from [http://www.healthyschools.org/SICK\\_SCHOOLS\\_2009.pdf](http://www.healthyschools.org/SICK_SCHOOLS_2009.pdf)
- Institute of Medicine. (2011). *Climate change, the indoor environment, and health*. Retrieved from <http://www.iom.edu/Reports/2011/Climate-Change-the-Indoor-Environment-and-Health.aspx>
- National Center for Education Statistics. (2011). *Digest of education statistics, Table 62* .  
NCES 2011-015 U.S. DEPARTMENT OF EDUCATION
- Occupational Safety & Health Administration. (2012a). *OSHA's mission*. Retrieved from [www.osha.gov/about.html](http://www.osha.gov/about.html)

Occupational Safety & Health Administration. (2012b). *Bloodborne pathogens and needlestick prevention*. Retrieved from [www.OSHA.gov/SLTC/bloodbornepathogens/index.html](http://www.OSHA.gov/SLTC/bloodbornepathogens/index.html)

Sattler, B., & Davis, A. D. (2008). Nurse's role in children's environmental health protection. *Pediatric Nursing*, 34(4) 329-339.

Selekman, J., & Coates, J. (2013). Disease prevention. In J. Selekman (Ed.), *School nursing: A comprehensive text* (2<sup>nd</sup> ed., pp. 473- 515). Philadelphia, PA: FA Davis Company.

Suwanwaiphatthana, W., Ruangdej, K., & Turner-Henson, A. (2010). Outdoor air pollution and children's health. *Pediatric Nursing*, 36(1) 25 – 34.

World Health Organization. (2011). *Guidelines for indoor air quality: Selected pollutants*. Retrieved from [www.who.int/topics/environmental\\_health/en](http://www.who.int/topics/environmental_health/en)

### **Acknowledgement of Authors:**

Nina Fekaris, RN, MS, BSN, NCSN  
Samantha Miller-Hall, BSN, RN, NCSN  
Janice Selekman, DNSc, RN, NCSN

Adopted: June 2012

This document replaces the following Issue Brief:  
Environmental Concerns in the School Setting (Adopted: 2004)

This document replaces the following Position Statements:  
Environmental Impact Concerns in the School Setting (Adopted: 1991; Revised: 1998, 2005)  
Indoor Air Quality (Adopted: June 2000; Revised: June 2005)  
Noise Induced Hearing Loss (Adopted: June 2003)

For more information refer to: NASN Environment Health web page @  
<http://www.nasn.org/ToolsResources/EnvironmentalHealth> and to NASN's Service Animals in Schools Issue Brief