

The State of Environmental Health in Southwestern Pennsylvania Schools



A summary report by Healthy Schools PA,
a program of Women for a Healthy Environment

September 2018

5877 Commerce Street
Pittsburgh, PA 15206
412-404-2872
info@HealthySchoolsPA.org



The State of Environmental Health in Southwestern Pennsylvania Schools

**A summary report by Healthy Schools PA,
a program of Women for a Healthy Environment**

September 2018

Co-authors:

Michele Buford, MEd

Chelsea Holmes, MS

Hawa Mariko, MPH

Molly Mehling, PhD

Michelle Naccarati-Chapkis

Editor:

Lynne Glover

Reviewers:

Norman Anderson, MS

Robert J. Kobet, AIA

**This material is based upon work supported by Women for a Healthy Environment under a grant provided
by The Heinz Endowments.**

**Any opinions, findings, interpretations, conclusions or recommendations expressed in this material are
those of its authors and do not represent the views of The Heinz Endowments.**

Copyright 2018. Women for a Healthy Environment.

All rights reserved. Read our privacy policy and terms of use.

About Women for a Healthy Environment

The mission of Women for a Healthy Environment (WHE) is to educate citizens about environmental risks and advocate for a community where children live, learn and play without threat of environmental harm.

WHE started as a group of individuals united by a passion for learning more about how environmental exposures impact public health. The nonprofit organization was founded following the “Women's Health and the Environment: New Science, New Solutions” conference held in Pittsburgh in 2007. The conference, which featured scientists, environmentalists and activists, drew 2,000 people eager to learn about environmental health hazards, along with steps they can take in their everyday lives to minimize those risks. After this conference, a group of community leaders and subject experts formed WHE to implement what they learned and to share the information with others in an effort to create a strong, healthy region.

WHE was formally established in November 2009 as a community resource and catalyst for change throughout the Pittsburgh region and beyond. Its community education efforts reach diverse audiences—from grassroots groups meeting in church basements to corporate lunch-and-learns. Since 2010, WHE has directly engaged with more than 15,000 individuals across southwestern Pennsylvania through educational programming, reaching thousands more through online campaigns and initiatives. WHE has increasingly been recognized as the “go to” source in western Pennsylvania for information regarding environmental exposures that impact health. Its three main program areas are: Healthy Homes, Healthy Schools and Healthy Early Learning.

Healthy Schools Pennsylvania was created by WHE to act as a resource-rich information hub (HealthySchoolsPA.org) for the school community, including parents, teachers, staff and administrators. Since 2010, WHE has delivered curricula in the classroom to dozens of schools across Allegheny County. Through technical assistance, Healthy Schools PA ensures that environmental risk factors are identified and eliminated in school buildings. It provides information, support and hands-on assistance so that the region’s children can thrive and learn to their fullest potential in a healthy, toxic-free learning environment.

About Healthy Schools Pennsylvania

Healthy Schools PA, a program of Women for a Healthy Environment, is designed to empower parents, students, educators, staff and administrators to take an active role in creating healthy school environments. By providing tools, guides and other resources, Healthy Schools PA acts as a bridge between communities and their schools, effectively creating an advocacy network capable of bringing about social and policy change throughout the school system.

Nearly 2 million students are currently enrolled in public schools in the Commonwealth of Pennsylvania. Students, teachers and staff members spend over 1,000 hours a year in school buildings and on school grounds where they can be exposed to potential environmental hazards, such as poor air quality, lead, radon, toxic building materials and pesticides. These health risks are discussed far too infrequently.

Healthy Schools PA works to increase awareness in the school systems about environmental health factors and supports policies that directly correlate to improved health outcomes and academic performance by engaging the school community. The goals of the program are:

- To serve as a central voice and hub for information across the region by engaging students, parents, community leaders and school district personnel;
- To increase awareness in the school systems about environmental health factors;
- To recognize and celebrate schools for steps they have taken toward achieving a healthy learning environment;
- To deliver environmental health curricula in the classroom;
- To provide guidance on policies and practices that directly correlate to improved health outcomes and academic performance; and
- To develop a platform that connects organizations such as parent-teacher associations, state agencies and non-government organizations to encourage collaboration for creating a green and healthy learning environment.

TABLE OF CONTENTS

Executive Summary	1
Introduction	5
Drinking Water Quality, Including Lead	8
Lead in Schools, Beyond Water	13
Asthma	16
Indoor Air Quality.....	21
Cleaning Products.....	25
Idling.....	28
Mold	31
Polychlorinated Biphenyl (PCBs)	34
Pesticide Management	36
Radon	40
Synthetic Playing Surfaces	42
Construction & Renovation.....	47
Call to Action.....	52

Executive Summary

A healthy school is one that is free of environmental hazards and fosters healthy learning. Children spend an average of 1,000 hours in the classroom each school year—where they can be exposed to environmental hazards, such as poor air quality, lead, radon toxic building materials and pesticides. We must ensure that the time spent in school is free from exposures that could negatively impact children’s health.

In order to gain a better understanding of environmental health hazards potentially facing the 332,795 children enrolled in public school districts across southwestern Pennsylvania, Healthy Schools PA—a program of Women for a Healthy Environment—requested information during the 2016-17 school year, via a Right-to-Know request, from 129 public school districts located in the 10-county region. All told, 72 percent (93 school districts) responded partially or fully to the Right-to-Know (RTN) request.

The main goal of *The State of Environmental Health in Southwestern Pennsylvania Schools* was to request information in a consistent manner to assess the types of environmental testing being completed in public schools; and then examine the levels at which these schools are taking action through practice or policy in addressing potential environmental hazards.

The creation—and sustaining—of healthy schools is a public health issue and demands the involvement and attention of the entire community, including school personnel, parents, local, state and federal officials, as well as elected leaders. Ultimately, the findings in this report will be used to help assess funding needs to address these particular hazards in school buildings, while identifying key opportunities for additional technical assistance and policy change necessary to protect the health of school students in the region.

Factors of chronic environmental illness that can cause physical, emotional and mental disorders fall into three general categories. They are inhalants (things we breathe), contactants (things we touch) and ingestants (things we eat). This report focuses primarily on causal agents that compromise acceptable interior air quality and lead, as well as other environmental factors that could impact long-term and short-term health. Other elements of a healthy, high-performance school such as effective daylighting, proper acoustics, the psychology of color, views and connection to the outdoors are recognized by the WHE as important environmental factors but are beyond the scope of this report.

For this report, information was requested of public school districts for a 10-year period, 2006 to 2016. Lab reports and answers to 13 questions were obtained concerning radon, water and lead testing, indoor air quality, artificial playing surfaces, cleaning products, construction and renovation projects, asthma rates, anti-idling signage, pest management and polychlorinated biphenyls. During the 2017-18 school year, data from public school districts in the following counties was compiled and analyzed: Allegheny, Armstrong, Beaver, Butler, Fayette, Greene, Indiana, Lawrence, Washington and Westmoreland.

Key Findings

The results indicate potential environmental hazards exist in school districts throughout southwestern Pennsylvania. Here are the findings from those school districts who responded to the RTK request:

- 44% did not answer whether they **tested the school's water supply for lead or other contaminants** or said no reports were available. Six school districts relied on the local water authority's reports as opposed to testing the schools' water themselves. 49% indicated that they tested the school's water supply, while 25% tested for lead. *Note: Healthy Schools PA firmly advocates that no amount of lead exposure is safe.*
- 22% of the school districts indicated they conducted **lead testing** for paint.
- Collectively in the study, four of the 10 counties in southwestern Pennsylvania are **above the childhood state asthma rate of 10.2%**. Asthma rates in 22 school districts exceed the state average.
- **Air quality testing** was completed in 58% of the school districts, though many provided results for only one or two schools. **Indoor Air Quality Management Plans** exist in 28% of the districts.
- School districts use an average of **25 different cleaning products**. 14% reported using at least one type of **environmentally friendly** cleaning product.
- At the time of the Right-to-Know request, 54% of school districts reported they did not have the **anti-idling signage** required by state law. The RTK request may have spurred at least two districts to order signs.
- 34% of the districts **tested for mold** in at least one of their school buildings, frequently as a result of a health complaint submitted to school administrators.
- **Testing for polychlorinated biphenyls (PCBs)** was completed in 6% of the school districts.
- 78% of the school districts reported at least one **pest management contractor**. A more thorough analysis is needed to investigate whether integrated pest management practices required by state law are being followed.
- **Radon testing** was completed in 31% of the school districts, with 28% of those that tested reporting radon overages above the acceptable limit.
- On average, **school districts have one synthetic or artificial field**. Studies have shown that known toxic substances such as lead, benzothiazole and carbon black may be present in synthetic turf. Comprehensive safety studies are needed to determine the type, concentration and toxicity of artificial turf materials and installation practices.
- The **average school building was built in 1952**, with the oldest one in the study built in **1879**.
- During the study period, the largest federal funding increase for school improvement projects was in 2009. The **renovation projects** in the RTK request reflect this escalation in available funding.

Key Recommendations

Healthy Schools PA believes forming wellness committees and/or green and healthy school initiatives are among the best ways to create an integrated approach to environmental health in schools. There are many things a school district can do to create a healthy learning environment. The investment in the health of any academic community—especially our children—will ultimately lead to decreased absenteeism, higher academic performance and increased productivity. This requires the involvement of a variety of sectors within the community, from school administrators, teachers and parent groups, to transportation providers, custodial workers and contractors. Together, a well-formulated, comprehensive plan can be developed and implemented. Every plan should be reviewed and evaluated on an annual basis to insure the initial goals and anticipated benefits are being realized.

Case studies show well-executed healthy school initiatives that eliminate or minimize serious health hazards in schools can provide both short- and long-term benefits and returns on investment. By taking pre-emptive measures, some health effects, such as lead poisoning (which is known to cause behavior or learning problems in children), and radon exposure (the second-leading cause of lung cancer deaths), can be prevented. Making smart environmental health decisions and investments in school districts will protect the people they are meant to serve.

In light of these findings, Healthy Schools PA recommends the following:

- Follow the Environmental Protection Agency’s “3Ts” toolkit to identify whether lead is present in drinking water.
- Use filtered water stations for drinking; install and maintain filters at cafeteria faucets used in food preparation; and remove access to fountains and classroom sinks that contain lead components. The use of filtered water stations in combination with a program that encourages refillable drinking vessels can also significantly reduce the plastic waste associated with bottled water.
- Daily cleaning to keep dust levels to a minimum and regular inspections for chipped/peeling paint can reduce exposure to lead.
- Follow EPA’s Lead Renovation, Repair and Painting Rule and use certified renovators for schools built before 1978.
- Adopt and follow an Indoor Air Quality Management Plan and become an “Asthma-Friendly School.”
- Conduct a “checklist” in schools to identify cleaning products currently used. Identify safe alternatives by purchasing third-party certified green cleaning products and follow EPA recommendations for disposing of toxic cleaning products.
- Work with wellness committees, Parent Teacher Associations (or similar groups) and school administrators to create an idle reduction policy. Educate the academic community about the dangers of school bus and campus auto exhaust. Install “idle-free zone” signage at student drop-off and pick-up locations and anywhere that vehicle exhaust can endanger school populations.

- Replace old lighting systems manufactured with PCBs with energy-efficient systems. Reduce the potential for PCBs in indoor air by properly maintaining PCB-laden fixtures that cannot be retrofitted or replaced and be sure ventilation systems are operating properly.
- Educate staff about the benefits of reducing herbicides and pesticides in school buildings and landscapes by accessing *Integrated Pest Management for Pennsylvania Schools: A How-To Manual*.
- Test for radon using a certified individual or firm. Radon tests should be conducted over the course of at least one year using reliable testing equipment and trained personnel. Short-term testing is not recommended and should not be part of a comprehensive radon testing and abatement program.
- Natural grass fields using integrated pest management and non-petrochemically based turf maintenance practices are generally considered less toxic than synthetic turf installations. Until national research studies currently underway determine whether using synthetic turfs are safe, opt for natural grass fields.
- Before any construction and renovation projects, reference *Strategies and Processes for Materials Selection and Techniques for Protecting Occupants from Renovation Pollutants*, as recommended by the EPA.
- Investigate biophilic architecture when designing new school buildings. This type of design incorporates natural materials, light, vegetation and other elements of the natural world into the modern built environment.

Call to Action

Just as the Pennsylvania Auditor General added safety components to school district audits in 2006, it makes sense that the environmental health of the public school buildings where 1.7 million children are enrolled is also routinely evaluated and reported upon. Here are practical steps that individuals and communities are encouraged to take in an effort to create healthier schools for our children:

- Engage with Women for a Healthy Environment's Healthy Schools PA Program and find incremental steps that can be taken to improve a school district's environmental health.
- Urge federal and state elected officials and agency leaders to prioritize funding for schools that invest in infrastructure and advances environmental health strategies.
- Advocate at the Pennsylvania state government level for lead testing and more stringent requirements for schools, recognizing lead testing in drinking water became required in July 2018. In addition, insist on regulations requiring radon testing in all schools, as well as the use of third-party certified cleaning products.
- Participate in the "1,000 Hours a Year" program by applying for mini-grants (up to \$7,500) to test for lead and radon.

Together, we can help the region's children thrive and learn to their fullest potential in a healthy, toxic-free learning.

Introduction

The World Health Organization defines environmental health as “addresses(ing) all the physical, chemical and biological factors external to a person, and all the related factors impacting behaviours. It encompasses the assessment and control of those environmental factors that can potentially affect health. It is targeted towards preventing disease and creating health-supportive environments. This definition excludes behaviour not related to environment, as well as behaviour related to the social and cultural environment, and genetics.”¹

A healthy school is one that is free of environmental hazards. It supports an optimum learning environment by enabling maximum focus, attention and well-being. Healthy learning environments are clean, dry, quiet, well lit, comfortable year round and have effective ventilation and superior interior air quality. Environmental hazards can be found in every learning environment, including classrooms and playgrounds, but they can be prevented! These risks include but are certainly not limited to volatile organic compounds (VOC), lead, radon, mold, pesticides, cleaning products and synthetic playing surfaces.

Children spend on average 1,000 hours in the classroom each school year. We must ensure these hours are free from exposures that could negatively impact their health. The creation and maintenance of healthy schools is a public health issue that demands the involvement and attention of the entire community. School administrators, staff, students, parents, and local, state and federal officials, as well as elected leaders, all have a role to play in creating and maintaining healthy schools.

Background

The Pennsylvania Department of Education reports that over 1.7 million children were enrolled in public school buildings during the 2015-2016 school year. Of that, approximately 333,000 children were enrolled in public school districts across southwestern Pennsylvania, the subject area of this report.

Over the years, national studies have been conducted to assess the aging infrastructure of school buildings. Healthy Schools PA, a program of Women for a Healthy Environment (WHE), wanted a better understanding of school buildings across the southwest region of Pennsylvania, particularly as it relates to potential harm from environmental health hazards. WHE wanted this study to assess potential gaps in data collection, funding and policies needed at the local and state level.

During the 2016-2017 school year Healthy Schools PA requested information via a Right-to-Know (RTK) request from public school districts across southwestern Pennsylvania (SWPA) to collect and summarize data related to potential environmental hazards in school buildings. For this report, SWPA is defined by the Southwestern Pennsylvania

Commission's 10-county area which includes Allegheny, Armstrong, Beaver, Butler, Fayette, Greene, Indiana, Lawrence, Washington and Westmoreland counties.²

WHE's main goal in requesting information in a consistent manner from the districts was to use collected data to assess the types of environmental testing completed in southwestern Pennsylvania school districts and examine the levels at which schools are taking action to address potential environmental hazards through practice or policy. Ultimately, the findings will be used to help assess funding needs to tackle these hazards in school buildings while identifying key opportunities for additional technical assistance and policy change to protect the health of school students in the region.

Data Collection

In Pennsylvania the "Right-to-Know" (RTK) law is an act that provides access to public information from state-related institutions. Local agencies—municipalities, school districts, institutes of higher education, etc. —are required to designate and register an Agency Open Records Officer (AORO). The Right-to-Know law is applicable to public school buildings operating in the Commonwealth. In a school district, the AORO duties often fall under the auspices of the administration or the district's solicitor.³

Methodology

Healthy Schools PA sent Right-to-Know letters via email followed by paper requests through the U.S. Postal Service if there was no response to emails during the 2016-17 school year. If the school district asked for a specific timeframe due to the volume of records, Healthy Schools PA requested a 10-year period, specifically 2006-2016. Data was compiled and analyzed during the 2017-18 school year. The information detailed in the report is based on the 129 school districts that answered the RTN request; however, every school did not answer every question. If districts answered the request even in part, they were included in the results. It is specified in the results where schools did not supply data or answer whether they tested and/or have supplied information requested.

The RTK for *The State of Environmental Health in Southwestern Schools* contained 13 specific requests regarding:

1. Water testing and results, including **lead in drinking water**
2. **Lead testing**, beyond water
3. **Asthma rates** for 2015-16 school year
4. Presence of **Indoor Air Quality Management Plans**
5. Any **air quality testing** performed and results
6. Names of all **cleaning products** used in the buildings
7. Number of **anti-idling signs** posted
8. **Polychlorinated biphenyls (PCB) testing** and results
9. Company contracted or engaged for **pesticide management**

10. **Radon** testing and results
11. Number of **synthetic playing surfaces** (playground or fields)
12. Dates of school building **construction**
13. Dates of school building **renovations**

Intended Audiences

This public report and its accompanying executive summary will be shared with those invested in the school community, including:

- School district communities across the southwestern Pennsylvania region
- Pennsylvania Department of Education
- Intermediate Units
- State legislature and local elected officials
- Other stakeholders, including nonprofits and media

Literature Cited

¹ World Health Organization. Environmental health.

http://www.searo.who.int/topics/environmental_health/en/. Accessed April 4, 2018.

² Southwest Pennsylvania Commission. Our region – 10 Counties.

<http://www.spcregion.org/reg.asp>. Accessed May 17, 2018.

³ Office of Open Records. About the Right-to-Know Law.

<https://www.openrecords.pa.gov/RTKL/About.cfm>. Accessed May 17, 2018.



DRINKING WATER QUALITY, INCLUDING LEAD

Schools typically get their water from a public municipal source or private well. Water testing results are conducted to determine the presence of legionella, usually found in cooling towers, coliform, including *Escherichia coli* or E-coli, and lead. If a school has a pool, testing for elevated chlorine levels is also conducted.

History chronicles the danger of lead in drinking water as early as the Roman empire. In the United States, documenting the potential for lead in drinking water dates to the early 1800s. More recently, lead in drinking water made national headlines when Flint, Michigan, was discovered to have city-wide lead contamination that affected the majority of its population, including school children. And, we know Flint is not an isolated, nor rare case in the U.S.

The science is clear: lead is a neurotoxin that negatively impacts human organs and systems. It affects the developing brain and has been linked to learning disabilities, attention deficit disorder (ADD), speech delay, hearing problems and kidney damage. Lead exposure especially harms fetuses and young children because their rapidly developing bodies absorb lead at a higher rate than the average adult.¹

Lead in drinking water can come from many sources in a school building, including water service lines, faucets, water fountains and plumbing fixtures. Solder containing lead can be found throughout the water distribution system. Under the federal Lead and Copper Rule (LCR) water authorities are required to monitor and test for lead in drinking water at the customer tap every three years. Generally, when water leaves a treatment plant it does not contain lead. However, it can become polluted with lead as it travels through leaded service lines, fixtures and fittings.

Water authorities are required to take a sample from a small number of homes that are representative of their service area. The actual sample size is based on the number of customers the authority serves. The samples are tested by a laboratory which reports the lead concentrations in milligrams per liter (mg/L). A water authority is required to act when more than 10% of the homes tested in their sampling pool exceeds 15 parts per billion (ppb) of lead. A lead level of 15 ppb is reported as 0.015 mg/L. The water system must undertake several additional actions to control corrosion of the lead pipes. It is important to note the action level of 15 ppb is not based on a health standard. **According to the American Academy of Pediatrics, World Health Organization and others, no amount of lead exposure is considered safe for children.**²

The U.S. Environmental Protection Agency (EPA) estimates approximately 8,000 schools and child care facilities maintain their own water supply. They are regulated under the

Safe Drinking Water Act (SDWA). As such, these schools and child care centers are required to test for lead on a regular basis. The sampling results are provided to the Pennsylvania Department of Environmental Protection which regulates public water supplies, bottled water and bulk water under the Pennsylvania Safe Drinking Water Act (SDWA).³

According to the EPA, there are approximately **98,000 public schools and 500,000 child care facilities nationwide not regulated under the SDWA**. These unregulated schools and child care facilities may or may not be conducting voluntary drinking water quality testing. As referenced in RTK responses, schools often rely on their local water authority's Consumer Confidence Report (CCR) data for potential exposure to lead in drinking water.

WHE recommends schools do not rely on the water authority's sampling data. This is because the authority's sampling data is based on a random sample of homes and is not reflective of potential lead-based water contamination risks in a school.

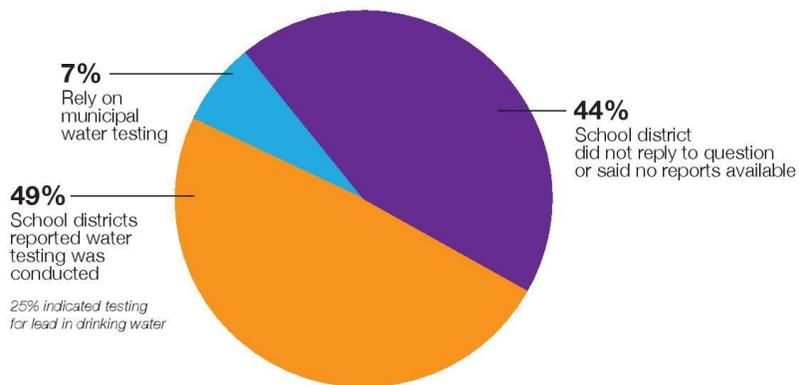
Over the last several years, states across the country have passed legislation requiring schools and early learning centers to test their drinking water for lead, regardless of the facility's water source. It is recommended that schools test every water outlet that an occupant would have access to for drinking, such as water fountains, classroom sinks, teacher lounges and food preparation areas. Schools should follow EPA's 3T's (Training, Testing, Telling) for Reducing Lead in Schools guidance document, which provides testing protocol. This protocol includes: using containers that are 250 milliliters (mL) in volume to collect the water sample, collecting samples before the facility opens and before any water is used, and using a qualified third party for testing.

The EPA recommended, non-enforceable action level for schools and child care centers is 20 ppb. Again, this is not based on any health-protection standard. In a June 2016 position statement, the American Academy of Pediatrics (AAP) stated: "Most existing lead standards fail to protect children. They provide only an illusion of safety. Instead we need to expand the funding and technical guidance for local and state governments to remove lead hazards from children's homes, and we need federal standards that will truly protect children. The AAP calls for new federal standards defining and testing for lead hazards in house dust, water and soil. It also urges legal requirements that lead be removed from contaminated housing and child care facilities and to **ensure water fountains in schools do not exceed water lead concentrations of more than 1 part per billion.**"⁴

We agree that no amount of lead exposure should be considered safe and the AAP recommendation of 1 ppb (0.001 mg/L) must be adhered to in schools.

Survey Results:

Testing for Lead & Other Contaminants in School Water



Right-to-Know Highlights: Testing for Lead in Water and Other Contaminants

- In our study, approximately six school districts relied on the local water authority’s water testing reports as opposed to testing the schools’ water themselves. In two municipalities lead levels in water exceeded the EPA Lead Action Level.
- Numerous school districts have had lead levels that exceeded EPA recommended action level of 20 ppb for schools.
 - Lead testing in one district revealed concentrations on “1st draw” samples – the first water out of the outlet – reached 149 ppb, significantly above the 20 ppb threshold set by EPA for action. Because “flush” samples (30 seconds of flushing the water) lowered levels to 6 ppb on second sample, no action was taken.
 - In one instance, 2016 testing determined a water fountain had a reading of 23.6 ppb after new water lines were connected to old lines during building renovations. A second sample reported a result <1.00 ppb. It was determined debris in the line contributed to the elevated level in the first sample. The debris was flushed out, and the contractor deemed the fountain safe to use.
 - Lead levels in a first-floor elementary school boys’ room was 15 ppb and 92.5 in girls’ room. A second-floor boys’ room was 25 ppb, and girls’ side 16 ppb. There was no documentation of any follow-up.
 - Lead was detected above the laboratory analytical detection limit in 23 of 35 samples collected at one school.
- In order to keep costs down, one district performed water analysis from “Test Kit-90.” It indicated “this report cannot be used for Safe Drinking Water Act regulatory compliance purposes because it does not comply with all of the U.S. EPA regulations,” mainly in the area of sample collection.

- Other water testing at various school districts indicated other contaminants, including the following:
 - One school district had to close for several days because its schools tested positive for coliform bacteria, including E. coli.
 - Water in the restroom in the administration building in one school district exceeded the EPA Action Levels of 1.3 mg/l of copper for drinking water with a 2.35 mg/l reading.

Call to Action

Healthy Schools PA recommends schools follow the *Environmental Protection Agency's "3Ts" Toolkit* to assist schools in identifying whether lead is present in the drinking water.⁵ These guidelines are intended to be used by school officials in charge of maintenance and school safety.

The 3Ts include the following:

- **Training** school personnel to educate school community on the occurrences, causes and health risks of lead in drinking water.
- **Testing** drinking water outlets in each school building to determine the potential problem of lead and to perform the necessary remediation.
- **Telling** the entire school community about the potential risks, the results of testing conducted and remediation steps taken.

Through the "1,000 Hours a Year" program, Healthy Schools PA and the Green Building Alliance have provided schools and child care centers in Southwestern Pennsylvania with funding to test for and remediate lead in drinking water. These organizations also provide technical assistance and guidance when interpreting test results and determining the necessary remediation actions to undertake.

Because there are a multitude of pathways of exposure for lead in drinking water in schools, schools are encouraged to:

- Use filtered water stations in their buildings for drinking.
- Install and maintain filters at the cafeteria faucets that are used for food preparation.
- Remove access to any water fountains and classroom sinks that contain lead components.

It is important for individuals and communities to advocate at the state level for long-term lead testing in schools, recognizing lead in drinking water testing became required in July 2018 for one year only.

Literature Cited

¹ U.S. EPA, Lead and Copper Rule, A Quick Reference Guide for Schools and Child Care Facilities that are Regulated Under the Safe Drinking Water Act.

<https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P10058C5.txt>. Accessed May 17, 2018.

^{2,4} American Academy of Pediatrics, June 2016; With no amount of lead exposure safe for children, American Academy of Pediatrics calls for stricter regulations.

<https://www.aap.org/en-us/about-the-aap/aap-press-room/pages/With-No-Amount-of-Lead-Exposure-Safe-for-Children,-American-Academy-of-Pediatrics-Calls-For-Stricter-Regulations.aspx>. Accessed April 4, 2018.

³ U.S. EPA, Lead in Drinking Water in Schools and Childcare Facilities.

<https://www.epa.gov/dwreginfo/lead-drinking-water-schools-and-childcare-facilities>. Accessed April 4, 2018.

⁵ U.S. EPA. Lead in Drinking Water in Schools and Childcare Facilities.

<https://www.epa.gov/dwreginfo/lead-drinking-water-schools-and-childcare-facilities>.

Accessed April 4, 2018.



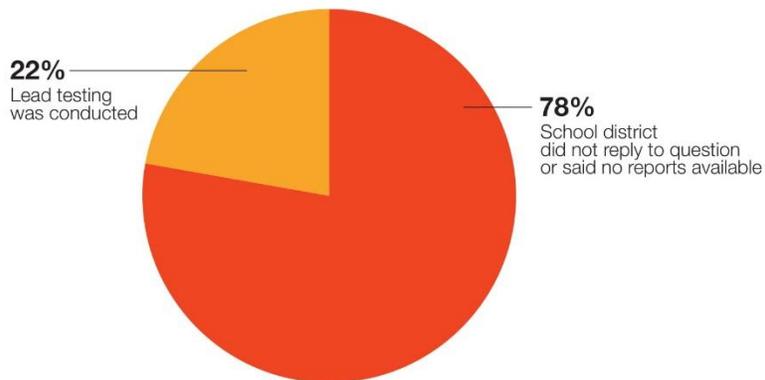
LEAD IN SCHOOLS, BEYOND WATER

There are multiple pathways of exposure to lead in a school building. In addition to water, it may be present in paint, dust, soil and consumer products. These include old toys, vinyl mini blinds, furniture and beauty products used in cosmetology programs. For purposes of this report, lead in paint, dust and soil will be addressed.

Prior to 1978, lead was still being used in paint for pigment, to enhance drying time and resist moisture. Therefore, school buildings constructed before 1978 have the likelihood of lead paint being used. There is an even higher possibility of lead presence in paint for those schools built before 1960. A 2010 federal law requires contractors disturbing more than six square feet of paint in schools, homes and child care facilities built before 1978 to be certified and to follow specific workplace practices to prevent lead contamination.¹

Lead in soil can be found in varying concentrations due to demolition practices, weathering of the exterior of buildings with lead-based paint, and air emissions from industrial sources such as smelters and automobiles that once used leaded gas. Schools utilizing vacant land for play/recess areas could unknowingly put students at risk. Increased interest in school gardens brings the risk of encountering soil contaminated with lead. This is particularly true in urban schools where lead content in neighborhoods exceed those in rural settings.²

Survey Results:
Lead Testing in Paint/Dust



Right-to-Know Highlights: Lead in Schools, Beyond Water

- Of the 307 school buildings reported in the study, 83% (256) were originally built before 1978, the year that federal regulations prohibited lead from being used in paints.

- At one elementary school built before 1978 an inspection revealed six out of 80 surface samples taken contained lead paint.
- Lead paint was found in the stairwell in an elementary school.
- In one school district, there was an assumption lead paint sealed during renovations in 2001 were not still fully encapsulated, but records indicate no further lead paint/dust testing performed.
- Lead-based paint screening indicated the fire-damaged metal and block bleacher area structure of an athletic stadium in one school district contained lead concentrations.
- Lead-based paint that was cracking and peeling was found in hallways and stairwells in one school district. Samples indicated lead levels over the action level of 1 mg/cm².

Call to Action

With daily cleaning to keep dust level at a minimum and regular inspections for chipped and peeling paint, school maintenance teams can greatly reduce students' exposure to lead in dust and paint. As schools continue to age and the need for renovation continues to rise, Healthy Schools PA strongly recommends that schools follow EPA's guide to safe renovations in school buildings.³

Further, EPA's Lead Renovation, Repair and Painting Rule (RRP Rule) should be adhered to. The RRP Rule requires "that firms performing renovation, repair and painting projects that disturb lead-based paint in homes, child care facilities and pre-schools built before 1978 have their firm certified by EPA (or an EPA authorized state), use certified renovators who are trained by EPA-approved training providers, and follow lead-safe work practices."⁴

It is highly recommended that schools test the soil before any child plays on the vacant surface or a classroom begins a garden initiative. Soil testing kits are available through the following:

- Allegheny County Conservation District, call 412-291-8017 or email jburgess@accdpa.org.
- The Penn State Extension master gardener program is a free resource for all gardeners, and experts there can address lead hazards. The agency has a soil testing lab and sells soil test kits. In winter months, phone and email messages are returned on a weekly basis: 412-482-3476 or 412-482-3477 or alleghenymg@psu.edu.

Literature Cited

¹ Consumer Reports. Sept. 2013; Reducing your child's lead levels.

<https://www.consumerreports.org/cro/2012/03/cdc-advisers-call-for-less-allowable-lead/index.htm>. Accessed May 17, 2018.

² Tulane University. Lead's Urban Legacy. http://lead.tulane.edu/lead_soil.html. Accessed August 3, 2018.

³ U.S. EPA. Lead Concerns During Renovations for a Healthy School Environment.

<https://www.epa.gov/schools-healthy-buildings/lead-concerns-during-renovations-healthy-school-environment>. Accessed April 4, 2018.

⁴ U.S. EPA. Renovation, Repair and Painting Program.

<https://www.epa.gov/lead/renovation-repair-and-painting-program>. Accessed April 4, 2018.



ASTHMA

According to the Centers for Disease Control and Prevention, asthma is defined as “a disease that affects your lungs. It causes repeated episodes of wheezing, breathlessness, chest tightness and nighttime or early morning coughing. Asthma can be controlled by taking medicine and avoiding the triggers that can cause an attack. You must also remove the triggers in your environment that can make your asthma worse.”¹ It is important to note that asthma is the leading cause of chronic disease-related school absenteeism in the United States and can contribute to making children more susceptible to other negative health effects.

It is well understood that air quality affects the development of asthma rates in school-age children. Approximately one in 10 children in the classroom are diagnosed with asthma. EPA reported that “During 2013, children with asthma aged 5-17 missed 13.8 million days of school per year. Students with uncontrolled asthma often miss more school and have poorer academic performance than healthy students. With the help of strong school asthma management programs, students with asthma can have equally good school attendance. When asthma is well controlled, students are ready to learn.”²

There are many known asthma triggers in and around the school building which must be addressed. Many are often unidentified. These triggers include:

- Classroom pets (dander)
- Cleaning and maintenance products
- Fragrances such as air fresheners, perfumes and body spray
- Off-gassing of building materials such as carpets, paints, etc.
- School supplies, including art and science materials
- Pest droppings from rodents, cockroaches and dust mites
- Pesticide use in the school or on the grounds
- Poor indoor air quality caused by improper maintenance of HVAC system, or mold and airborne particulates
- Outdoor hazardous air pollutants such as diesel exhaust and hot asphalt fumes infiltrating the indoor school environment

The Pennsylvania Department of Health collects data on a regular basis to monitor rates in the Commonwealth. The *2015 Asthma Prevalence in Pennsylvania Report* published data on current asthma prevalence rates by gender, age, race, educational status and income status. A fact sheet summary of children with asthma in Pennsylvania follows.³

- In 2013 (the most recent year available), the average lifetime of asthma prevalence in children ages 0-17 was 14.4%. This represents an estimated 382,146 Pennsylvania children with lifetime asthma. The current asthma prevalence in children ages 0-17 is 10.2%. This represents an estimated 269,423 children with

current asthma. (In Allegheny County, 12% of school-age children live with asthma, according to a 2018 report released by the Allegheny County Health Department.)

- The current asthma prevalence was higher in boys (12.6%) compared to girls (7.8%).
- Black non-Hispanic children had the highest current asthma prevalence (24.1%) compared to white non-Hispanic children (7.1%) and Hispanics (14.9%).
- Children ages 10-14 had the highest lifetime asthma prevalence of 18.8%.

The *2015 Pennsylvania Asthma Prevalence Report* states: In 2010, the state of Pennsylvania spent approximately \$1.7 billion in health care costs for asthma and absenteeism alone. In 2020, this cost is projected to be around \$2.6 billion. This represents a more than 50 percent increase in the cost of asthma from 2010 to 2020, excluding the cost of inflation. Although there is no cure for asthma, the severity of symptoms and associated costs have been shown to reduce with effective management through education and medical care.⁴

Studies continue to demonstrate children living in underserved, low-income communities have higher rates of asthma. These children are often uninsured. In 2017, Dr. Deborah Gentile with the Pediatric Alliance and Dr. Jennifer Elliott with the Duquesne University School of Pharmacy released results of the Surveillance and Tracking of Asthma in our Region's Schoolchildren (STARS) program. The goal of this program was to clearly identify the prevalence of asthma in Allegheny County. The STARS team objectives were to 1) effectively and efficiently identify school children at risk for asthma and 2) examine the impact of environmental factors on asthma.

The study targeted high-risk elementary school children from the Pittsburgh region. In particular, the STARS team assessed fifth graders in five school districts located in underserved communities known to be affected by poor air quality from emissions stemming from industrial sources in close proximity. The study determined the following:

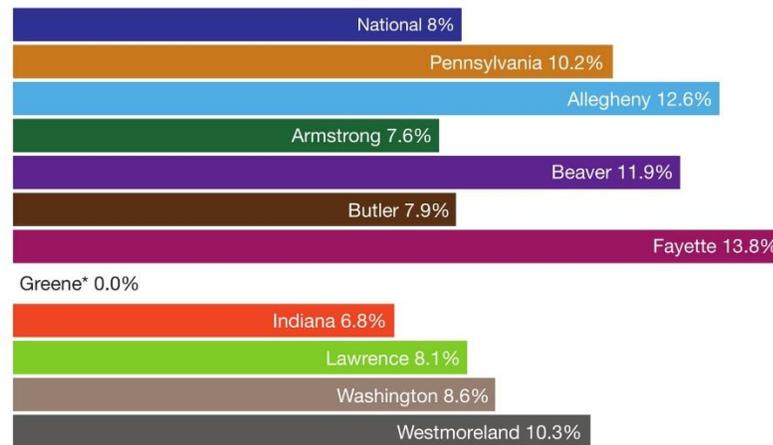
- 59.3% had asthma that was not well controlled.
- Overall asthma prevalence was 22.5%. There was significant positive association with male gender, African American race and outdoor air pollution, but not obesity, environmental tobacco smoke (ETS) or secondhand smoke.
- There was significant positive association with outdoor air pollution exposure, but not demographics, obesity or ETS.
- There was a significant relationship between increased asthma prevalence and PM2.5 exposure (fine particulate matter from industrial sources, such as power plants, steel mills, coke plants and diesel traffic).
- 70.7% exceeded the World Health Organization threshold of 10 ug/m³. 38.8% exceeded the Environmental Protection Agency threshold of 12 ug/m³, demonstrating a trend toward poorer asthma control with increased PM2.5 exposure.

- Higher PM2.5 exposure was associated with:
 - 1.6 times increased odds of asthma prevalence.
 - 4.7 times increased odds of poorly controlled asthma.

This study determined there is a strong need to reduce regional air pollution levels, under the proven premise that cleaner air will improve health outcomes.

Survey Results:

Percentage of Public School Children with Asthma, by County



*Note: According to data collected by the Pennsylvania Health Care Cost Containment Council, Greene County had inpatient hospitalization rates that listed asthma as "primary discharge diagnosis" among children at a rate of 9.4 percent for the period of 2003-2010.

Right-to-Know Highlights: Asthma

- Twenty-two school districts in the southwestern Pennsylvania study area reported asthma rates for students higher than the state average for school children of 10.2%.
- Some schools in one district have had asthma rates as high as 19 percent.
- After complaints that a child suffered from asthma attacks at school, but nowhere else, air quality checks were performed at school. A check of school's ventilation system determined that further investigation by an HVAC mechanic was recommended to see if system was operating as designed because testing levels indicated "general occupant discomfort may occur" from people who suffer from respiratory illnesses.

Call to Action

Healthy Schools PA staff is trained in and supports EPA's Indoor Air Quality Tools for Schools program which has been implemented successfully in tens of thousands of schools nationwide. Our organization strongly recommends that all schools adopt an ongoing indoor air quality management plan.⁵

Help your school become an “Asthma-Friendly School.” The main components of an asthma-friendly school include:

- Maintaining a healthy school environment to improve indoor and outdoor air quality.
- Developing and following an air quality management plan.
- Enlisting school nurses to identify and track students with asthma.
- Utilizing asthma action plans that incorporate green, yellow and red action zones (these are zones of asthma care defined by your peak expiratory flow rate and symptoms).
- Developing an integrated team effort for asthma management which includes parents, guardians, school administrators/nurses and health care providers.
- Creating supportive policies regarding guidelines for asthma medication.
- Providing asthma education to all students and staff.

As part of the Healthy Schools Recognition Program, schools can receive free assistance and recognition to become an asthma-friendly school. Healthy Schools PA also offers Open Airways for Schools, a program of the American Lung Association that teaches students how to manage their asthma by identifying individual triggers and developing methods to reduce exposure.

There are several resources available on the Pennsylvania Asthma Partnership’s website, where you’ll find the **Pennsylvania Pediatric Asthma Toolkit**.⁶ This toolkit was developed by the Pennsylvania Department of Health and the Philadelphia Allies Against Asthma Coalition. The goal of the toolkit is to improve asthma education resources among community-based organizations, primary care providers and schools.

According to the latest *Scope and Standards of Practice* from the National Association of School Nurses and American Nurses Association, development of plans of care are a standard of nursing practice.

Below are template plans found on the Pennsylvania Asthma Partnership’s website that schools may adopt:⁷

[Asthma Action Plan \(English\)](#)

[Asthma Action Plan \(Spanish\)](#)

[Is the Asthma Action Plan Working?](#)⁸

Literature Cited

¹ Centers for Disease Control and Prevention. Asthma. <https://www.cdc.gov/asthma/default.htm>. Accessed April 4, 2018.

² U.S. EPA. Managing asthma in the school environment. <https://www.epa.gov/iaq-schools/managing-asthma-school-environment>. Accessed April 4, 2018.

³ Pennsylvania Department of Health. 2015 Asthma Prevalence in Pennsylvania Fact Sheet.
<https://www.health.pa.gov/topics/Documents/Programs/2015%20Asthma%20Prevalence%20in%20Pennsylvania%20fact%20Sheet.pdf>. Accessed April 4, 2018.

⁴ Pennsylvania Department of Health. 2015 Pennsylvania Asthma Prevalence Report.

⁵ U.S. EPA, The “Indoor Air Quality Tools for Schools” approach: providing a framework for success. <https://www.epa.gov/sites/production/files/2014-08/documents/framework.pdf>. Accessed May 17, 2018.

⁶ Pennsylvania Asthma Partnership. Asthma Toolkit. <http://www.paasthma.org/asthma-toolkit/>. Accessed June 5, 2018.

⁷ Pennsylvania Asthma Partnership. American Lung Association’s Asthma Action Plan. <http://www.paasthma.org/wp-content/uploads/2018/01/asthma-action-plan.pdf>. Accessed June 5, 2018.

⁸ Pennsylvania Asthma Partnership. National Asthma Education and Prevention Program. Is the action plan working?
<http://www.paasthma.org/images/docs/is%20the%20action%20plan%20working.pdf>. Accessed June 5, 2018.



INDOOR AIR QUALITY

Ambient outdoor air and indoor air quality (IAQ) both impact a child's ability to learn. IAQ affects a person's health, comfort and ability to function. An estimated 50 percent of the nation's schools have problems linked to poor indoor air quality, according to the EPA.¹ In fact, indoor air pollution is consistently ranked among the top five environmental health risks by the EPA and its Science Advisory Board.

Poor air quality impacts the health of staff and students, with children being the most susceptible to air pollutants. Poor indoor air quality can cause many different reactions. Among these are shortness of breath; sinus congestion; coughing; sneezing; eye, nose, throat and skin irritation; dizziness; nausea; headache and fatigue. Susceptible effects include asthma and allergic reactions, chemical sensitivities, respiratory diseases and suppressed immune systems. Each of these symptoms can make teaching and learning in a classroom uncomfortable and challenging. It should be noted poor air quality can occur in any part of a school, including locker rooms and natatoriums; and vocational education spaces have unique air quality challenges.

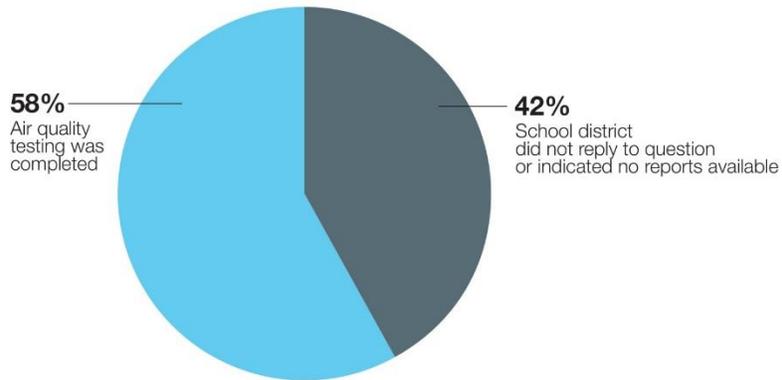
Air quality management addresses items such as temperature, humidity, lack of acceptable outside air for ventilation and exposure to other toxins. Indoor air pollution in schools can come from many sources, including, but not limited to art and science supplies, cleaning products, large amounts of cooking waste, furniture and carpet off-gassing, poorly maintained HVAC systems, mold, pesticides and trash. Air pollutants contain numerous particulates, mists, bioaerosols, fibers and gases that must be controlled or IAQ problems can arise.

Development of a comprehensive air quality management plan can avoid many of the allergy and asthma triggers that school occupants encounter. "The definition of good indoor air quality management includes control of airborne pollutants, introduction and distribution of adequate outdoor air, and maintenance of acceptable temperature and relative humidity. Temperature and humidity are important because thermal comfort concerns underlie many complaints about "poor air quality."² Comprehensive commissioning of school building HVAC systems can prevent the emergence of poor IAQ conditions; but generally, air quality testing in schools occurs only after a specific problem has been identified or complaint has been registered.

Schools are designed and built to use outside air for ventilation. Therefore, outdoor air pollutants such as diesel bus idling, pesticides and hazardous emissions from industrial sources have the ability to enter a school building envelope. Schools must be cognizant of these sources, and work with community members and regulators to reduce such hazards from entering the school building.

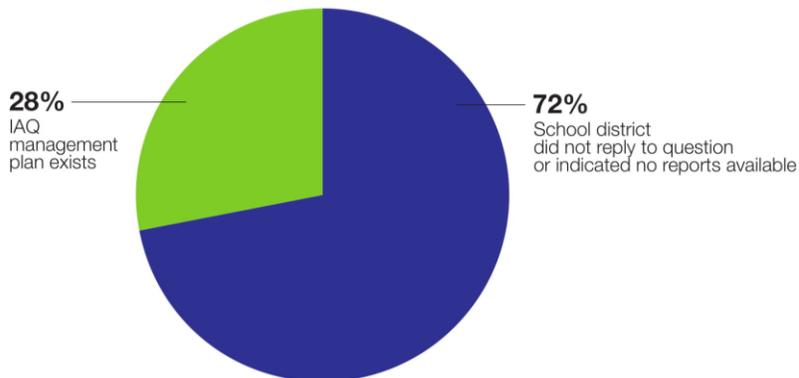
Survey Results:

Air Quality Testing



Survey Results:

Indoor Air Quality (IAQ) Management Plan



Right-To-Know Highlights: Indoor Air Quality

- The preponderance of air quality sampling tests in school districts were conducted as a result of complaints by teachers or staff.
- There were many instances where vents intended to introduce fresh air into the school were either blocked or covered, thus obstructing air flow. History shows, in some cases, schools in the U.S. closed outside air intakes in reaction to the energy crisis of the 1970s. Classrooms served by unit ventilators are vulnerable to vents being blocked by materials stacked on supply air slots.
- Some classrooms have no capability to provide fresh outside air into the building. This is a code violation.
- Delivery trucks were sometimes left running near school buildings, introducing truck exhaust via functional vents.

- One school showed while maximum ventilation indicators did not exceed the OSHA Permissible Exposure Limit; it was above the recommended National Institute of Occupational Safety and Health acceptable range for occupant comfort.
- One school district has procedures in place for air quality complaints.
- One school district conducts routine testing of air quality in at least four locations within the facility. If any reading falls outside specified ranges, the HVAC system is investigated.
- Air Quality Reports in some schools indicate air deodorizers such as scented wall plug-ins, sprays, candles, diffusers, etc. can be problematic because they create disagreeable smells for some individuals.
- At one school, malfunctioning equipment such as broken fans and leaking garbage disposals called for remedial actions involving cleaning with petroleum-based products, creating bad smells. Recommendations were for crawlspace fan repair to be made to improve air quality, along with inspecting and cleaning unit ventilators on a routine basis. Recommendations also called for outside air intakes be maintained and kept free of standing water and organic debris.
- In one district, all air handling equipment was replaced with new equipment said to meet the Air Quality Standards of the Government and Industry for Schools in the USA and the Commonwealth of Pennsylvania.
- Several school districts follow Indoor Air Quality Guidelines for Pennsylvania Schools and the EPA's Indoor Air Quality Tools for Schools Reference Guide as their indoor air quality plan.
- One school district reported air quality control factored into design of new construction. The development of an IAQ Management Plan is in progress in this district.
- One school district's IAQ Management Plan consists of handwritten documentation of three items: 1) building HVAC air filters changed at least twice yearly; 2) UV light technology installed in most elementary buildings; and 3) UV light technology installed in the HVAC that serves the wrestling and athletic areas.
- One school district located 900 yards away from a hydraulic fracking well pad performed air monitoring to address concerns regarding children's potential exposure to chemicals used in hydraulic fracking operations.

Call to Action

In addition to the development and adherence to a thorough Indoor Air Quality Management Plan, Healthy Schools PA recommends that programs focused on environmental quality, including air management and maintenance, be delivered to school nurses and facility directors as an ongoing component of professional development and training. All asthma educator certification programs must include information on indoor environmental quality. Healthy Schools PA endorses the American Lung Association's action steps that schools can take to support healthy indoor air in schools:

- Raise awareness among school personnel, students, parents and communities about federal regulations that protect those with asthma.
- Establish districtwide Indoor Air Quality (IAQ) policies.
- Establish emergency management plans for IAQ issues and external hazards.
- Establish policies and procedures for field trips.
- Treat school buses as indoor environments and enforce Pennsylvania’s anti-idling statute.
- Purchase asthma-friendly products.
- Complete a school IAQ self-assessment. Include investigating the use of perfumes, cologne and other potential irritants that are not building related.
- Implement the most comprehensive IAQ management program possible.

Literature Cited

¹ U.S. EPA. Healthy Schools and Indoor Air Quality. <https://www.epa.gov/schools-air-water-quality/healthy-schools-and-indoor-air-quality>. Accessed August 3, 2018.

² U.S. EPA. Indoor Air Quality Tools for Schools: Actions to Improve Indoor Air Quality.” Publication #402-F-99-008. September 1999.



CLEANING PRODUCTS

A large line item in school budgets is often cleaning and maintenance supplies, but how often are these products assessed for health and safety? Chemicals found in conventional cleaning products used in schools can be toxic and lead to adverse health impacts such as asthma, upper respiratory distress, fatigue, nasal congestion, nausea, dizziness and hormone disruption. It was our goal through the RTK request to gain a greater understanding of the range of products being used by area school districts and assess if any schools were using third-party certified green cleaning products. The feedback illustrates the wide range of cleaning and maintenance products being used in school buildings, with perhaps little consideration and oversight of the type of products being used.

A study by the Environmental Working Group (EWG) shows ordinary school cleaning supplies can expose children and staff to hundreds of air contaminants that have never been tested for safety. Laboratory tests performed for EWG found a typical assortment of cleaning products released 457 distinct chemicals into the air. EWG's findings come at a time when childhood asthma and many childhood cancers are on the rise.¹ Another study showed that 25% of chemicals in the cleaning products used in schools are toxic and contribute to poor indoor air quality, smog, cancer, asthma and other diseases.² A third study demonstrated formaldehyde, styrene, and four other toxic substances that contribute to asthma were found in school cleaning supplies. These and nine other chemicals also found in the cleaners are known to cause cancer.

Lax labeling requirements mean schools often don't know what they're purchasing. Safety Data Sheets (SDS) should be accessed and reviewed for every cleaning and maintenance product purchased. Purchasing agents and maintenance personnel should be trained in how to interpret Safety Data Sheets. Several school districts submitted the SDS of products used in their buildings to our study. Common household products are also used in schools. Many would be alarmed to learn that when used as directed Comet Disinfectant Powder Cleanser released more than 100 air contaminants including chloroform, benzene and formaldehyde.³ U.S. institutions currently spend more than \$75 million annually on medical expenses and lost wages for custodians caused by injuries from using chemicals.⁴

However, with improved technology a healthier approach to cleaning is now attainable for schools. Third-party certification measures a cleaning product for its environmental and health impacts. These products, vetted by an independent party, are now more readily available and cost effective. The three main companies that certify these cleaning and maintenance products are EPA's Safer Choice, Eco Logo and Green Seal.

Green cleaning is a proven strategy that creates a space where school communities can breathe easier. Developing a comprehensive green cleaning program that uses certified,

non-toxic products protects students and staff, increases furniture and facility lifespan, protects the environment, and saves the school district money. A 2010 study determined the price of green cleaning products has become comparable to or lower in cost than conventional choices.⁵ Schools have shown decreased costs after implementing their green cleaning plans. One school district in New York reported a \$365,000 annual savings after switching to green cleaning practices.⁶ Accounting for the costs related to human health and the environment makes the value of green cleaning even higher.

To date, 14 states and the District of Columbia have passed Green Cleaning in Schools legislation. Pennsylvania is not one of them.



Right-To-Know Highlights: Cleaning Products

- Common manufacturers used were Buckeye, Diversey, Hillyard and Spartan. Identifying certified-green products offered by these manufacturers can provide an easier transition to developing a green cleaning program.
- One school district uses 94 different cleaning products. Common household products also used regularly include Comet, Lysol, Pine Sol and Spic 'N Span.
- One school district's Indoor Air Quality Manager reviews all chemical products purchased or used in the facility to determine whether chemicals can contribute to IAQ problems. In addition, the IAQ Manager requests copies of Safety Data Sheets for all chemicals to determine whether there are hazardous constituents present within the products purchased. Among these are pesticides, paints, cleaning compounds.
- All custodial cleaning products at one school district have been converted to a certified green product line.
- At one school district, staff is discouraged from bringing in off-the-shelf-cleaning, disinfecting and deodorizing products, as well as fragrant scented candles.

Call to Action

- Conduct a green cleaning checklist to identify which products are currently being used, those that can be eliminated, and what safer alternatives are available.
- Educate your school community about the need for green cleaning products in the school setting and invest in training for custodial staff. Training should include what products to use and how to use them properly and cost effectively.
- Learn the difference between cleaning, disinfecting and sanitizing and determine which products are the best choice for each situation.
- Purchase third-party certified green cleaning products which have been proven to work effectively and save money.
- Support statewide legislation that would require all schools in Pennsylvania to use third-party certified green cleaning products.
- Visit greencleanschools.org or contact Healthy Schools PA for more information.

Literature Cited

¹ Natural News. School Cleaning Supplies Emit Toxic Fumes into Classroom Air, Jan. 1, 2010. https://www.naturalnews.com/027848_cleaning_supplies_schools.html#. Accessed May 8, 2018.

² Healthy Schools Network, Inc. Guide to Green Cleaning: Practices and Products for Schools. 2011. http://www.healthyschools.org/downloads/Guide_to_Green_Cleaning_2011.pdf. Accessed May 8, 2018.

³ Environmental Working Group. Greener School Cleaning Supplies: Research links air quality to cleaning supplies. Nov. 3, 2009. <https://www.ewg.org/research/greener-school-cleaning-supplies#.WvHqH0xFxPY>. Accessed May 8, 2018.

⁴ Green Seal. Presentation to Association of School Business Officials International. May 23, 2016. Making mandates mainstream: Putting green cleaning products and procedures into practice. May 23, 2016. http://asbo.org/images/downloads/2016_Spring_Conference_Presentations/making_mandates_mainstream.pdf. Accessed May 8, 2018.

⁵ Healthy Schools Campaign. Learn about the five steps to green cleaning. <https://greencleanschools.org/>. Accessed April 4, 2018.

⁶ Healthy Schools Campaign. Third party certifications. <https://greencleanschools.org/resources/third-party-certifications/> Accessed April 4, 2018.



IDLING

The U.S. Environmental Protection Agency points to diesel exhaust as among the most dangerous forms of air pollution. Diesel exhaust releases high levels of toxic particulate matter which travels deep into our lungs. Children, as well as people with existing heart and lung conditions, are especially vulnerable to diesel pollution. Children's lungs, which are still developing, are larger in proportion to adults' lungs, so children inhale 50 percent more air per pound of body weight than adults.¹ Individuals routinely exposed to diesel exhaust face higher risks of stroke, cancer, asthma, heart attacks and other chronic illnesses.

School buses produce diesel exhaust every time they park with the engine running, often while waiting for children to enter or exit the bus. Idling exhaust pollutes both the outdoor air and the air inside the school building as school ventilation systems often draw air ventilation from areas where buses and other vehicles circulate. School districts must be cognizant of where buses pick up and drop off children. For instance, queuing parallel to each other, rather than parking front to back, reduces exhaust from entering into the bus and exposing children and the driver to additional harmful fumes. Not only is idling dangerous to our health, it also puts a great stress on bus engines and wastes fuel.

In addition, pollution from car exhaust is created when parents que up to drop off or pick up their children. Green school initiatives often include incentives that reduce the number of children driven to school. These include rewarding carpooling, walking and riding bikes.

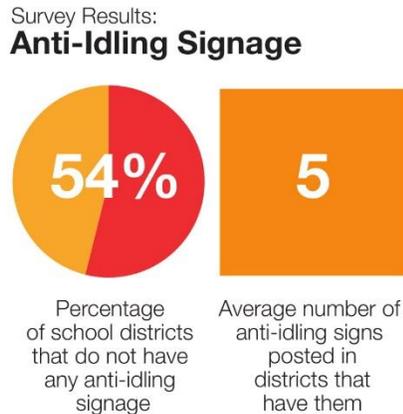
School districts have opted to either purchase their own school buses and manage an in-house transportation department or contract this service to a third party. Regardless of what entity owns the buses, all schools must follow state regulations and comply with the Pennsylvania Diesel Powered Motor Vehicle Idling Act (Act 124).²

This Act forbids diesel-powered vehicles, including school buses, to idle more than five minutes in any continuous 60-minute period. It states, "An owner or operator of a location where subject vehicles load or unload or a location that provides 15 or more parking spaces for subject vehicles shall erect and maintain a permanent sign" informing drivers that idling is restricted in Pennsylvania. By law, schools and school districts must post at minimum one sign to alert school bus drivers of idling restrictions. This Act also applies to diesel-powered vehicles that visit the school, such as delivery trucks. The idling restriction in Act 124 is a good guide for parents waiting in school pick-up and drop-off lines, as well.

In addition, Section 2105.91 of the Allegheny County Health Department regulations address school bus idling.³ It mirrors the state law, but also states: "A school bus driver shall not park or idle a bus within 100 feet from a known and active school air intake

system, unless the school district has determined that alternative locations block traffic, impair student safety or are not cost effective.”

Pennsylvania will receive \$118 million from a settlement with Volkswagen, which will be used to fund grants and rebates for cleaner vehicles and engines.⁴ This will be an opportunity for school districts to apply for funds to purchase energy-efficient buses that are less polluting.



Right-to-Know Highlights: Anti-Idling

- The Right-to-Know request may have prompted two school districts to order signs restricting idling. School officials said at the time of the survey they did not have any signs but have since ordered them.
- Exhaust from vehicles can be drawn into fresh air vents.
- Some school districts have multiple, large signs at each school location. Some measure 4 ft. x 4 ft.
- One school district has 14 anti-idling signs, one at each entrance of each school facility.
- The “No idling” signs on each school building in one district include “Act 124 of 2008” enforcement language.

Call to Action

- Become familiar with Pennsylvania Act 124, which was signed into law in 2008 and became effective in 2009.
- Work with your school community to create an idle reduction policy. With such a policy in place, bus idling can be controlled or even eliminated in school environments. To find out more about creating an effective idle reduction policy, visit the EPA’s Idle-Free Schools Toolkit for a Healthy School Environment at <https://www.epa.gov/schools/idle-free-schools-toolkit-healthy-school-environment> and EPA’s National Idle Reduction Campaign at <http://www.epa.gov/cleanschoolbus/antiidling.htm>.

- Develop a plan to provide both drivers and bus company with information and support to ensure understanding and cooperation on all levels. For instance, in the winter, provide a space inside the school where bus drivers who arrive early can wait.
- Enlist an Environmental Health Wellness Committee to spot-check idle-free zones and ensure the policy is upheld.
- Ensure “idle-free zone” signage is installed at student drop-off and pick-up locations. If you see a violation of Act 124, call your local law enforcement agency or the Pennsylvania Department of Environmental Protection’s toll-free Citizen Complaint Line at 1-866-255-5158.
- Contact Healthy Schools PA to request “Idle Free Bus” window decals, which have been approved by the Pennsylvania State Police and Pennsylvania Department of Transportation.
- Plan school budgets accordingly to earmark funds to retrofit existing school buses or purchase new buses that are more environmentally friendly, such as hybrid fleets or propane school buses. Review federal and state funding opportunities at <http://www.dep.pa.gov/Business/Air/BAQ/Automobiles/Pages/DieselRetrofits.aspx>.
- Incentivize riding the bus instead of arriving by car. Van pool, walk or ride a bike to school. This is best done via friendly competition and recognizing staff, students and parents who contribute to reducing idling pollution.

Literature Cited

¹ U.S. EPA. Air pollution and kids. What you should know about diesel exhaust and school bus idling. June 2003. <https://www.epa.gov/sites/production/files/2015-04/documents/dieselexhaustschoolbusidling.pdf>. Accessed May 22, 2018.

² PA Department of Environmental Protection. Diesel Idling and Act 124 Information. <http://www.dep.pa.gov/Business/Air/BAQ/Automobiles/Pages/DieselIdling.aspx>. Accessed May 22, 2018.

³ Allegheny County Health Department. School Bus Idling Regulation. <http://www.achd.net/airqual/pubs/pdf/sbireg.pdf>. Accessed May 22, 2018.

⁴ State Impact Pennsylvania. May 10, 2018. Volkswagen settlement money to go toward cleaner vehicles, engines. <https://stateimpact.npr.org/pennsylvania/2018/05/10/volkswagen-settlement-money-to-go-toward-cleaner-vehicles-engines/>. Accessed May 22, 2018.



MOLD

Molds are classified as micro-flora—plants that do not contain chlorophyll. They are often green, black, purple or orange with an earthy, musty or alcohol-like odor. They are a type of fungus that require three things to live: oxygen, food and moisture in any form. Typical food sources include food leftovers, wood, paper, cloth or wallboard. Moisture can be supplied by high humidity, condensation, leaks, flooding and damaged or malfunctioning plumbing fixtures.

There are over 100,000 different types of mold, many with very beneficial ecological benefits. Depending on how sensitive someone may be, all molds have potential health effects. However, some are especially toxic and can cause serious health defects. Symptoms include sinus inflammation, nosebleeds, respiratory diseases, and exacerbating existing asthma symptoms and allergies. People with impaired immunity are especially at risk, and those with significant sensitivities may have zero tolerance for mold. Like many other causal agents, mold can contribute to weakening already compromised immune systems which, in turn, can lead to other negative health consequences. Even dead mold may cause reactions, so mold must be considered something that must be removed and prevented from re-establishing.

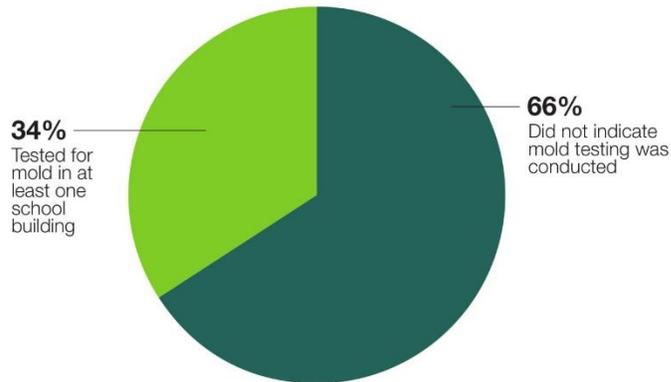
There are currently no federal regulations concerning mold remediation in schools and no state policy in Pennsylvania. Testing for mold in schools is usually conducted in response to a complaint or presentation of allergy or asthma symptoms by school occupants. According to environmental remediators, there are no numeric or regulatory standards for airborne or surface microbial contamination indoors. However, there are suggested guidelines that indicate the types and levels of fungi found indoors should be similar to that located outdoors. It should be noted mold levels in outdoor ambient conditions vary, most often in response to seasonal changes, rain, humidity, falling leaves and the level of decomposing plant material in surrounding landscapes.

Schools are encouraged to utilize the EPA's Indoor Air Quality (IAQ) Tools for Schools Program and checklists to address IAQ issues to provide a healthy learning and working environment. Most IAQ problems are preventable and resolvable through simple, low-cost measures. It cost significantly less to prevent mold than resolving building maintenance and health problems after they occur.¹

While mold testing data was not specifically sought after in our Right-to-Know request, 32 school districts submitted reports indicating that they tested for mold. Many of these reports indicated that mold tests were performed in various places throughout the school complex.

Survey Results:

Mold



Right-to-Know Highlights: Mold

- When school districts tested for mold, it was frequently as a result of health complaints submitted to administration.
- Active roof leaks, old carpet, water-damaged ceiling tiles and steam line breaks were frequently cited as sources for moisture when there were indications of active fungal growth.
- Many reports indicated “degraded air results do not indicate unacceptable concentrations.” However, reports noted that individuals susceptible to molds may have adverse reactions related to low levels of mold.
- The areas/places where various types of molds were frequently found include locker rooms, training rooms, walk-in cooler, crawl spaces, cork boards, carpeting and ceiling tiles.
- There were multiple instances where indoor mold counts far exceeded the outdoor levels—the standard to determine if indoor mold counts were considered high. For example: In 2016, the home economics room in in one school district had a total mold count (spores/m³ of air) of 804,766 vs. 21,957 outside. This high count came with the recommendation: “Keep unnecessary students and personnel out of this room until it has been decontaminated. All food items, paper, cardboard and non-washable items are to be disposed.”
- Air quality tests at one district found that exposed earth floors in a storage area dubbed the “Dungeon” in one classroom contributed to mold levels five times as high as those found outdoors.
- In one district, Aspergillus/Penicillium mold found in libraries presented as white surface dust. Prior to technical evaluation by professionals, the observed white surface dust on books was removed or cleaned by library staff. It was recommended workers wear NIOSH-approved respiratory protection with cleaning

performed using HEPA filtered vacuums and damp wiping techniques. The library staff was empowered to decide if books or other articles could be disposed of in lieu of detailed cleaning. Mold remediation involved surface cleaning of all books and wood shelving within the library and one classroom.

- One school district follows the EPA Guidelines for Mold in Schools.

Call to Action

Below are steps schools can take to reduce the chance for developing mold:⁴

- Create a Wellness Committee to perform an indoor air quality assessment and develop an Indoor Air Quality Management Plan that includes follow-up evaluations.
- Inspect the building for signs of mold, moisture, leaks or spills using the EPA Guidelines for Mold in Schools.
- Respond promptly when signs of moisture and/or mold are present, or when leaks or spills occur.
- Prevent moisture condensation.
- Control indoor humidity to stay within American Society for Heating, Refrigeration and Air Conditioning Engineers' (ASHRAE) guidelines.
- Train the school's custodial crew to handle small mold remediation jobs. Hire professional mold remediation specialists to remove mold-damaged materials from the school and perform necessary restoration services.
- Visit the EPA's website - <https://www.epa.gov/mold/mold-and-indoor-air-quality-schools> - to learn more about mold management, including how to prevent mold, investigate moisture and mold problems, and how to cleaning up mold and water damage.

Literature Cited

¹ U.S. EPA. Creating Healthy Indoor Air Quality in Schools. <https://www.epa.gov/iaq-schools>. Accessed May 22, 2018.



Polychlorinated biphenyl (PCB)

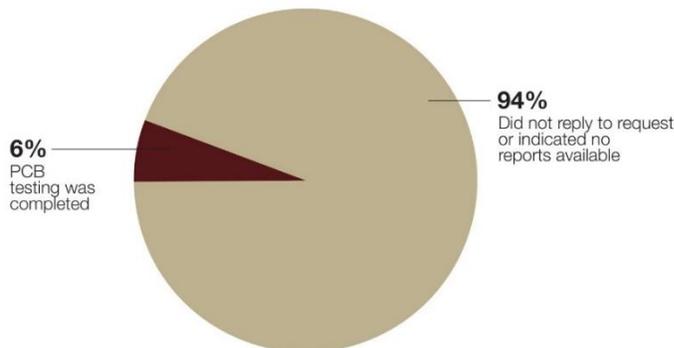
The U.S. Environmental Protection Agency states that polychlorinated biphenyl (PCB) is a class of organic chemicals used in caulk, electronics, fluorescent light ballasts and other building materials from the 1950s to 1979.¹ Congress banned its use in 1976 due to toxic health and environmental impacts. As caulking degrades or light ballasts leak or rupture, PCBs can leach out of components that contain it. It can also be present in dust.

PCB is classified as a probable human carcinogen. Exposure to this chemical may also cause neurologic or reproductive health impacts. According to the Agency for Toxic Substances and Disease Registry (ATSDR), additional adverse effects of PCBs may involve the cardiovascular, gastrointestinal, genetic, immune and musculoskeletal systems.²

Schools built between the 1950s and 1970s may contain PCBs and must therefore prepare to address this health hazard. As an example, PCBs were detected in light ballasts of schools located in the New York City School District. The City of New York and the New York City (NYC) School Construction Authority entered into a consent agreement with the U.S. EPA in 2010 to address PCBs in NYC public schools. The pilot study included replacement of all PCB-containing lighting fixtures by the end of 2016. Under the pilot is a comprehensive study evaluating the possible presence of PCBs in other building materials, and potential remedial alternatives for school buildings.³

Replacing PCB-containing lighting fixtures in school buildings with energy-efficient lighting eliminates a public health hazard, provides better lighting for students and staff, decreases energy costs, and reduces the potential risk of a future emergency regarding PCBs. EPA's website also contains more information on PCBs in school buildings. Check out "Renovations and Polychlorinated Biphenyls (PCBs) for a Healthy School Environment."⁴

Survey Results:
Polychlorinated Biphenyl (PCB) Testing



Right-to-Know Highlights: PCBs

- Limited information was supplied on this topic via the RTK, which leads to the question of whether school districts are familiar with potential health risks associated with PCBs.
- One school district said it had done no specific testing for PCB. It noted all technology equipment is updated and built after the 1979 PCB cut-off time period.
- One school district conducted a hazardous materials visual survey of its facilities, looking for everything from halon fire extinguishers, mercury fluorescent light tubes and bulbs, PCB hydraulic elevator oil, mercury thermostats/thermometers, lead batteries, petroleum or hazardous material drums, and mercury vapor lights.
- One school district removed all apparatus containing PCBs.

Call to Action

Below are steps identified by the EPA that school districts should adhere to in addressing PCBs (please note that protective gear should be worn to protect contractor health):

- Replace old lighting systems made with PCBs with energy-efficient systems.
- Reduce the potential for PCBs in indoor air by maintaining a proper ventilation system, which includes following an air quality management plan that addresses ongoing and regular HVAC maintenance to keep dust levels to a minimum, as well as ensures custodians are addressing dust as part of their cleaning program.
- Until it can be safely removed, limit exposure to caulk containing PCBs by:
 - Keeping children from touching caulk or surfaces near it.
 - Washing children's toys often and washing their hands with soap and water before eating.
 - Using wet cloths to clean surfaces and cleaning frequently to reduce dust.
- Call EPA's Toxic Substances Control Act Hotline at (888) 835-5372 to learn more about PCBs in caulk and to get information on PCB professionals in your area.

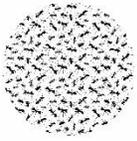
Literature Cited

¹ U.S. EPA. Learn About Polychlorinated Biphenyls. <https://www.epa.gov/pcbs/learn-about-polychlorinated-biphenyls-pcbs>. Accessed Aug. 2, 2018.

² Agency for Toxic Substances and Disease Registry. Polychlorinated Biphenyls (PCBs) Toxicity. What Are Adverse Health Effects of PCB Exposure? <https://www.atsdr.cdc.gov/csem/csem.asp?csem=30&po=10>. Accessed May 22, 2018

³ New York City Dept. of Health. Polychlorinated Biphenyl (PCB). 2013 NYC Pilot Study on PCBs in Schools. <https://www1.nyc.gov/site/doh/health/health-topics/polychlorinated-biphenyl-pcb.page>. Accessed June 5, 2018.

⁴ U.S. EPA. Renovations and Polychlorinated Biphenyls (PCBs) for a Healthy School Environment. <https://www.epa.gov/schools-healthy-buildings/renovations-and-polychlorinated-biphenyls-pcbs-healthy-school-environment>. Accessed June 5, 2018.



PESTICIDE MANAGEMENT

Pests in and around school grounds are always a concern for school personnel. These critters need food, water and shelter to survive. They often thrive in the same damp, dark areas that propagate mold. To control pests, staff tend to focus on the kitchen and cafeteria areas, as well as school lots and landscapes. The presence of pests is harmful and must certainly be avoided. Rodent droppings can spread disease and viruses and trigger asthma and allergy symptoms. Cockroach fecal matter can also trigger asthma symptoms.

Pesticides used in schools are often toxic chemicals that can have serious short and long-term health impacts. According to Beyond Pesticides (formerly National Coalition Against the Misuse of Pesticides), experts believe there is a link between pesticide exposure early in life and the rising number of children being diagnosed with developmental disabilities.

Of the 40 most commonly used pesticides in schools, 28 are known carcinogens, 14 are linked to endocrine (hormone) disruption, and 26 could lead to adverse reproductive effects.¹ Nationally, children between 6-11 years of age are found to have higher levels of pesticide residue in their bodies than any other group of people. The American Academy of Pediatrics recommends policies that promote integrated pest management, comprehensive pesticide labeling and marketing practices that incorporate child health considerations to enhance safe use.²

Fortunately, the presence of pests can be avoided with integrated pest management (IPM). IPM revolves around six essential components: monitoring, record-keeping, action levels, prevention, tactics criteria and evaluation.³ IPM reduces or eliminates the use of pesticides to minimize the toxicity of and exposure to harmful chemicals. It is important to note an IPM plan does not merely mean that the school hires a contractor to conduct monthly preventative spraying. Rather, it means a plan has been developed that puts practices in place that are focused on prevention of pests; and only under very limited circumstances does the school engage a professional to apply pesticides of any type to the site. The most successful IPM plans are those that properly educate school staff on the purpose and benefits of IPM strategies as opposed to pesticide use.

According to the National Wildlife Federation, research shows that incorporating time outdoors and in natural spaces leads to improved student concentration, higher test scores, lower absenteeism, increased student and teacher energy levels and satisfaction and healthy brain development in children.⁴ For these reasons, it is imperative that outdoor school spaces are free from pesticide/herbicide use. This national study found that:

- 31 states and the District of Columbia have a minimum competency standard in place for persons using pesticides at schools.
- Twenty-three states have a school IPM law or regulation.

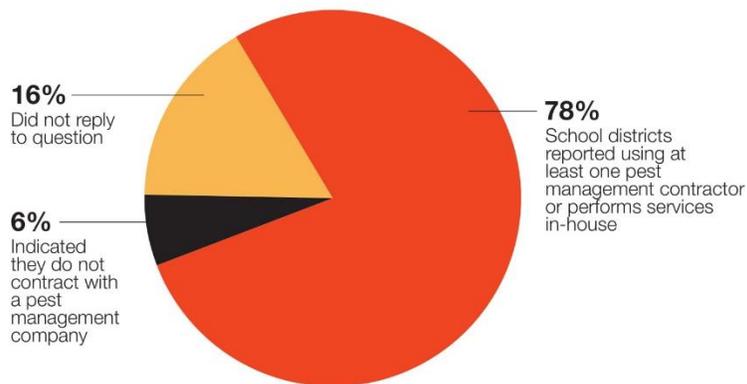
- 25 states require schools to pre-notify parents and staff of upcoming pesticide applications.
- 18 states have re-entry requirements based on an interval period before which entry back to school is permitted or other beyond label requirements for pesticide applications at schools.
- 31 states and the District of Columbia mandate the posting of signs for the application of pesticides at schools.
- In this Right-to-Know request, many schools indicated that they practice IPM, but often no plans were submitted as proof. Rather, the name of the chemical contractor was supplied.

In Pennsylvania, state regulations require schools to implement IPM plans and alert parents and staff of chemical pesticide application prior to use. The following two statutes regulate how pesticides are used on school grounds:

1. Pennsylvania Senate Bill 705 (Act 35) - Signed by the governor April 18, 2002. Requires all PA schools to adopt IPM programs by January 1, 2003.
2. Pennsylvania House Bill 1289 (Act 36) - Signed by the governor April 18, 2002. Amends the Public School Code of 1949, requiring notification of pesticide treatments in PA schools (section 772.1).

Survey Results:

Pesticide Management



Right-to-Know Highlights: Pesticide Management

- Very few school districts have an Integrated Pest Management plan that have been created and routinely reviewed that would satisfy Pennsylvania law. However, this study revealed one district has an IPM plan.
- Several school districts have employees who are certified to perform pesticide management services.
- One school district reported it does not use pesticides.

- One district performed indoor air quality testing following a pest control contractor's eight separate pesticide applications in a five-month period to control wasps and yellow jackets at their middle school.

Call to Action

- Educate school personnel using *IPM for Pennsylvania Schools: A How-To Manual*. It contains extensive pest management information on common building pests, as well as information about managing weeds and pests on school fields.⁵
- Meet with your school's Parent Teacher Association or similar group and administrative office to ask about the school and/or district's IPM policies.
- Encourage your school to adopt a "no pesticides" policy for school grounds.
- Work with your school community to create a plan to raise awareness about the potential health hazards of exposure to chemical pesticides.
- Contact local environmental/health organizations for assistance developing a cost and benefit plan for IPM policies at your school.
- Organize a Wellness Committee to regularly review IPM plans at your school.
- More information can also be accessed at the following:
 - EPA's Approach for Integrated Pest Management in Schools. <https://www.epa.gov/managing-pests-schools/epas-approach-integrated-pest-management-schools>.
 - EPA's Roundtable on School Integrated Pest Management <https://www.epa.gov/managing-pests-schools/roundtable-school-integrated-pest-management>.
 - National Pest Management Association's Overview of State School Pest Management Requirements. <http://www.npmapestworld.org/public-policy/national-advocacy/StateSchoolRegs>.

Literature Cited

¹ Pesticide-induced Diseases Database. Wide range of diseases linked to pesticides. Summer 2010. <https://www.beyondpesticides.org/assets/media/documents/health/pid-database.pdf>. Accessed May 15, 2018.

² American Academy of Pediatrics. December 2012. Pesticide exposure in children. <http://pediatrics.aappublications.org/content/130/6/e1757>. Accessed May 15, 2018.

³ U.S. EPA. Introduction to integrated pest management. <https://www.epa.gov/managing-pests-schools/introduction-integrated-pest-management>. Accessed May 15, 2018.

⁴ National Wildlife Federation. September 2010. Creating high-performance students. <https://www.nwf.org/~media/PDFs/Be%20Out%20There/Back%20to%20School%20full%20report.ashx>. Accessed May 15, 2018.

⁵ Penn State Extension. IPM for Pennsylvania Schools: A How To Manual.
<https://extension.psu.edu/ipm-for-pennsylvania-schools-a-how-to-manual>. Accessed May 15, 2018.



RADON

Radon is a naturally-occurring, colorless, odorless and tasteless radioactive gas that originates from the breakdown of uranium found in soil, rocks and underground water. It moves vertically through cracks in bedrock, soil and, sometimes, building foundations. Radon decays into three particles called “radon daughters,” one of which can release small burst of radiation that, when trapped in the lungs, can damage lung tissue and increase the risk of cancer. Radon is very site specific and can therefore be unevenly distributed within buildings in close proximity. Schools are as susceptible to radon infiltration as any other building type.

Radon is classified as a Class A carcinogen. Exposure to radon is the second-leading cause of lung cancer deaths in the United States, second only to smoking. Radon is measured in units of picocuries per liter (pCi/L). Outdoor levels of radon in the United States average 0.4 pCi/L and typically do not pose health risks. However, levels of radon can build up in indoor spaces, especially in basements and first floor levels, particularly during winter months when buildings are more tightly sealed. Another potential pathway of radon exposure can be via drinking water (specifically relevant to those schools relying on groundwater for their drinking water supply). This is far less of a concern than soil gas, however may constitute a hazard nonetheless.

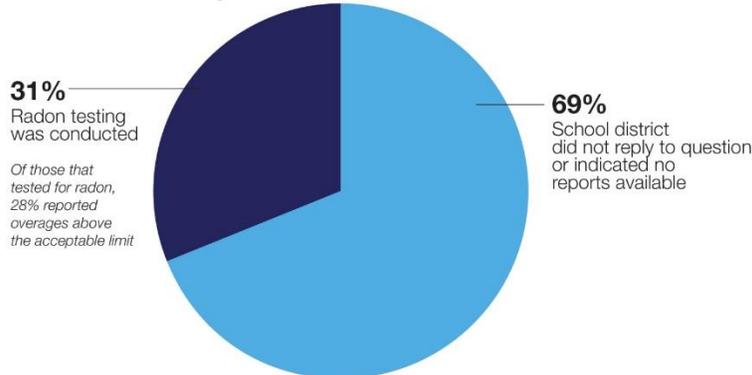
While even low levels of radon pose some risk, the U.S. EPA has established 4 pCi/L as the radon action level and recommends that levels remain below this limit in homes and other buildings, including schools. If levels are found to be above 4 pCi/L, mitigation and retesting is recommended. Anyone providing radon services must be certified by the Pennsylvania Department of Environmental Protection. Schools may have personnel trained to test for radon or outsource this service.¹ Comprehensive radon testing recognizes the high variability of radon levels that occur over the course of a year as seasons change and HVAC systems transition between idle periods and active heating and cooling modes.

A nationwide survey conducted by the EPA—the National School Radon Survey—estimated that nearly one in five schools has at least one room with a high short-term radon level. The EPA recommends all schools should be tested for radon, but in most states, this is not a requirement. To date, according to the EPA, approximately 20 percent of schools nationwide have conducted some radon testing.² Currently, radon testing is only legislated in 11 states; it is not required in Pennsylvania.

Twenty percent of all schools (approximately 70,000 rooms) will have at least one room with a concentration greater than 4pCi/l (nationwide). In 2013, a bill was introduced in the Pennsylvania House ([HB915](#)) that would require schools to test for radon every five years. Unfortunately, the bill did not move out of the Education Committee.

Survey Results:

Radon Testing



Right-to-Know Highlights: Radon

- Many school districts do not perform radon testing. Of the districts that responded to the RTK, 31 percent reported that they tested for radon.
- One of eight districts with levels over 4 pCi/L reported mitigation and retesting.
- One school indicated they are slab on grade with no basement inferring no risk. Yet, many slab on grade buildings are subject to radon infiltration.
- In one school district, 14 of 31 rooms tested had values that exceeded EPA’s Action Level of 4 pCi/L for radon.
- One school district says it uses a radon gas detector in the administration center with normal results for 2015-16, but no information for other school buildings.
- Radon hit “high levels” at one school district but was reportedly mitigated, with no actual results submitted.

Call to Action

- Inquire with your school district to see if testing has been conducted.
- If radon testing has not been conducted, ask your school district to test using a certified individual or firm, and inform the school community of funding available via the www.1000HoursAYear.org program.
- Ensure all new school construction is radon-free, as there is no safe level of radon.
- Visit EPA’s site for more information: U.S. EPA Managing Radon in Schools at <https://www.epa.gov/iaq-schools/managing-radon-schools#iaq-tools>.
- Advocate for state legislation that requires regular radon testing in schools.

Literature Cited

¹ Pennsylvania Department of Environmental Protection, Radon Division. <http://www.dep.pa.gov/Business/RadiationProtection/RadonDivision/Pages/default.aspx>. May 22, 2018.

² U.S. EPA. Radon in schools. <https://www.epa.gov/radon/radon-schools>. Accessed May 5, 2018.



SYNTHETIC PLAYING SURFACES

Synthetic playing surfaces, some of which are known as artificial turf, are widely used as soil additives or ground cover in athletic fields, running tracks, playgrounds and other commercial facilities, including schools. Synthetic turf fields are comprised of materials often made from recycled rubber tires (crumb rubber). However, due to the increased scrutiny over health risks associated with crumb rubber, companies are now using alternative materials which may result in additional health concerns, as many have not yet been properly studied.

There are many factors to consider when assessing what type of playing surface to install. This includes: potential chemical hazards, physical and biological hazards, impacts to the environment, performance characteristics and financial considerations. In reference to chemical hazards, synthetic turf is known to release many toxic and harmful substances that may negatively affect both short- and long-term health. Although data is limited, synthetic turf contains a variety of substances with disconcerting health effects. These include:

- Toxic heavy metals such as lead, arsenic, cadmium and chromium that can impact developing systems in the body.
- Potential carcinogens such as polycyclic aromatic hydrocarbons (PAH).
- Latex and other rubbers, which can provoke allergic reactions.
- Phthalates, which are known endocrine/hormone disruptors.

Further, turf fields can rise to temperatures above 100°F. This was noted during data sampling conducted by Healthy Schools PA staff in September 2018. The surface temperature of synthetic fields often ranged from 10-30 degrees higher than the surface of the adjacent natural grass, and 10-20 degrees higher than the observed ambient air. This artificially intensified heat can cause students discomfort, dehydration and heat stress.

Turf chemicals may also become more volatile, and therefore more toxic, in periods of higher temperatures. Crumb rubber is loose and often sticks to the skin which is why showering is recommended after playing on such surfaces. Crumb rubber that sticks to shoes and clothing constitutes a potentially irritating contactant which can precipitate skin reactions in chemically sensitive people. The volatiles that off gas from synthetic playing surface installations are asthma triggers that can cause respiratory distress. Crumb rubber often contains zinc, sulfur, benzothiazole, black carbon and oils that contain polycyclic aromatic hydrocarbons.

In May 2017, The Children's Environmental Health Center of the Icahn School of Medicine at Mount Sinai urged a moratorium on the use synthetic turf generated from recycled rubber tires based upon the presence of known toxic substances in tire rubber and the lack of comprehensive safety studies.¹

In response to concerns with crumb rubber, synthetic turf manufacturers have begun to design and market new infill materials, each with their own potential health concerns. From those scientific studies that have been completed, it has been demonstrated that:

- Infill may contain dozens of chemicals, including those that are carcinogenic.
- Synthetic turf fields are maintained with additional toxins: chemical disinfectants, flame-retardants and antimicrobials.
- As the fields heat up, the chemicals in the fields volatilize, creating a greater risk exposure for players.

Massachusetts Toxics Use Reduction Institute (TURI) has developed preliminary alternatives assessment for sports turf. Below is a summary of information from TURI regarding infills and potential health risks:

Synthetic turf infill materials: Overview

	Material	Comments
Synthetic	Recycled tires	Principal material is generally styrene butadiene rubber (SBR). May be referred to as “crumb rubber,” “tire crumb” or “SBR”
	Ethylene propylene diene terpolymer	Also referred to as ethylene propylene terpolymer, ethylene propylene diene monomer (EPDM), or ethylene propylene elastomer
	Waste athletic shoe materials	Proprietary material; may contain a variety of polymers
	Thermoplastic elastomer (TPE)	Broad category; can refer to a variety of materials
Mineral or plant-based	Sand Cork Coconut hulls	May be used in combination with one another or with other materials
Combinations	Acrylic-coated sand	A variety of other combinations may be available, as well

Reprinted with permission: Massachusetts Toxics Use Reduction Institute, UMASS LOWELL

Other infill terms commonly referred to include virgin rubber (examples include EPDM and TPE) and cryogenic rubber (ground-up recycled tires are cryogenically frozen then shattered into small, smooth-edged particles.)

Environment and Human Health Inc. (EHHI) provides the following reasons that synthetic turf poses a health risk:

- Many synthetic turf fields are made of plastic grass infilled with 40,000 shredded waste tires known as “crumb rubber,” which contains 92 chemicals, of which 11 are carcinogenic.
- As the fields get used, the crumb rubber breaks down and creates a dust that contains carcinogenic chemicals that are easily inhaled.
- Synthetic turf fields are maintained with additional toxins including chemical disinfectants, flame-retardants and antimicrobials.
- Synthetic turf fields get very hot in the summer and pose a heat stress danger.
- The fields are a danger for concussions unless they continually add infill.
- Both the EPA and the Consumer Product Safety Commission (CPSC) no longer support safety claims for synthetic turf fields or playground rubber mulch.
- European studies from Sweden, Italy and Spain all concur synthetic fields are dangerous.

Scientific studies continue to research the safety and efficacy of synthetic turf fields. In November 2015, the EPA called for more comprehensive efforts to identify potential exposures to tire crumbs and better assess risks. In 2016, the EPA, Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry (ATSDR), and the Consumer Product Safety Commission (CPSC) launched a multi-agency [Federal Research Action Plan on Recycled Tire Crumb Used on Playing Fields and Playgrounds](#) to study key environmental and human health questions associated with synthetic fields.² The final report that considers technical and public feedback is projected to be released mid-fall 2018.

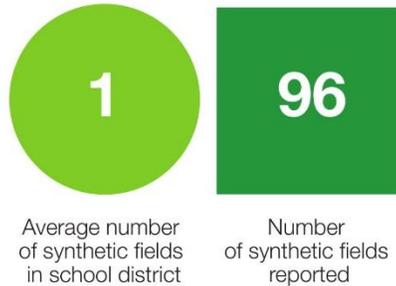
The California Office of Environmental Health Hazard Assessment (OEHHA) has conducted laboratory studies on synthetic fields, including “Environmental Health Study of Synthetic Turf - August 2016 Update.” A brief summary of this study follows:

“Under a recently modified four-year contract with the California Department of Resources Recycling and Recovery (CalRecycle), OEHHA is conducting a study of the potential health effects associated with the chemicals that can be released from synthetic turf and playground mats containing recycled waste tires. The study will be completed by mid-2019.”⁴ OEHHA found 46 studies in the scientific literature that measured the release of chemicals by recycled tires in laboratory settings; and in field studies where recycled tires were used in civil engineering applications, 49 chemicals were identified.

Some states, like Connecticut, are attempting to phase out the use of crumb rubber in the use of schools and municipal playgrounds.⁵ Other cities, including Gaithersburg, Md., and

Silverdale, Wash., have already phased out synthetic fields by using plant-based materials in place of crumb rubber.⁶ Voters in Concord, Mass., approved a three-year moratorium on synthetic turf at Concord Public Schools—except one high school.⁷ The New York City Department of Parks and Recreation stopped installing fields with crumb rubber in 2008,⁸ and the Los Angeles Unified School District followed suit in 2009 with a temporary ban.

Survey Results:
Synthetic Playing Surfaces



Right-to-Know Highlights: Synthetic Playing Surfaces

- Where artificial playing surfaces were noted, it was often a high school playing field.
- One school district chose to pay extra to install virgin rubber.
- One school district chose to pay extra to install a cryogenic rubber fill field instead of crumb rubber.

Call to Action

- Consider the potential health impacts primarily when contemplating which type of playing surface to purchase. Consult with Healthy Schools PA to learn more about safer, non-toxic options available.
- Coaching staff, athletic trainers and key personnel responsible for those using synthetic fields need to know skin cuts and abrasions from turf fields are susceptible to infection. Be sure to clean, monitor and bandage any “turf burns.” Have students shower and wash thoroughly after playing on a synthetic turf field.
- Carefully monitor the ambient temperature and the surface temperature of synthetic turf fields to protect players from heat injury.
- If considering a synthetic turf field, practice the precautionary principle which states: “When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.” More research is needed to determine whether synthetic turfs are safe playing surfaces. Until that research is concluded, opt for a natural grass field.

Literature Cited

- ¹ Mount Sinai Children’s Environmental Health Center. Artificial Turf: A Health Based Consumer Guide <https://static1.squarespace.com/static/57fe8750d482e926d718f65a/t/593b15421e5b6c414467a03b/1497044293003/CEHC+Position+Statement+on+Recycled+Rubber+Turf+Surfaces+2017-5-10.pdf>. Accessed June 5, 2018.
- ^{2,3} U.S. EPA. Federal research action plan on recycled tire crumb used on playing fields. <https://www.epa.gov/chemical-research/federal-research-action-plan-recycled-tire-crumb-used-playing-fields>. Accessed June 5, 2018.
- ⁴ California’s Office of Environmental Health Hazard Assessment. Environmental health study of synthetic turf – August 2016 Update. <https://oehha.ca.gov/risk-assessment/fact-sheet-environmental-health-study-synthetic-turf> Accessed June 5, 2018.
- ⁵ Connecticut House Democrats. [Urban Praises OK Of Crumb Rubber Ban](http://www.housedems.ct.gov/urban/article/urban-praises-ok-crumb-rubber-ban) <http://www.housedems.ct.gov/urban/article/urban-praises-ok-crumb-rubber-ban>. Accessed June 5, 2018.
- ⁶ The Town Courier, Gaithersburg. Nov. 6, 2014. City Hits Home Run with Organic Infill Synthetic Turf. <http://towncourier.com/city-hits-home-run-with-organic-infill-synthetic-turf/>. Accessed June 5, 2018.
- ⁷ USA Today. June 10, 2009. Two cities spurn crumb rubber in artificial turf. http://usatoday30.usatoday.com/sports/2009-06-10-artificial-turf_N.htm. Accessed June 5, 2018.
- ⁸ LA School Report. Jan. 6, 2015. Bill looks to ban ‘crumb rubber’ turf discontinued by LAUSD. <http://laschoolreport.com/bill-looks-ban-crumb-rubber-turf-discontinued-laUSD/>. Accessed June 5, 2018.



CONSTRUCTION & RENOVATION

In 2014, the National Center for Education Statistics (NCES) surveyed a sample of school districts and estimated that the average age of the nation's main school buildings was 55 years old, putting the average date of construction for our nation's schools at 1959. Additionally, nearly one-fourth of the nation's schools have one or more buildings in need of extensive repair or replacement and nearly half have reported problems related to indoor air quality (IAQ).

The Brutalist architecture style of most school buildings features a lot of exposed concrete and small windows. Together, these features limit natural airflow and sunlight. Traditional learning spaces within older schools are characterized by static seating arrangements and artificial elements. All of this equates to an environment that is not conducive to students' development, growth or overall satisfaction with the educational experience.

According to data obtained by the Right-to-Know, the average age of school buildings in southwestern Pennsylvania is 66 years and approximately 79 percent of districts have conducted some renovation in their buildings.

Historically, programs are available at the state level to assist with funding school construction and renovation projects. The Pennsylvania Department of Education states the following: "When a school district undertakes a major school construction project and seeks reimbursement from the Commonwealth, a process known as PlanCon is initiated. PlanCon, an acronym for Planning and Construction Workbook, is a set of forms and procedures used to apply for Commonwealth reimbursement."

Additional funding is provided for:

- Projects constructed and based on an approved school facility design published on the Department's School Design Clearinghouse which is currently under development.
- Projects where the general construction contract alters or adds to an existing building.
- School buildings receiving a silver, gold or platinum certification from the U.S. Green Building Council's Leadership in Energy and Environmental Design Green Building Rating System (LEED-NC™) certification or two, three or four Green Globes™ certification on or after January 1, 2005."²

Federal funds for education were allocated for school improvement programs in FY 2000, 2005 and 2009. In 2000, schools were able to access an increase that was double the amount of federal funding from previous years for school improvements. In 2005, this amount almost tripled, giving schools another opportunity to invest in their school buildings. The largest federal funding increase was seen in 2009 when schools were given more than three times the previous amount of funding to improve their schools.³ The

corresponding renovation projects in the RTK requests reflected these escalating funding cycles, meaning schools took advantage of financial resources when available to make building improvements.

Due to the average age of schools, there is reasonable concern over the type of building materials routinely used, such as asbestos, lead paint and PCBs, in older buildings. Asbestos is a fibrous mineral that is toxic and a known carcinogen. It was widely used in construction materials such as roofing and siding shingles, pipe and boiler insulation, and floor and ceiling tiles. Intact, undisturbed asbestos-containing materials (ACM) generally do not pose a health risk. ACM becomes a serious health problem if they deteriorate or are disturbed, as in during renovations when asbestos fibers can infiltrate the air and be subsequently inhaled by building occupants. School personnel must be familiar with the Asbestos Hazard Emergency Response Act (AHERA).

The EPA notes that “when selecting materials for interior surfaces and finishes for a high-performance school, designers look for cost-effective, durable and materials-efficient products that provide the desired performance and aesthetic qualities, while protecting indoor air quality and health.”⁴ Selection criteria depends on the task the material is intended to perform.

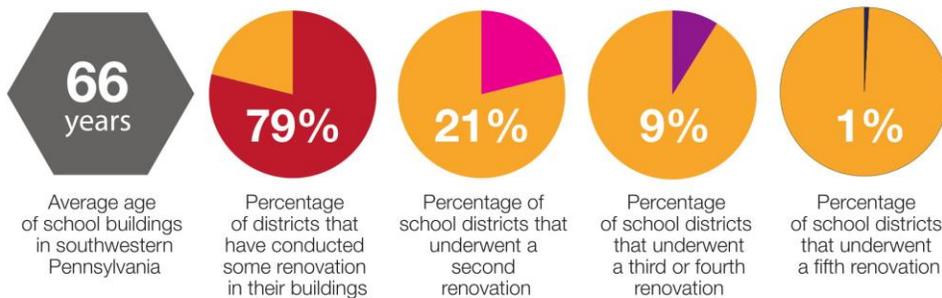
Health-related materials selection supports the goals of superior indoor air quality. Important sources of potential IAQ contaminants include interior building materials and finishes such as carpet, carpet padding, paints, sealants and caulking, adhesives, floor and ceiling tiles, molding, composite wood products, pliable stair treads and wood work.⁶ Cabinets, office and classroom furniture, storage systems and equipment can also contain contaminants that can off gas harmful health irritants.

Building products typically exhibit the highest rates of off-gassing when they are newly installed or refurbished. As building materials and other objects age, they usually off gas much less until they are eventually considered benign. This phenomenon is referred to as the contaminant “decay curve.” It varies with each material and is why using non-toxic, hypoallergenic cleaning products and practices is important, as cleaning products are reintroduced regularly and there is no corresponding aging phenomenon.

The selection process should consider installation and maintenance requirements, as well as how the material or furnishing performs during its service life. Many benign finishes must be installed using adhesive, sealants or coatings that off-gas.

Survey Results:

Construction & Renovation



Right-to-Know Highlights: Construction & Renovation

- In one district, before any remodeling or renovation, the Indoor Air Quality Manager meets with the contractor to implement a work plan designed to minimize entry of air contaminants to other areas of the building during the work utilizing a four-page, detailed checklist.
- Some school buildings constructed in 1952 have reportedly never been renovated.
- Asbestos materials were found in everything from floor tiles and lab benches to table tops, ceiling tile, plaster wall board, insulation, wall and ceiling plaster, and spotlight wiring. In some places where asbestos was found, it was determined that the potential for fiber release was low since the sites were inaccessible; and thus, removal was not recommended.
- Some school districts showed documentation of their three-year re-inspection process regarding asbestos inspections. Asbestos was evaluated for friability, along with updates on asbestos removal and condition of asbestos-containing tile.
- Asbestos in window caulking was removed at one high school.

Call to Action

- Below are the Strategies and Processes for Materials Selection during construction and renovation projects, as recommended by EPA:
 - **Consider biophilic architecture when designing new school buildings.** This innovative way of designing projects incorporates the natural environment into the building design, providing a healthy and more productive place to learn.
 - **Prioritize sensitive program areas.** Identify and prioritize spaces where material selection issues are of particular concern based on intended occupancy, such as the nurses' office and special education classrooms. Prioritization should include critical uses, such as carpet in Pre-K spaces where young children nap on floor mats.
 - **Use product consensus standards when possible.** Select products based on available consensus standards developed by government agencies,

- environmental certification services, or trade organizations that address health/toxicity issues relating to specific material types.
- **Develop specification criteria.** Facility planners should provide specification criteria for appropriate materials and installation methods. Incorporate specifications into design and construction documents.
 - **Obtain Material Safety Data Sheets (MSDS) and/or manufacturer certifications.** For materials that are deemed critical to the project and for which standards or other references do not exist, obtain and review MSDS and/or manufacturers' certifications or test data. Contact manufacturers for clarification as needed. Review by experienced indoor air quality professionals may be justified for particularly critical materials or sensitive spaces.
 - **Require field approval for product substitutions.** Review and approve contractor requests for product substitutions to ensure the indoor air quality criteria defined in the specifications have not been compromised. Require MSDSs and other certifications for any product substitutions affecting critical items.⁵
- In addition, during renovations, there are ways to prevent exposure to pollutants to occupied areas. A good source is the guidelines provided by the Sheet Metal & Air Conditioning Contractors Association.
 - In addition, utilize the EPA's Techniques for Protecting Occupants from Renovation Pollutants:
 - **Testing:** Before performing any demolition, check for asbestos and lead-based paints.
 - **Timing:** When possible, perform work at times when occupants are not in the building, such as vacation breaks, weekends or evenings.
 - **Distance:** Keep building occupants as far from renovation activities as possible. The greater the distance between pollutants and occupants, the less concentrated the pollutants will be upon reaching the occupants.
 - **Barriers:** Install temporary barriers, e.g., plastic sheeting, to seal the work areas from the occupied areas. Cover all supply and return air grilles if the HVAC system in the renovation area also serves occupied areas so that the air ducts will not spread pollutants to occupied area. Exhaust air from the construction area so that pollutants cannot flow from the construction area to the occupied areas.
 - **Containment:** When possible, keep pollutants confined to as small an area as reasonably possible and do not allow them to spread to larger areas. Examples include wet sanding and vacuum sanding drywall to prevent the spread of dust, misting asbestos with water to prevent it from easily becoming airborne during demolition, and keeping containers of chemicals such as solvents, adhesives, paints and other coatings closed as much as possible. Do not operate the heating/cooling equipment when work is causing dust to be visible in the air.

- **Cleanup:** At least daily, construction debris, dust and scraps should be adequately cleaned up so that there is less chance that these pollutants will enter occupied areas.

Literature Cited

^{1,2} Pennsylvania Department of Education. School Construction and Facilities (PlanCon). Reimbursable Projects.

<http://www.education.pa.gov/Teachers%20-%20Administrators/School%20Construction%20and%20Facilities/Pages/Reimbursable-Projects.aspx>. Accessed June 5, 2018.

³ National Center for Education Statistics. Digest of Education Statistics. Federal on-budget funds for education, by level/educational purpose, agency, and program: Selected fiscal years, 1970-2012. https://nces.ed.gov/programs/digest/d12/tables/dt12_421.asp. Accessed June 5, 2018.

^{4,5} U.S. EPA. Controlling Pollutants and Sources: Indoor Air Quality Design Tools for Schools. <https://www.epa.gov/iag-schools/controlling-pollutants-and-sources-indoor-air-quality-design-tools-schools>. Accessed August 3, 2018.

⁶ U.S. EPA. Controlling Pollutants and Sources: Indoor Air Quality Design Tools for Schools. <https://www.epa.gov/iag-schools/controlling-pollutants-and-sources-indoor-air-quality-design-tools-schools#MaterialsSelection>. Accessed August 3, 2018.

Call to Action

Just as the Pennsylvania Auditor General added safety components to school district audits in 2006, it makes sense that the environmental health of the public school buildings where 1.7 million children are enrolled is also routinely evaluated and reported upon. Here are practical steps that individuals and communities are encouraged to take in an effort to create healthier schools for our children:

- Engage with Women for a Healthy Environment’s Healthy Schools PA Program and find incremental steps that can be taken to improve a school district’s environmental health.
- Urge federal and state elected officials and agency leaders to prioritize funding for schools that invest in infrastructure and advances environmental health strategies.
- Advocate at the Pennsylvania state government level for lead testing and more stringent requirements for schools, recognizing lead testing in drinking water became required in July 2018. In addition, insist on regulations requiring radon testing in all schools, as well as the use of third-party certified cleaning products.
- Participate in the “1,000 Hours a Year” program by applying for mini-grants (up to \$7,500) to test for lead and radon.

Together, we can help the region’s children thrive and learn to their fullest potential in a healthy, toxic-free learning.