School Environmental Health
An Investment in Our Future

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Alaska School Health & Wellness Institute
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SCHOOL ENVIRONMENTAL HEALTH
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OUTLINE

1. Perceptions of school environmental health (SEH) in Alaska
2. Environmental hazards in the school
3. Influence of environmental hazards on health and school performance
4. Educational resources and actionable steps to promote healthy school environments
STATEWIDE SEH SURVEY

145 responses

39 Alaskan communities

71 schools (24 in Anchorage)

18 professions

 Responses collected November 2016-December 2016
 Sent through school listservs and to school personnel by email
How important do you believe EH to be in the overall well-being of staff and students?

- 98% of respondents think EH is very or somewhat important

How concerned are you with the EH condition of the school(s) you work in or occasionally frequent?

- 65% of respondents are very or somewhat concerned about EH in their schools
The top 5 environmental health problems identified involved **air quality**
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“There are old moldy carpets with bulges that are easily tripped on.”

“Our school can go from freezing cold to sweltering hot in the course of one school day. These temperature fluctuations can be uncomfortable for not only staff, but also our students.”

“Some areas of our building are enclosed with no windows to the outside.”

“Cars idling near air intake for school.”
THE BIG PICTURE
NEXT EXIT
SCHOOL ENVIRONMENTAL HEALTH MATTERS

Exposure to environmental hazards in schools

Adverse health outcomes

Discomfort and/or distraction

Reduced attendance

Decreased performance and/or achievement
Exposure to environmental hazards in schools

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ENVIROMENTAL AGENTS

- Allergens
- Chemicals
- Temperature
- Humidity
- Heavy metals
- Noise/lighting
- Infectious disease
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- Temperature
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- Noise
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Indoor Air Quality (IAQ)
ALLERGENS

Examples:
- Dust mites
- Animal hair and dander
- Molds, mildew, fungi, spores
- Pollen
- Cockroaches
- Rodents
- Perfume

What to know:
- 1 in 5 adults and children have allergies
- At least 90% of children and 50% of adults with asthma have allergies that aggravate their asthma
AIR CONTAMINANTS

Examples:

- Indoor air contaminants
  - VOC: Benzene, Toluene, Xylene, Formaldehyde, etc.
    - Vehicle emissions, cleaning agents, pesticides, etc.
  - Gases: CO, radon, etc.
    - Inefficient combustion
  - Particulate matter
    - Road dust, idling vehicles, etc.

What to know:

- 30-60% of outdoor pollutants can infiltrate into the indoor environment
- Indoor air levels of pollutants can be 2-5 times (and even more than 100 times) higher than outdoor levels
AIR CONTAMINANTS: RADON

2nd leading cause of lung cancer worldwide
**TEMPERATURE AND HUMIDITY**

- Improper regulation of temperature and humidity can result in:
  - Discomfort
  - Growth of mold and fungi
  - Increased infectivity of bacteria and viruses
  - Physical hazards (i.e. warping of hardwood floors)
SCHOOLS MATTER

- Children spend 20% of their time at school with 80-85% spent indoors.
- Children are more susceptible to environmental pollutants than adults.
- Schools can be the site of exposure for many environmental hazards:
  - 53% of schools in the U.S. need repairs, renovation, or modernization to bring buildings into good condition.
  - 69% of schools in Alaska have at least one inadequate building feature and 80% have at least one unsatisfactory environmental factor.
Freezing and thawing cycles lead to leaks and mold
Temperature inversions increase harm of idling vehicles
Rodents enter buildings to escape the cold
Decreased ventilation during cold winter months
Inefficient wood burning
High rates of pollen in spring/fall can effect indoor air quality and exacerbate allergies
Exposure to environmental hazards in schools

Adverse health outcomes

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HEALTH OUTCOMES (1)

- Increased sick building syndrome symptoms (e.g., irritation of eyes, nose, and throat, headache, fatigue)
  - Non-specific and often remain unnoticed
- Increased respiratory illness and morbidity (including common colds and influenza)
- Exacerbation of allergic diseases (hay fever, asthma, eczema, etc.)
- Discomfort (e.g., too hot, too cold, bad odors)
- Some chemicals and gasses have been shown to cause cancer (e.g., formaldehyde and radon)
### HEALTH OUTCOMES (2)

- Improper humidity ranges can cause a variety of problems

<table>
<thead>
<tr>
<th>Control School Humidity Levels to Limit:</th>
<th>Recommend Space Humidity Range (Relative Humidity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory Infections</td>
<td>10% 20% 30% 40% 50% 60% 70% 80% 90%</td>
</tr>
<tr>
<td>Mold and Fungi Problems</td>
<td></td>
</tr>
<tr>
<td>Infectivity of Bacteria and Viruses</td>
<td></td>
</tr>
<tr>
<td>Formaldehyde Off-gassing</td>
<td></td>
</tr>
<tr>
<td>Asthma and Allergic Reactions</td>
<td></td>
</tr>
<tr>
<td>Comfort Complains</td>
<td></td>
</tr>
<tr>
<td>Perceived Air Quality Complaints</td>
<td></td>
</tr>
<tr>
<td>Book Damage in Libraries</td>
<td></td>
</tr>
<tr>
<td>Warping of Hardwood Floors (Gymnasium)</td>
<td></td>
</tr>
<tr>
<td><strong>ASHRAE Recommend Range</strong></td>
<td><strong>30% - 60% Relative Humidity</strong></td>
</tr>
</tbody>
</table>
HEALTH OUTCOMES (3)

Health Gains from Improved Indoor Air Quality

- **Increased Outside Air**
  - Flu: 87%
  - Sick Building Syndrome: 67%
  - Respiratory: 46%

- **Individual Control/Task Air**
  - 23.5% Headache
  - 20.0% Respiratory

- **Moisture Control**
  - 73%

- **Pollutant Source Controls**
  - 85%
  - Asthma: 62%
  - Colds: 15.0% Colds
  - Asthma: 13.5% Asthma, Bronchial

**Flu**
- Driscoll et al. 1996
- Jakobs & Mathieu 1975
- Braud et al. 1988
- Fisk & Rosenfeld 1997
- Bourbeau et al. 1997
- Salsberg 1996
- Fisk & Rosenfeld 1997

**Sick Building Syndrome**
- Kaczmarek et al. 2002
- Morgan 1997
- Car-GARE et al. 2005
- Husband et al. 2002
- Beilig et al. 1996
- Asthma Garrett 1996
- Wang 1998
- Whitley et al. 1997
- Jakobs et al. 1974
- Olofsson et al. 1980

**Respiratory**
- 35.0% SBS
- 33.6% SBS
- 33.0% SBS

**Asthma**
- 47.0% SBS

**Colds**
- 23.6% Asthma, Maximal

**SOURCE:**
Carnegie Mellon University Center for Building Performance, 2005
Exposure to environmental hazards → Adverse health outcomes → Reduced attendance

Adverse health outcomes → Discomfort and/or distraction

Discomfort and/or distraction → Decreased performance and/or achievement
Poor IAQ is correlated with increased rates of student absence (by 10-20%)

Decreased ventilation is associated with sick building syndrome, which leads to increased short term absence

Absenteeism related to asthma
- Most common chronic disease among U.S. children
- Leading cause of school absences among children aged 5-17
- Children with asthma are absent 2.21 more days than children without asthma
- Accounts for >10 million missed school days per year
EXPOSURE TO ENVIRONMENTAL HAZARDS

- Adverse health outcomes
  - Discomfort and/or distraction
  - Reduced attendance
  - Decreased performance and/or achievement
PERFORMANCE OUTCOMES (1)

Temperature

Indoor air pollution/Ventilation

https://iaqscience.lbl.gov/vent-summary
Impact of greening schools

- Estimated 25% reduction in asthma incidence
- Greater teacher retention
- Reduced teacher and student absenteeism
- Lower operations and maintenance costs
A PRACTICAL APPROACH TO HEALTHY SCHOOLS

Exposure to environmental hazards → Adverse health outcomes → Discomfort and/or distraction → Reduced attendance → Decreased performance and/or achievement

Solutions and mitigating actions
A PRACTICAL APPROACH TO HEALTHY SCHOOLS

Solutions and mitigating actions

Exposure to environmental hazards

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A PRACTICAL APPROACH TO HEALTHY SCHOOLS

Prevention is better AND cheaper than cure!

1. Assess
   - Walkthrough

2. Identify
   - What could cause disease or injury?

3. Control
   - Solve or mitigate problems

USE AVAILABLE TOOLS!!
1. ASSESS

- Checklists available for personnel:
  - Teachers
  - Administrative staff
  - School nurses

- Checklists available for school functions:
  - Building maintenance
  - Food service
  - Renovations

https://www.epa.gov/iaq-schools/indoor-air-quality-tools-schools-action-kit
# ALASKA CHECKLIST

- Collaboration between EPA and ANTHC

## Environmental Assessment Checklist for Healthy Schools
Alaska Edition

This checklist was created to be a tool for schools and communities to:

- Assess the health of school environments
- Identify areas for improvement
- Find and access resources for addressing issues that may exist.

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**Healthy School Environments** ➔ **Healthy Children and Staff** ➔ **Successful Students**

## AMBIENT (OUTDOOR) AIR QUALITY

**Quick Overview**
- The short- and long-term health of students and staff is affected by outdoor air quality, linked to health issues like headaches, dizziness, nausea, allergy attacks, asthma, heart, and respiratory problems.
- Emissions from activities at the school may impact those living and working nearby in the community.
- Most air pollution is evidenced by smoke, dust, and/or odors.
- Some air pollution is odorless and invisible (e.g., carbon monoxide).

Outdoor pollution is often the source of poor indoor air quality.
- Exhaust can enter the school building through air intakes, doors, and windows and expose students and staff to harmful pollutants.
- Construction or repair activities can produce dust and debris.
- Dust and other pollutants can be inhaled outside or carried indoors on shoes or through ventilation systems.
- Heat and energy-producing equipment often emits air pollution.

The following questions will help you to identify and address possible outdoor air concerns.

<table>
<thead>
<tr>
<th>Assessment Question</th>
<th>Mark X if Follow-Up Needed</th>
<th>Notes, Expanded Answer</th>
<th>Possible Action(s)</th>
</tr>
</thead>
</table>
| 1. Are there any **smoke stacks** on roofs of school or nearby buildings from which smoke or emissions can be regularly seen? | [ ]                         |                        | - Track where those emissions typically travel and if they appear to be impacting the school or nearby residences.  
- Investigate with the school officials whether there may be some corrective action that should be taken.  
- Inspect outdoor areas regularly to check for new or changing emissions. |
| 2. Do any **vehicles regularly idle** near the school entrance or the intake for the ventilation system? | [ ]                         |                        | - Develop a strategy to reduce the idling (e.g., limit to no more than five minutes) or relocate waiting areas to a location where school air quality will not be impacted.  
  - A "No Idling" sign and other outreach can help implement this policy. |
## 1. ASSESS

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<td>2. Do any vehicles regularly idle near the school entrance or the intake for the</td>
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<tr>
<td>ventilation system?</td>
<td></td>
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<tr>
<td>2. Do any <strong>vehicles regularly idle</strong> near the school entrance or the intake for the ventilation system?</td>
<td></td>
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</tr>
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</table>
2. **Identify**

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</tr>
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<tr>
<td>2. Do any <em>vehicles regularly idle</em> near the school entrance or the intake for the ventilation system?</td>
<td>X</td>
<td>Drop-off/pick-up is located next to air intake vent. Parents wait with idling cars for children.</td>
</tr>
</tbody>
</table>
2. CONTROL

- Develop a strategy to reduce the idling (e.g. limit to no more than five minutes) or relocate waiting areas to a location where school air quality will not be impacted.
  - A “No Idling” sign and other outreach can help implement this policy.
Air Quality

▪ Assess
  ▪ Have there been air quality complaints in the past several months?
    ▪ If yes, describe (were the issues resolved and, if so, how?)

▪ Control
  ▪ Create a tracking log for air quality complaints
  ▪ Document air quality complaints to track changes over time and to ensure all issues are resolved
OTHER EXAMPLES

Cleaning Products

▪ Assess
  ▪ Does your classroom use the least hazardous cleaning products?
  ▪ Are they environmentally friendly?

▪ Control
  ▪ Check for products that meet EPA’s Safer Choice standard:
    • Neutral pH levels and no known carcinogens
    • Low or no fragrance
    • Low or no volatile organic compounds
    • Energy and water savings benefits
    • Biodegradability and less packaging
## Search Products that Meet the Safer Choice Standard

Looking for safer cleaning and other products? Use the search box below to find products that meet the Safer Choice Standard.

### Search Products

- **Product or Company Name (Optional):**
  - Business
  - Window/Glass Cleaners

- **Show only:**
  - Fragrance-free products
  - Products with outdoor uses

### Products List

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Company</th>
<th>Sector</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eco Green Cleaner Glass and Hard Surface Cleaner</td>
<td>A&amp;C Green Cleaner, LLC</td>
<td>Business</td>
<td>Window/Glass Cleaners</td>
</tr>
<tr>
<td>Earth Force Ltd Kleer View Glass Cleaner</td>
<td>ABC Compounding Co., Inc.</td>
<td>Business</td>
<td>Window/Glass Cleaners</td>
</tr>
<tr>
<td>Earth Force Ltd Kleer View Glass Cleaner Concentrate</td>
<td>ABC Compounding Co., Inc.</td>
<td>Business</td>
<td>Window/Glass Cleaners</td>
</tr>
<tr>
<td>LYNX LXL-1 Glass and Multi-Surface Cleaner</td>
<td>ABC Compounding Co., Inc.</td>
<td>Business</td>
<td>Window/Glass Cleaners</td>
</tr>
<tr>
<td>The Force 001 Glass/Multi-Surface Cleaner</td>
<td>ABC Compounding Co., Inc.</td>
<td>Business</td>
<td>Window/Glass Cleaners</td>
</tr>
<tr>
<td>Chemically Green Glass &amp; Window Cleaner</td>
<td>Alan Chemical</td>
<td>Business</td>
<td>Window/Glass Cleaners</td>
</tr>
<tr>
<td>EnviroStar Green Glass &amp; Surface Cleaner 331</td>
<td>Amano Pioneer Eclipse Corporation</td>
<td>Business</td>
<td>Window/Glass Cleaners</td>
</tr>
<tr>
<td>Focus GC 55 Glass &amp; Window Cleaner</td>
<td>American Cleaning Solutions</td>
<td>Business</td>
<td>Window/Glass Cleaners</td>
</tr>
<tr>
<td>Focus GC 55 RTU Glass &amp; Window Cleaner</td>
<td>American Cleaning Solutions</td>
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[https://www.epa.gov/saferchoice/products](https://www.epa.gov/saferchoice/products)
EPA TOOLS FOR SCHOOLS APP

App Home Screen

Checklists

List of EH Factors

Ex: Ventilation

Action Kit Resources
EPA TOOLS FOR SCHOOLS APP

Send Responses

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For more information, visit: http://www.epa.gov/iaq/schools/teachers.html

6a. Located unit ventilator, yes

6b. Located air supply and return vents, yes

6c. Air is flowing from supply vents, no, “Inspect HVAC systems regularly. Clean air supply diffusers, return registers and outside air intakes. Keep unit ventilators clear of books, papers and other items.”

6d. Air supply pathway is not obstructed, no, “Inspect HVAC systems regularly. Clean air supply diffusers, return registers and outside air intakes. Keep unit ventilators clear of books, papers and other items.”

6e. No vehicle exhaust, kitchen/food, and chemical odors in the classroom, yes

6f. No signs of mold or mildew, yes

6g. Windows operate properly, no, “Provide outdoor air ventilation according to ASHRAE Standards or local code”
SCHOOL-BASED ASTHMA MANAGEMENT PROGRAM (SAMPRO)

- Developed to improve health-related outcomes for children with asthma
- School-based partnerships
- Includes:
  - Asthma Action Plan
  - Asthma Education Plan
  - Environmental Asthma Plan
WHY THESE TOOLS

- Voluntary initiative
- Flexible
- Easy-to-use
- Target common problems
- Common sense solutions
- No/low cost projects
- Holistic approach involving a team
Environmental factors have an impact on health and performance at school

Find EH problems before they occur

Use available Tool Kits and Assessment Material
  - To know what to look for
  - To (hopefully) implement easy, affordable solutions
  - EPA, SAMPRO, other school districts…etc.
Promoting school environmental health
Promoting school environmental health

Better health
Promoting school environmental health

Better health

Better performance
Promoting school environmental health

Better health

Better performance

Good education and healthier adults
Promoting school environmental health

Better health

Better performance

Good education and healthier adults

An Investment in our Future
Resources:

- EPA Tools For Schools: https://www.epa.gov/iaq-schools
- SAMPRO: https://www.aaaai.org/conditions-and-treatments/school-tools/SAMPRO

Thank you!

Questions?

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