Making the Connection
Environment, Health, Performance

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Disclaimer

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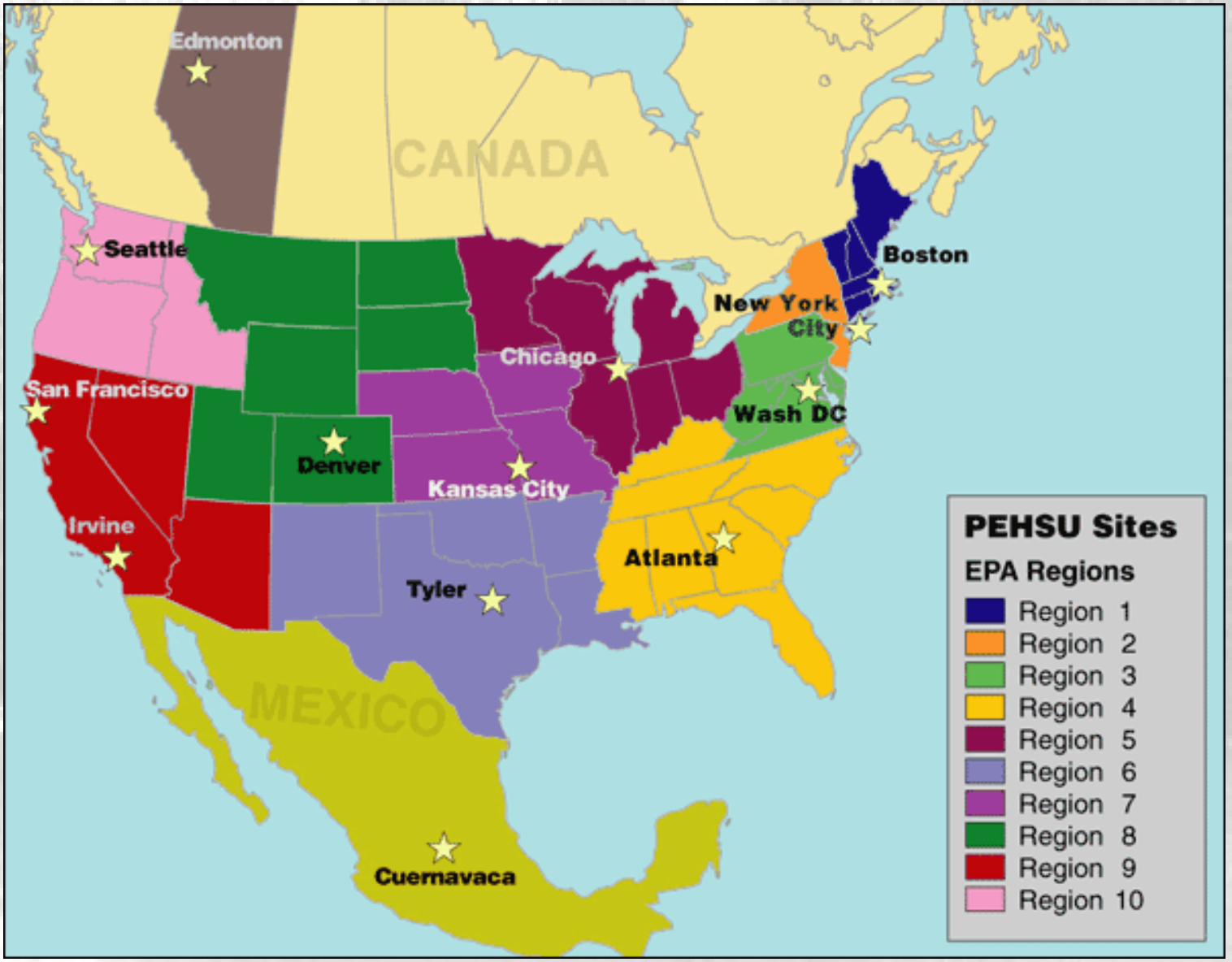
Pediatric Environmental Health Specialty Units



Southwest Center for Pediatric Environmental Health (SWCPEH)

- Supported by EPA and ATSDR through a cooperative agreement with AOEC
- Covers EPA Region 6 (AR, LA, OK, NM, TX)
- Provides education and telephone consults to agencies, the public, health professionals
- Provides rapid response fact sheets on timely topics.

Recent hot topic

PEHSU Pediatric Environmental Health Specialty Units

INFORMATION ON ARSENIC IN FOOD

Recent reports have described arsenic levels in a variety of foods including: (1) rice products such as brown or white rice, rice cakes, and rice milk, (2) foods sweetened with organic brown rice syrup such as cereal and energy bars, and (3) non-rice products such as apple juice. This document can help you understand what is known about this issue.

What is arsenic?

Arsenic is a naturally occurring element, found widely in the environment. It is present in some types of rock and soil. It is used in a number of industrial processes. It is found in measurable amounts in most seafood and in many grains and vegetables.

What types of arsenic exist?

Arsenic-containing compounds can be classified into two groups: “organic” and “inorganic”. Organic arsenic compounds are usually produced by an animal that has metabolized the inorganic arsenic into a less toxic form and vary in toxicity. The organic arsenic compounds found in seafood are thought to be nontoxic.

Where is arsenic often found?

Arsenic may be found in drinking water, especially water from wells that draw from groundwater flowing through bedrock containing arsenic. US municipal water supplies should meet the EPA guideline for inorganic arsenic of less than 10 ppb (10 micrograms per kg of water, which is equal to 0.010 milligram per liter of water).

Why schools?

- Children spend 30-50 hrs per week in and around school facilities, on the bus, after school events, etc
- Majority of school time is indoors
  - Average age of schools: 42 years
  - Maintenance often neglected for cost reasons

Special susceptibilities

- Young children with developing immune systems
- Asthmatics and asthma triggers in school
- Students/faculty with allergies
  - Cat dander, dusts, odor masking chemicals, fragrances
- Older faculty and staff with declining immune and respiratory systems

What exposures are possible?

- Biological agents
  - Molds, dust mites, infectious agents
- Chemicals -cleaners, paints, glues, copiers, toilets, pesticides. lead
- Unique areas - labs, cafeterias, rest rooms, shops, arts and crafts
- Asbestos - Ceilings, pipe insulation in older schools

Other agents

- Radon
  - 19% of schools exceed EPA action level
  - Testing not required
- Art supplies
  - Labels required to disclose heavy metals, solvents, etc.
- Noise
  - Levels above 60 dBA can interfere with cognitive learning

Where do pollutants come from?

- Occupant-generated
  - Hygiene related
- Activity-generated
  - Classroom, labs, cafeteria, other rooms, HVAC
- Infiltration from outdoor air
  - Carbon monoxide from idling school buses
  - Traffic or area pollutant sources

Some examples

Table 30.2
Poor Indoor Air Quality

Signs of poor IAQ

Common Signs and Symptoms

- Headache
- Fatigue
- Shortness of breath
- Nasal congestion
- Cough and sneezing
- Eye, nose, throat, and skin irritation
- Nausea and syncope
- Nosebleeds

Clues Suggesting Indoor Air Quality Problems

- There is a stuffy or musty odor when entering the building or room in the morning.
- Symptoms are widespread in a class or within the school.
- Symptoms disappear or diminish with sufficient time out of the school building (weekends).
- Onset is sudden after some change at the school (painting, remodeling, pesticide use).
- Affected persons have symptoms indoors but not outdoors.

School environments: Its not just IAQ

- Building design
  - Lighting – natural lighting shown to produce better learning environment
  - Noise control – a quiet place free from loud HVAC noise, traffic, hall, adjacent classrooms
  - Openness and floor plan
- Building maintenance
  - HVAV, cleaning materials, water leaks

Formula for success

Good learning environment

LEED certified green buildings + control of common sources of poor IAQ + good maintenance = better attendance + increased student performance + better student health + reduced costs of operation.

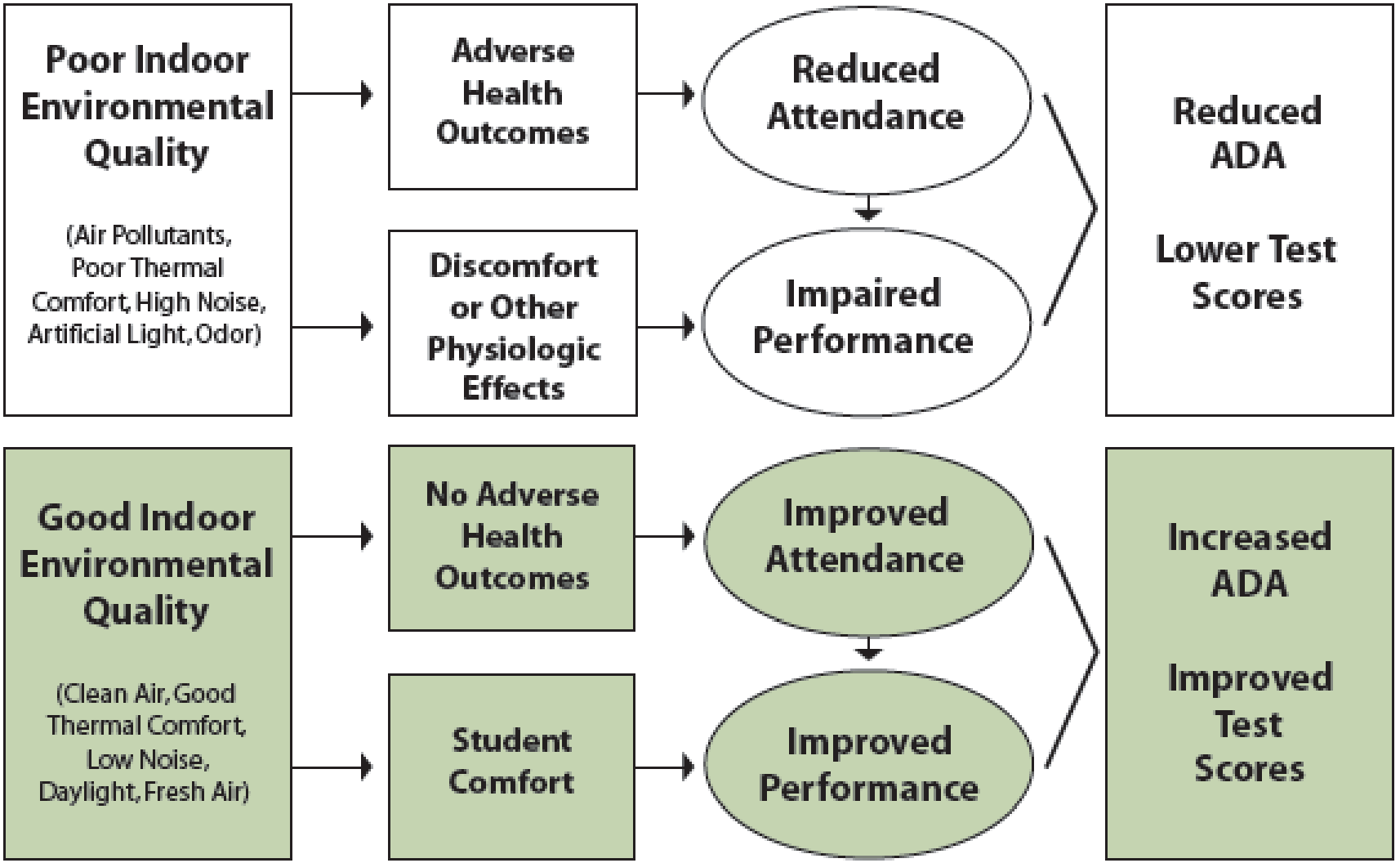
What Is Green Building?

What is a green building?

This is not a green building

Source: US Green Building Council LEED program

Why are green schools healthier?



Global Green USA Green Schools Report (globalgreen.org)

Do green schools improve health and performance?

- LEED shows documented savings in costs
- EPA: improvements in performance and health
  - http://www.epa.gov/iaq/schools/student_performance/evidence.html
- Improvement in student performance and health in the National Academy report
  - http://www.nap.edu/openbook.php?record_id=11756&page=1

Green is not enough
What else is needed?

- Additional steps are needed to improve health and student performance
  - Control IAQ using Tools for Schools
  - Control temperature/humidity to minimize mold growth
  - Control noise
  - Maintain cleanliness to reduce indoor allergens

Reality check

- Old schools in poor repair
  - Deferred maintenance
- Declining school attendance
- Declining student performance
- Reduced funding

Money issues

- Low cost improvements

  - EPA Tools for Schools Program
    - Routine maintenance of leaks
    - Increased air flow into classrooms
    - Improved cleaning to reduce allergens

Resources and evidence

- EPA High Performance Schools Program
  - http://www.epa.gov/iaq/schooldesign/highperformance.html
- Collaborative of High Performing Schools (CHPS)
  - http://www.chps.net/dev/Drupal/node
- EPA: Improvements in performance and health
  - http://www.epa.gov/iaq/schools/student_performance/evidence.html
- Green Schools: Attributes for health and learning, NAS
  - http://www.nap.edu/openbook.php?record_id=11756&page=1

Case study
Carbon monoxide in school

- Headaches reported in students and faculty at about 2:30 pm
- Many students referred to the ER
  - Carboxyhemoglobin in blood elevated indicating exposure to carbon monoxide
- School closed while investigation of source conducted.
  - Loss of funding for average daily attendance

Case continued

- Where did carbon monoxide come from?
  - HVAC system? Not likely at specific time
  - Culprit: Air intakes for school located near traffic circle where busses and parents pick up kids after school
- Short term solution: prohibit idling of buses and vehicles in the traffic circle.
- Long term solution: Move air intake or traffic circle

Seek help from your local PEHSU

- PEHSU.net (www.pehsu.net)
  - Educational programs for schools and school nurses
  - Telephone consultation for parents, school administrators, teachers, state and federal agencies
  - Fact sheets and presentations from PEHSU.net
  - SWCPEH –Region VI (www.swcpeh.org)