Getting Schooled on Indoor Air Quality

2024 ANNUAL CONFERENCE

#iasboAC24

INVEST IN YOURSELF IGNITE OTHERS

Introductions

Ellen Hanson (Moderator)
- *Business Development Leader, DLR Group*

Ben Hettel (Speaker)
- *Executive Director of Operations, Troy CCSD 30-C*

Calvin Cornish, CEM (Speaker)
- *Senior Account Executive, Johnson Controls*

Good Indoor Air Quality

Good IAQ contributes to a favorable environment for students, performance of teachers and staff, and a sense of comfort, health and well-being. These elements combine to assist a school in its core mission — educating children.

The EPA's guidance on the definition of good indoor air quality (IAQ) management includes:

- Introduction and distribution of adequate outdoor air
- Maintenance of acceptable temperature and relative humidity.
- **Control of airborne pollutants**

https://www.epa.gov/iaq-schools

Children are not small adults.

They have developing lungs with narrower airways and breathe larger volumes of air relative to their body size.[1]

In poorly ventilated spaces:

- A student's "power of attention" is equivalent to how a student might feel after skipping a meal[2]
- Students experience greater fatigue, impaired attention span, and poor performance on tests of concentration[3,4]

Good news! As IAQ improves, students' academic performance improves[5,6,7,8]

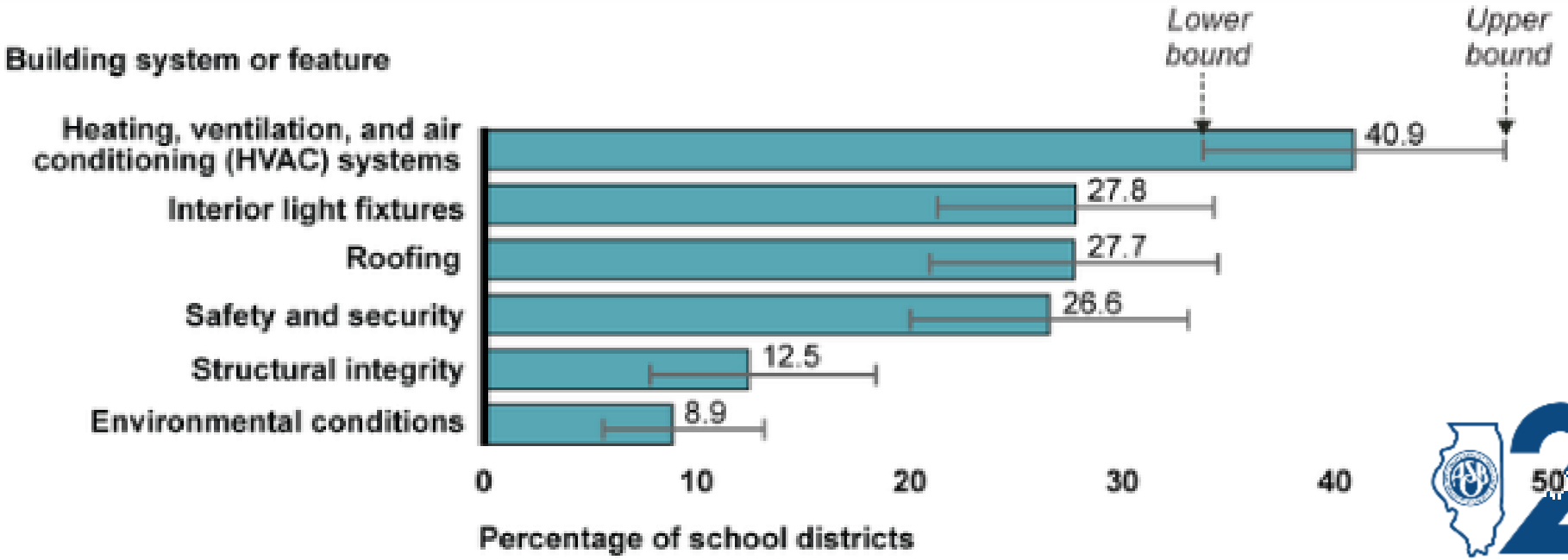
In fact, students in classrooms that received portable mechanical ventilation systems interventions were found to perform faster and more accurately on computerized tasks[9]

↑15% Word Recognition ↑ 8% Picture Memory ↑2% Choice Reaction

1 Annesi-Maesano et al., 2013; Schwartz, 2011 2 Coley et al, 2007 3 Chatzidilakou et al., 2012 4 Dorizas et al, 2015a
5 Basch, 2011 6. Centers for Disease Control and Prevention, 2009a 7 La Salle & Sanetti, 2016 8 Michael et al., 2015 9 Bako-Biro et all, 2011

Conveying the importance of IAQ

A 2020 GAO study found that over half of America's school districts require major upgrades to their school buildings. The **most common out-of-date features were schools' HVAC systems**, which **41 percent of districts** reported as needing an upgrade.



Source: GAO analysis of school district survey data. | GAO-20-494

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Conveying the importance of IAQ

Nearly 1 in 13 children

Asthma, which is the leading cause of school absenteeism due to chronic illness.

- Reduced teacher absenteeism and substitute teacher costs
- Reduction in illness-related absences by students

Increased school funding based on increased average daily attendance (ADA)

Teachers have a higher prevalence of asthma compared with other non-industrial occupational groups[1]

https://www.epa.gov/iaq-schools

Conveying the importance of IAQ

- Reduced liability from mold and other contaminant-based health issues

For custodians, ingredients in common cleaning products may exacerbate asthma and rhinitis[3]

- Improved student learning and achievement on test scores

Improvement from portable Ventilation systems

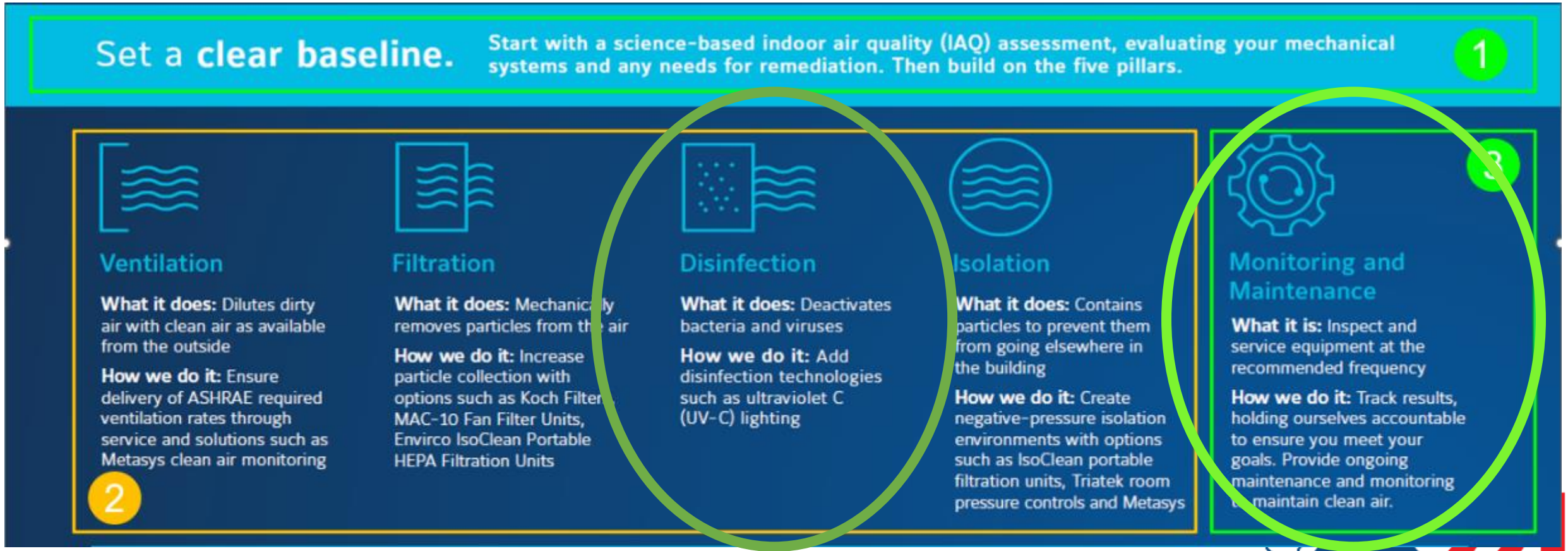
↑ 15% Word Recognition

↑ 8% Picture Memory

↑ 2% Choice Reaction

https://www.epa.gov/iaq-schools

5 Pillars of an Indoor Air Quality Strategy

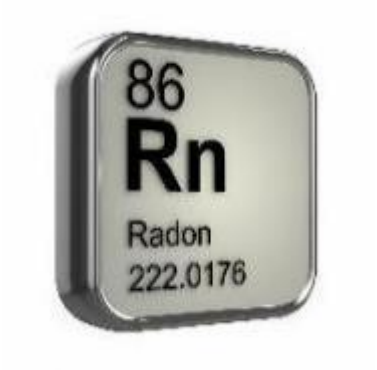


Methods of Maintenance

Controlling Airborne Pollutants

Methods of Maintenance

What Contributes to Poor IAQ in Schools?



Methods of Maintenance

What products have VOC'S?

Pesticides

Cleaners & Disinfectants

Adhesives

Air Fresheners

Paints & Coatings

Methods of Maintenance

Electrochemically-Activated Solutions

ECAs (ē-kaz)

Water + Salt + Electricity

"…the electrolysis of ordinary tap water containing dissolved sodium chloride (salt) produces a solution of hypochlorous acid and sodium hydroxide.

The resulting water is a known cleaner and disinfectant/sanitizer."

Methods of Maintenance

Electrochemically-Activated Solutions

Traditional Cleaning Products	Electrochemically Activated Systems (E.C.A.S)
• Contains Volatile Organic Compounds (VOC's) • Contains, Fragrances, Dyes, additives • Requires PPE to handle • Can be hazardous when mixing chemicals • Tough on people. Tough on Germs • Respiratory irritants and allergens • Migraine and asthma triggers	• Free from VOC's, Fragrances, dyes, and additives • Requires no PPE to handle • No hazardous dilution or mixing of any kind • Gentle on people, Tough on Germs

Methods of Maintenance

ECAs in Action

- How
  - Cleaner
  - Disinfectant
- Why
  - NO PPE
- Considerations

Methods of Maintenance

ECAs in Action

Electrostatic Misters

Pros & Cons

Real Life Application

Methods of Maintenance

Needlepoint Bipolar Ionization

When bipolar ionization is deployed in a space, the positive and negative ions seek out and bond with particles in the air.

The larger a cluster of particles becomes, the easier your system can filter it out of the air.

Methods of Maintenance

Needlepoint Bipolar Ionization

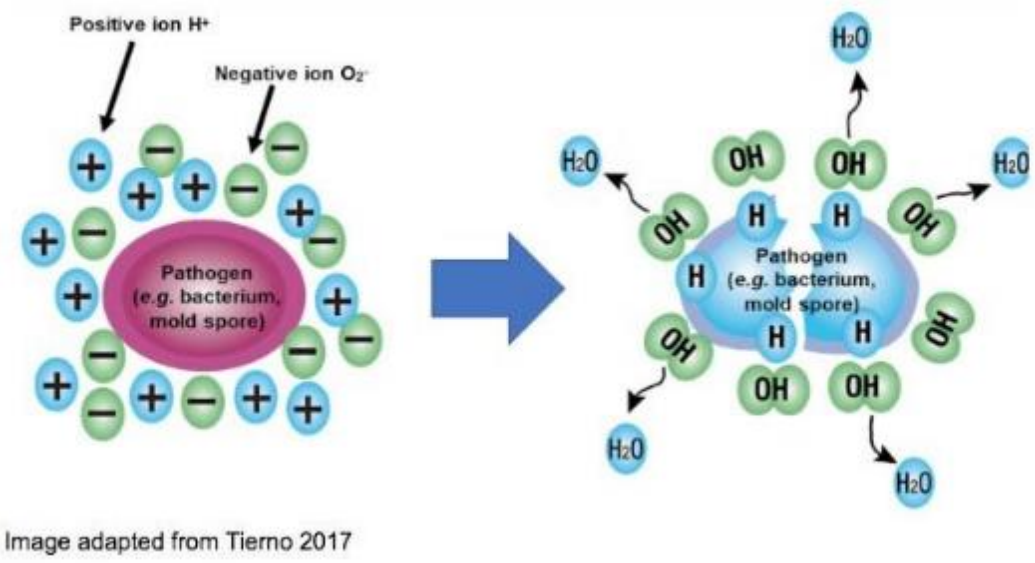


Image adapted from Tierno 2017

As the positive and negative ions surround air particles that include pathogens the ions pull hydrogen away from the pathogen.

This kills pathogens such as viruses, bacteria, and mold spores

Methods of Maintenance

Needlepoint Bipolar Ionization

- Reduces airborne particles
- Neautralize odor causing compounds and VOCs
- Helps kill pathogens – Viruses, mold spores, and bacteria
- Potential to save energy by reducing outside air intake

Methods of Maintenance

Real Life Experiences

Monitoring & Testing

An independent assessment of the IAQ, ventilation and infection control systems:

- **Enhances** safety and financial decision making
- **Prevents** misdirected efforts and wasted spending
- Enables short-term and long-term facility improvement measure **prioritization**
- Generates an independent, science-based, **defensible** assessment **reducing your liability** as a facility manager

Monitoring & Testing

- Reach out to an Environmental Consultant
  - Periodic testing
  - Response to complaints or concerns

- Build the value of needed repairs and maintenance that are often under appreciated
  - Superintendent
  - Board Members

Monitoring & Testing

IAQ Measurements

- Ion levels
- Carbon dioxide (CO2)
- Temperature
- Humidity
- Particulate matter (PM2.5 & PM10)
- Total VOCs (TVOC)

Monitoring & Testing

The Future of Indoor Air Quality

- Active monitoring of space occupancy and IAQ
- Analytics to drive energy savings opportunities within space usage
- Smarter cost-effective cleaning of spaces
- Real-time monitoring of air quality improve occupant experience

Effective IAQ Management

School officials (including superintendents, principals, chief operating officers (COOs), and chief financial officers (CFOs)) play a key role in an indoor air quality (IAQ) program's direction and success.

- Get approval of a district wide IAQ program
- Document an IAQ Maintenance Plan
- Designate an IAQ Coordinator for the district
- Establish communication procedures & schedules (bottom up)
- Planning for Emergencies

https://www.epa.gov/iaq-schools/operations-and-maintenance-part-indoor-air-quality-design-tools-schools

Effective IAQ Management

IAQ Policty Statement

Demonstrate commitment by the school administration to address and prevent issues that may impact the health and comfort of staff and students, as well as the environmental quality in the school.

General issues that may require policies include, but are not limited to:

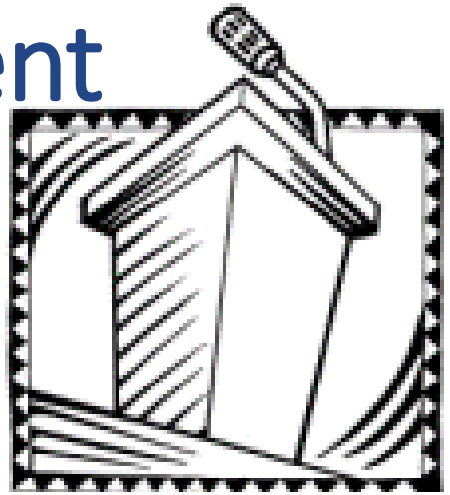
- Painting
- Smoking
- Renovations and repairs
- Pest management
- Ventilation system operation
- School supply and purchasing
- Food or pets in the classroom
- Disinfectants
- Vehicle idling
- and maintenance schedules

Effective IAQ Management

IAQ Maintenance Plan

1. **Educate the staff** on the value of maintenance and IAQ to help educate their students
2. Establish a **budget** for maintenance
3. Describe and **document how to hire** qualified staff or contractors to perform tasks
4. Develop **a preventative maintenanc**e plan (including schedules for periodic maintenance checks);
5. Use a work order system to track work orders, maintenance performed, and costs
6. Ensure availability of recommended spare parts in the warehouse
7. **Provide training** to the maintenance staff.

Effective IAQ Management



Instructions

1. Read the *IAQ Backgrounder* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of the checklist for future reference.
3. Complete the Checklist.
   - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
   - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

School Official's Checklist

Name: _____

School: _____

Room or Area: _____ Date Completed: _____

Signature: _____

https://www.epa.gov/sites/default/files/2014-11/documents/schoolofficialchklst.pdf

1. ROLE AS A LIAISON

	Yes	No	N/A
1a. Obtained approval for IAQ program from the school board and continuously [illegible]	❑	❑	❑
1b. Arranged proper funding for IAQ program through the school CFO and, if necessary, the school board	❑	❑	❑
1c. Collaborated with unions to establish processes to address various situations	❑	❑	❑
1d. Communicated IAQ program's progress to parents, community, and media	❑	❑	❑
1e. Introduced IAQ Coordinator to staff, fully endorsing his or her leadership	❑	❑	❑

2. VERBAL AND WRITTEN SUPPORT

2a. Ensured that top level management provided written support for the *IAQ TfS* Program	❑	❑	❑
2b. Wrote a letter to notify EPA that the school is participating in the *IAQ TfS* Program (qualifying the school for a Great Start Award)	❑	❑	❑
2c. Participated in EPA's mentoring program (i.e., obtained advice from schools and districts with effective IAQ programs and, after implementation, provided advice to other schools and districts initiating an IAQ program)	❑	❑	❑
2d. Applied for EPA's Leadership and Excellence Awards (after implementing the IAQ program)	❑	❑	❑

3. IAQ MANAGEMENT PLAN

3a. Authorized (or obtained authorization for) the development of a district-wide IAQ management plan	❑	❑	❑
3b. Coordinated the implementation of the district-wide IAQ management plan and monitored progress	❑	❑	❑
3c. Ensured that IAQ policies and upgrades in each school are developed and conducted consistently	❑	❑	❑
3d. Developed management plans for integrated pest management, radon, and other relevant issues	❑	❑	❑

4. EMERGENCY RESPONSE

4a. Developed an emergency plan for IAQ crises	❑	❑	❑
4b. Identified a contact person(s) to communicate IAQ issues to the media	❑	❑	❑
4c. Notified school staff and other officials of emergency procedures and the identity and responsibilities of the contact person(s)	❑	❑	❑

Links to EPA Resources

- School Official's Checklist
- IAQ Coordinator's Guide
- Finance Resources for IAQ Projects
- A Guide to Implemneting an IAQ Program
- References and Resources
- OnDemand Training Webinars

Questions and Answers

We thank you for your time!

Presenters:

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