Asthma Management in Schools

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Director, Environmental Health
North East Independent School District

Summarize NEISD’s six key driver framework and its best practice strategies for achieving healthy environments as a means to improve the quality of life for the district’s environmentally sensitive population.

Describe the importance of maintaining a healthy environment for all students as it relates to school funding and productivity of student’s capacity to learn.

Evaluate the district’s four component approach and best practices used for Asthma Management / IAQ and the measured outcomes achieved.

Action Planning Guide

As you listen to this presentation, use the chart in your Action Planning Guide to write down any key strategies to install the Six Technical Solutions in your district.

NEISD Four Components of Control: Implemented

- Medication & Tools
- Awareness
- Environment
- Education

Stakeholders: students, parents, staff, community

Impact on School Districts

- attendance
- performance

Awareness

- prevalence
- expectations

Communicate

- Environmental relationship to health / performance

North East Independent School District

School District Impact

- Quality of Life Surveys
- Parent/Staff Expectations
- data, data, data feedback

Administrative Cost Ratio

District Profile 2010-2011

- School District Impact
- Quality of Life Surveys
- Parent/Staff Expectations
- Data, data, data feedback

- Environmental relationship to health / performance

- website

- website

- Environmental relationship to health / performance
Asthma is...  

- **Environment**: Dust mites, cat dander, cockroach, mold, environment pulls the trigger.  
- **Genetics**: Our genes may load the gun, but the environment pulls the trigger. — Ellen Silbergeld, Ph.D.

Control of Asthma defined as:
- No absences from school
- No interruptions of class time due to symptoms
- No use of inhaler more than 2 times per week
- No coughing during the night
- Participation in all physical activities
- No emergency or urgent care visits

Web-based Asthma survey located on NEISD Parent Portal

Worth repeating......  
Asthmatics defined as:
- Normal activity level
- Ability to engage in desired activities
- No school days missed
- Reliever inhaler use less than twice per week
- Night-time cough less than twice per month
- Normal (or "near normal") pulmonary function

No Emergency Room / Urgent Care visits
No Hospitalizations

3. In the past 30 days, how often did your child use asthma medication (Albuterol) that was prescribed or given to you by your doctor for treatment of his/her asthma symptoms? 

- Never - 0%
- 1-2 times per month - 24.0%
- 1-2 times per week - 24.0%
- 56.3%
- 7.7%  

4. In the past 12 months, how many times has your child's sleep been interrupted by wheezing or coughing? 

- Never - 0%
- 1-2 times per month - 24.0%
- 1-2 times per week - 24.0%
- 56.3%
- 7.7%
5. Has your child had coughing, wheezing, or shortness of breath with exercise or activity and had to stop because of these symptoms in the past 12 months?

| Diagnosed | yes | 76.6% | no  | 21.2% |

6. In the past 12 months, how many times did your child visit an emergency room or urgent care center because of his/her asthma?

<table>
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<th></th>
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<th>1-3 times</th>
<th>4-6 times</th>
<th>6-9 times</th>
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<td>75%</td>
<td>20%</td>
<td>4%</td>
<td>1%</td>
<td>0%</td>
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<tr>
<td>Roosevelt</td>
<td>54%</td>
<td>37%</td>
<td>5%</td>
<td>2%</td>
<td>1%</td>
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</table>

Whom does your child see for his/her asthma?

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<thead>
<tr>
<th>Diagnosed</th>
<th>family doctor</th>
<th>pediatrician</th>
<th>allergist</th>
<th>pulmonologist</th>
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<td>17.8%</td>
<td>47.6%</td>
<td>22.6%</td>
<td>11.4%</td>
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<tr>
<td>Roosevelt</td>
<td>35.8%</td>
<td>51.2%</td>
<td>2.4%</td>
<td>5.7%</td>
</tr>
</tbody>
</table>

Control of Asthma defined as

- No absences from school
- No interruptions of class due to symptoms
- No use of inhaler more than 2 times per week
- No coughing during the night
- Participation in all physical activities
- No emergency or urgent care visits

National Asthma Education Prevention Program

Communicate – Goals and Expectations

Parent Welcome Packet:
- Establish asthma control expectations
- Environmental connection
- Website

Clinic visit encounter: Asthma Control Test
- Used when frequent PRN usage for symptoms
- Communicate with physician
- www.asthmacontrol.com
Over 120 EMS calls for asthmatics during school hours due to student not having medication on campus.

80 of those were (67%) transported via EMS to Emergency Department.

Nebulizer Protocol

2006-2007 Need Assessment

60 of those were (67%) transported via EMS to Emergency Department.

Continuity of Care

Inhaler usage & Asthma protocol

Activity level & ACT

Attendance & performance

Physician and Parent communication

Maintenance & performance

Nebulizer Protocol

THIS ASSESSMENT APPLIES ONLY TO STUDENTS WHO HAVE A CURRENT DIAGNOSIS OF ASTHMA, AND/OR ARE UNDER THE CARE OF A PHYSICIAN FOR THEIR ASTHMA, AND/OR HAVE CURRENT ORDERS FOR ASTHMA TREATMENT.
Transitional Research

- Evidence of the impact of the environment on asthma incidence and morbidity—especially allergens and irritants has been mounting. Evidence strengthens recommendations that reducing exposure to inhalant indoor allergens can improve asthma control and that a multifaceted approach is required; single steps to reduce exposure are generally ineffective.

- Exposure of patients who have asthma to irritants or allergens to which they are sensitive has been shown to increase symptoms and precipitate exacerbations.

Tiny particles float in our indoor environment. Our nose normally traps the particles you see here. It's the particles you don't see that are the problem. If you were to look what is in these particles microscopically, you would find... ALLERGENS - dust, dust mites, mold spores, rodent dander/droppings, pet dander, cockroach-by-products, and even the pollens from outside can enter into the home environment.

IRRITANTS - volatile organic compounds (VOC) and other ultra fine particles.

INFECTION MICROBES (germs, viruses, bacteria).

What factors affect the classroom indoor environment and learning conditions

Causes for poor indoor environmental quality

Infections + Invisible particles + Irritants = Inflammation process

Environmental Awareness

- Aerosols Levels in the classroom
  - Airborne particles have the potential to cause allergic reactions, skin irritation, coughing, sneezing, respiratory difficulties and circulatory system problems.

- Ventilation Practices for the classroom
  - Total volatile organic compounds (TVOC), formaldehyde, and biological contaminants are causes for occupant discomfort and poor health outcomes.

- Cold/Flu Virus Transmission Paths in the classroom
  - Bacterial and viral respiratory tract infections are associated with the majority of asthma exacerbations and illnesses in both children and adults.

Indoor Air Quality at Schools

Concerns that affect attendance and learning

Aerosols Levels in the classroom

ALLERGENS: Airborne dust particles can carry allergens and have the potential to cause allergic reaction, skin irritation, coughing, sneezing and respiratory difficulties

- Pollen
- Mold
- Grass Cutting, seasonal pollination
- Wet carpet, plants, obstructed A/C vents, high relative humidity
- Animals
- In and out of the classroom
- Cockroaches
- Snacks attract pests
- Dust (dust mites)
- Carpet, stuffed animals, pillows, curtains, air vents, chalk, cushions, fluffy stuff

The dust mite

The dust mite
The dust mite is one of the most significant sources of allergens, implicated in allergic asthma, rhinitis, conjunctivitis, and dermatitis. If you are allergic to dust, you are allergic to the feces/carcasses of the dust mite. As many as 10% of the general population and 45-90% of allergic asthmatics are sensitive to dust mites. Many experts suggest that more than 50% of asthma attacks are triggered by the allergenic proteins contained in the fecal matter of dust mites.

The dust mite thrives in the modern environment of fully carpeted, double-glazed, draft-proof homes/schools, and is comfortable at 77 degrees Fahrenheit and 70% relative humidity. The dust mite does not bite or sting. The mite generally lives on shed human/animal skin cells. An average person sheds about 1.5 grams of skin a day (approximately 0.3-0.45 kg per year), which is enough to feed roughly a million dust mites. People become allergic to proteins in mite body parts and mite feces. These fecal pellets are as tiny as some pollen grains and can float easily into the air and get carried into the nose and lungs.

**Measures to control dust mites:**
- Reduce ambient humidity below 60% to inhibit growth
- Cut clutter. If it collects dust, it also collects dust mites. Remove knickknacks, tabletop ornaments, books, magazines, and newspapers.
- Remove carpeting and other dust mite habitats. Carpeting provides a comfortable habitat for dust mites. This is especially true if carpeting is over concrete, which holds moisture easily and provides a humid environment for mites. If possible, replace carpeting with tile, wood, linoleum, or vinyl flooring.
- Consider replacing other dust-collecting furnishings, such as upholstered furniture, nonwashable curtains, and horizontal blinds.
- Vacuuming carpeted areas regularly, preferably with a HEPA filter-equipped vacuum cleaner.
- Regular damp dusting of surfaces.
- Wash sheets, pillows, curtains, stuffed toys, and clothing at least every week over 140°F hot water.

**Outdoor Air Quality (IAQ)**

**Indoor Air Quality at Schools**
**Concerns That Affect Attendance and Learning**

2. **IRRITANTS**
   - Total volatile organic compounds (TVOC): formaldehyde, body odors, and biological contaminants are causes for occupant discomfort and increase inflammation
     - Tobacco Smoke
     - Perfumes
     - Lotions, hair spray, aerosols
     - Ozona/Air Quality Alert Days
     - Exhaust
     - Buses, cars
     - Chemicals
     - Markers, paints, science supplies
     - Strong Odors
       - Air fresheners, off gasing

**Indoor Products: Formaldehyde and VOCs**
- can arise from sources such as new linoleum flooring, synthetic carpeting, particleboard, wall coverings, furniture, and recent painting—have been implicated as potential risk factors for the onset of asthma and wheezing
- Chemicals
- Cleaning Supplies
- Scented Materials
- Occupant Practices
  - National Education Association Health Information Network online survey on adverse health effects of scented products. Results:
    - Perfumes – 75%
    - Lotions – 61%
    - Body sprays: lotions – 58%
    - Air fresheners – 71%
    - Candles – 64%
  - MAKE ASTHMA SYMPTOMS WORSE
Children, Learning and Toxins Don’t MIX

- ALL Children are especially vulnerable to environmental health hazards
  - Body organs are still developing
  - (Inhalation) breathe more air per pound of body weight than adults
  - Aerosols, vapors, fumes, or dusts can be inhaled triggering nasal congestion, shortness of breath, cough, wheezing, watery eyes, headache, dizziness, fatigue, nausea.
  - (Skin contact) residuals can damage skin or be absorbed by skin, rashes, dermatitis
  - (Ingestion) unable to detoxify, hands to mouth, poor handwashing practices, behavior exposes them to more risk and unable to realize risk

Of the thousands of synthetic chemicals in commercial use today, only a small fraction have been tested for toxicity

**Synthetic Organic Chemical Production**

United States, 1945 - 1985

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**Control Pollutants** –

Anything that produces an aerosol or emits an order has the potential to be an irritant

Be mindful of the new product ‘smells’ they produces VOCs that can lead to meeting the symptom threshold. Allow ‘off gassing’ time periods

Maintain moderate temperature and humidity levels and provide adequate ventilation; use low emitting products.

**Indoor Air Quality at Schools**

Concerns That Affect Attendance

3. INFECTIONS Cold/Flu virus transmission
   - Viral respiratory tract infections, particularly of rhinoviruses, are associated with the majority of asthma exacerbations in both children and adults.

- Colds
- Flu
- Poor Hygiene Practices

**Microbial Contamination of Surfaces**

Viruses were found in the greatest numbers on the following surfaces, in order from the highest to the lowest

- Desk tops,
- Faucet handles,
- Classroom doorknobs,
- Computer keyboards/mouse

**Hand Hygiene**

Good hand and surface hygiene can reduce illness and school absenteeism rate among children and adults by 30% to 50%

**Hand Sanitizers**

Alcohol Based Sanitizers
- Potential Fire Hazard
- Possible Poison Agent
- Skin Irritant
- Nervous System Disruptor

Non Alcohol Based Sanitizers
- Smaller Quantity
- Residual Kill
- Fragrance free

Technical Solutions can be impacted by occupant behavior

- Impedes Custodial cleaning practices
- Increases dust collection
- Increases microscopic particle counts
- Reservoirs for pests
- Impedes effective ventilation

Examples of Cluttered Classrooms

Best Practices: Reduced Classroom Clutter and Furnishings

- Walk through Assessments
- Healthy Tips for Classrooms
- Asthma Friendly Campus Award program

Examples of Organized Classrooms

Cleaning a Classroom to Reduce Airborne Particles

Before cleaning

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<tr>
<th>Particle Size, Micrometers</th>
<th>0.1</th>
<th>1</th>
<th>10</th>
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<tbody>
<tr>
<td>Counts Before Cleaning</td>
<td>9271</td>
<td>275</td>
<td>312</td>
</tr>
<tr>
<td>Counts After Cleaning</td>
<td>123</td>
<td>77752</td>
<td>3056</td>
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</tbody>
</table>

Inhaled into lungs NOT filtered by nose

Planning leads to Action

- Carpet Removal
- De-cluttering
- Green Cleaning
- Cleaning Custodial
- Cleaning Efficiency
- HVAC filtration - MERV 8 to MERV 13
- Integrated Pest Management
- EMC Commissioning
- HEPA Filter Vacuums
- Water irrigation trailer
- Drying Equipment
- Earth Retainer Blocks
- Chemical ‘overuse’ Policy
- Occupant Best Practices ‘Tips’
- Environmental Walk Thru / Work Order

Environmental Assessment

Objective:
To ensure a healthy environment for NEISD students, staff, and visitors by providing a healthy environment. By using best known practices in environmental health we will effectively best utilize district funds, staffing, and training processes to achieve healthy environments for all.

Purpose:
To improve the capacity of student / staff attendance and student/staff performance while reducing absenteeism of students/staff and reduce district health care costs
Scope: The Environmental Assessment of Facilities will be performed as follows:

Visual inspection of Technical Solutions (Classroom, Custodial, Chemical, Facility categories)

- Classroom – occupant behavior and education
- Custodial – cleaning standards being met and/or evaluating training processes
- Facility – identifying maintenance issues (easy remedy on-site or generate work order)
- Chemical – identifying chemicals and safety in Science labs

Air summary – pre-identified and random locations. Measurement of ventilation and comfort parameters (HVAC/Moisture)

Symptom driven IAQ work order is generated due to symptoms or concerns of student/staff

Symptom-driven work order air investigations will include an assessment of Technical Solutions.

Observation of conditions in the identified area of concern (Classroom, Custodial, Facility, as above)

Interviews with staff individuals experiencing symptoms (per work order or interview) or campus nurse

Data will be evaluated with correlations to attendance issues, campus clinic health reports, and facility map and distributed to campus administrators when necessary.

Environmental Assessment

Assessment score of each classroom based on predetermined standards by areas:
- 100 – (acceptable) no action required
- 50 – (ok) room for improvement
- 0 – (concern) education/action needed (work order generated)

Occupant clutter, stuffed animals, plants, furry animals, blocking of ERUs etc

Custodial high touch cleanliness, dust practices, infection control measures, etc

Facilities plumbing leaks, HVACs, exhaust fans, grounds, pests, etc

Chemical Storage (NIOSH high school lab standards)

Air Summaries
- Particle counts, CO2 levels, humidity, air flow

Five possible areas – average score for each classroom and overall campus score

Education

- Faculty/Administrator In-services
- End of Year Procedure
- Asthma Friendly Campus Award
- Facilities Maintenance/Support
- Asthma Blow Out!

- Curriculum via CATCH program
- Healthy Lifestyles high school course (graduation requirement)
- Asthma Blow Out!
- Asthma Awareness Week
- Healthy Schools Week

- PTA/Campus hosted events
- Parent letter on environment
- Website
- Bond Program

Asthma Triggers

- perfumes
- cold air
- illnesses
- exercise
- cigarettes
- mold
- pets
- mice
- spiders
- trees
- grass

Custodial/Facilities Trade Training on Environmental Health

Managing Indoor Environmental Quality (IEQ) leads to cleaner and healthier schools.

Podcast available to:
- all district area custodial foreman
- all head custodians
- all campus custodians

Education to Administrators

Same grade level
Same classroom size

Custodial staff unable to clean effectively

Custodial staff can clean room within 15 minutes
Improving the quality of life of the child with asthma involves a multifaceted approach — the child, parents, physician, and schools working together.

- Children of age should take action to help manage their asthma.
- Parents must understand definition of asthma control, recognize the symptoms of asthma, seek proper medical diagnosis and treatment and manage triggers in the home.
- Physicians must be kept informed of student’s level of asthma control to prescribe proper medication regimen.
- Schools should facilitate the provision of asthma education and treatment modalities when appropriate and strive to remove asthma triggers from the environment.

This collaborative approach can facilitate asthma control for the child with asthma.

### Coordinated Approach

**Asthma Blow Out**

- **By Cluster** — elementary and middle schools that feed into High school.
- **Principal participation** — offer campus incentives for attendance.
- **Adult teaching done by Asthma Specialist physicians**
- **Student teaching done by campus nurse and campus physical education teachers**
  - secondary
  - elementary
- **Asthma educators - inhaler technique and medication review**
- **Advertise via district public relations**

1000 – 2000 people in attendance

### Student Sessions

- **Medication**
- **Trigger Avoidance**
- **Living with Asthma & Exercise**

### Feedback from students

- "I know that I have to use my controller medicines, or my asthma can turn into an emergency. Plus, if I use my preventative medications, it prevents me from missing class and having to go to see the nurse."
- "I don’t have asthma, but my brother does. I learned that when he plays football, pollen can rise from the ground and be a problem for him."
- "I learned how to take better care of everyone in my family. I have lots of stuffed animals, and these can become dust bags. The dust isn’t good for my brother, and it isn’t good for anyone else."
- "I’m also going to get rid of aerosol sprays because they can be really dangerous for my brother. I learned that if he gets the aerosol in his lungs, he will need to use his inhaler."
- "I want to get rid of as many triggers as I can so that my brother can breathe easier."

### Asthma Control

**Awareness**
- What is Asthma?
  - Particles, irritants, infections, dust, etc.

**Medication**
- Use of medications
  - Controller
  - Inhaled steroid

**Environment**
- Triggers
  - Allergens, irritants
- Trigger Avoidance
  - Practical strategies to avoid most common triggers.

**Education**
- Living with Asthma
  - Risk factors
  - Both technique
  - Understanding risks
  - Asthma
  - Self-management
  - Asthma’s importance

**Student Entrance**
- Asthmatic vs. non-asthmatic

**Feedback from students**

- "I know that I have to use my controller medicines, or my asthma can turn into an emergency. Plus, if I use my preventative medications, it prevents me from missing class and having to go to see the nurse."
- "I don’t have asthma, but my brother does. I learned that when he plays football, pollen can rise from the ground and be a problem for him."
- "I learned how to take better care of everyone in my family. I have lots of stuffed animals, and these can become dust bags. The dust isn’t good for my brother, and it isn’t good for anyone else."
- "I’m also going to get rid of aerosol sprays because they can be really dangerous for my brother. I learned that if he gets the aerosol in his lungs, he will need to use his inhaler."
- "I want to get rid of as many triggers as I can so that my brother can breathe easier."
I can't tell you how much my daughter (middle school student) and I learned at the Asthma Blow Out last night at Johnson High School. Thank you so much for everything NEISD did to coordinate the event.

Although she has had problems with asthma for years, we have always been reactive in dealing with it. She basically takes allergy medication and uses an inhaler when she needs it.

We both learned so much last night that we never knew about prevention and management. Even with regular checkups we've apparently missed a lot of information. Now I understand there are options for keeping asthma under control and avoiding problems altogether.

All four sessions for adults were helpful (with GREAT handouts), and my daughter even loved the videos and education for students (plus the rock-climbing wall was a big hit).

Parent evaluation of Asthma Blow Out
Results after first year

Comparison of Inhalers/Nebulizers

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<tr>
<td>Aug/Sept</td>
<td>3000</td>
<td>2000</td>
<td>1000</td>
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Nebulizer Trends over past Three Years

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<td>Feb</td>
<td>90</td>
<td>110</td>
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</tr>
<tr>
<td>Mar</td>
<td>80</td>
<td>100</td>
<td>120</td>
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</table>

Green Cleaning Program

- Improved attendance of custodial staff due to less respiratory related illnesses
  - $157,000 savings
  - $470,000 savings
  - $328,000 savings

Closer Look at Campus E’s clinic visits for PRN inhaler usage.

Benefit seen after applying Tips for Healthy Classroom

- Greater than 50% decrease in PRN (for symptoms) inhaler usage in February and an additional 40% decrease in March

Environmental Intervention

- Environmental assessment found:
  - Overuse of air-conditioning in classrooms
  - Outside ventilation not in service

Actions:

- Restoring outside air unit to service
- Installing air filtration system
- Providing education on asthma triggers

Results: Reduction in PRN usage
An Email from a Parent to the Superintendent:

Dr. Middleton,

I am just delighted to see the interest that NEISD has taken in Asthma Awareness. I have a daughter who will be starting Kindergarten next year at Roan Forest Elementary. She has asthma and I have been concerned about the classroom air environment and also whether or not she could be cared for sufficiently while she was in school.

My daughter’s consistent attendance at school is important to her being able to learn. Providing an environment that helps prevent asthma attacks makes consistent attendance more possible.

Thank you for this proactive measure that is so important to the many families who deal with asthmatic children. It is greatly appreciated.

Benefits possible when Asthma / Allergy Control Environmental measures applied:

- Reducing average number of schools days missed due to asthma by 50%... $1,031,808.00
- Improving all asthmatics attendance by only ONE day... $257,952.00

Texas Accountability Ratings

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<tr>
<th>Texas Rating</th>
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<th>2008</th>
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<th>2010</th>
<th>2011***</th>
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NEISD achieved the “Recognized” District Rating for the FOURTH year in a row.

EPA Tools for Schools Award Program

For schools or school districts that have:

- Taken the initial step in effective IAQ management by describing their current actions, commitment toward comprehensive IAQ management program

The IAQ TIS National Leadership Award recognizes schools and schools districts that have committed to providing a healthy and safe environment for students and staff as demonstrated by:

- Senior-level commitment to establish and maintain a sustainable IAQ program.
- Relating your school IAQ strategies to the Framework for Effective School IAQ Programs
EPA IAQ TFS 2004 National Excellence Award is to demonstrate that your program incorporates the Framework for School IAQ Program Success. These programs consistently demonstrate a commitment to student and staff health and wellness and have proven that a proactive IAQ management program can have a positive, lasting impact on the school, the staff and students, and the entire community.

National IAQ TFS 2008 Special Achievement Award are individuals that demonstrate a significant dedication to student and staff health and wellness, and have taken steps to leave a positive, lasting impact on school buildings, staff and students and the entire community.

EPA IAQ TFS 2009 Mentoring Award is for helping other School Districts to develop a School IAQ Program.

- EPA National Symposium Presentations
- Faculty ISD, Green Cleaning, & Asthma in Schools
- National AASA / ASBO Conferences
- Hosting Regional EPA/CEFPI conferences

EPA IAQ TFS 2009 Model of Sustained Excellence Award is for demonstrating that the District has a Sustainable School IAQ Program. Districts must demonstrate how they have sustained their IAQ practices, established IAQ management goals, and tracked short-term and long-term progress on IAQ management.

- EPA Six Key Driver Framework
  - System that gathers relevant data/information
  - Data drives change
  - Performance
  - Attendance
  - Healthier Children Learn Better

You have to….. Communicate, Communicate, Communicate To change a culture
Diane Rhodes
drnode@neisd.net

www.neisd.net/env_health