


Asthma in Schools: The Health Perspective

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Indoor Air Quality (IAQ) 1

The Framework for Effective School IEQ Management: Six Technical Solutions

Quality HVAC


- Inspect HVAC systems regularly
- Establish a maintenance plan
- Change filters regularly and ensure condensate pans are draining
- Provide outdoor air ventilation according to ASHRAE Standard or local code
- Clean air supply diffusers, return registers, and outside air intakes
- Keep unit ventilators clear of books, papers, and other items

Control of Moisture/Mold

- Conduct routine moisture inspections
- Establish mold prevention and remediation plan
- Maintain indoor humidity levels between 30% and 60%
- Address moisture problems promptly
- Dry wet areas within 24-48 hours

Strong Integrated Pest Management (IPM)

- Inspect and monitor for pests
- Establish an IPM plan
- Use spot treatments and baits
- Communicate with occupants prior to pesticide use
- Mark indoor and outdoor areas treated with pesticides



Effective Cleaning & Maintenance


- Conduct routine inspections of school environment
- Develop a preventative maintenance plan
- Train cleaning/maintenance staff on protocols
- Ensure material safety data sheets (MSDS) are available to staff
- Clean and remove dust with damp cloth
- Vacuum using high-efficiency filters

Smart Materials Selection

- Maintain products inventory
- Develop low-emitting products purchasing and use policies
- Use only formaldehyde-free materials
- Use only low-toxicity and low-emitting paint
- Select products based on product rating systems
- Use least toxic cleaners possible (only those approved by the district)

Aggressive Source Control

- Conduct regular building walkthrough inspections
- Test for radon; mitigate if necessary
- Implement a hazardous materials plan (use, label, storage and disposal)
- Establish a school chemical management and inventory plan
- Implement Smoke-Free policies
- Establish an anti-idling school bus policy
- Use walk-off mats at building entrances
- Conduct pollutant-releasing activities when school is unoccupied



Indoor Air Quality (IAQ)

Relevance of Asthma among Children in Georgia


Figure 4. Prevalence of current asthma among children ages 0-17 by age group, Georgia 2006

Age Group	Prevalence (%)
0-4	9
5-11	12
12-17	12

Figure 11. Age-specific asthma ER visit rates by age group, Georgia 2006-2008

Age Group (Years)	ER Visits per 1000 Children
0-4	1347
5-9	1195
10-14	700
15-19	322
20-24	168
25-29	117
30-34	412
35-39	407
40-44	287
45-49	224

Source: Georgia Department of Health, Behavioral Risk Factor Surveillance System




Indoor Air Quality (IAQ) 3

Georgia Asthma Prevalence in Schools

Prevalence of current asthma among middle and high school students by sex, Georgia, 2007 and 2009

School Level	Male (%)	Female (%)
Middle School	11	11
High School	9	12

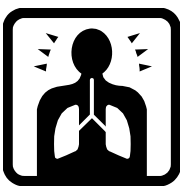
Source: Georgia Youth Risk Behavior Surveillance Survey




Indoor Air Quality (IAQ)

What is Asthma?

- Long-Term or Chronic
- Lung Disease
- Overreaction of the Airways in the Lungs
- Not Curable
- Caused by Triggers
- Can Be Controlled with Proper Care






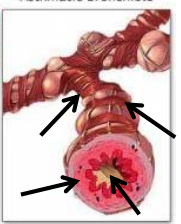
Indoor Air Quality (IAQ) 5

What Happens in the Lungs during an Asthma Episode?


Normal bronchiole



Asthmatic bronchiole



Swelling
Muscle Tightening
Excess Mucus



Indoor Air Quality (IAQ) 6

Triggers

INDOOR:

- ✓ Dust
- ✓ Dust Mites
- ✓ Cockroaches
- ✓ Pests, Rodents
- ✓ Mold
- ✓ Animal Dander

OUTDOOR:

- ✓ Automobile Exhaust
- ✓ Air Pollution
- ✓ High Humidity
- ✓ Cold, Dry Air
- ✓ Pollen
- ✓ Wood Smoke

OTHER TRIGGERS:

- ✓ Strong odors, Ex. air fresheners, perfumes
- ✓ Colds, Viral Pneumonia
- ✓ Chemical Fumes
- ✓ Laughing
- ✓ Crying
- ✓ Food Allergies
- ✓ Tobacco/Secondhand Smoke

Indoor Air Quality (IAQ)

EPA

Common symptoms:

- Wheezing
- Coughing
- Tightness of chest
- Shortness of breath
- Chest pain
- Chest tightness
- Feeling weak/ tired

Emergency symptoms:

- Trouble walking or talking
- Blue or Gray lips and fingernails
- Chest and Neck Retractions

Indoor Air Quality (IAQ)

What to do in an Asthma Emergency?

- Remove the child from any triggers, if known
- Administer Reliever Medication as instructed in the asthma action plan
- Follow the child's Asthma Action Plan
- Do not leave the child alone
- Have the child to sit upright
- Calm the child down
- If asthma signs do not improve immediately call 911 or go to the nearest emergency room

Key Note:
Remember to contact the child's parent or guardian after calling 911.

Indoor Air Quality (IAQ)

EPA

Asthma Action Plan

GREEN ZONE: No cough, wheeze, breathing faster or sucking in of the chest skin.

HIGH YELLOW ZONE: Total asthma sign score 7 or 8. Measure this before giving quick relief medicine.

LOW YELLOW ZONE: Total asthma sign score 5 or 6.

RED ZONE: Total asthma sign score 3 or 4.

Indoor Air Quality (IAQ)

EPA

Types of Medications

Reliever Medication

- Relieve acute asthma symptoms
- Works quickly
- Use during an asthma episode

Controller Medication

- Prevents asthma symptoms
- Long-term control
- Taken Daily

Indoor Air Quality (IAQ)

Reducing Asthma Triggers in the School Environment

Common Asthma Triggers:

- ✓ Animal dander
- ✓ Cockroaches/rodents
- ✓ Mold
- ✓ Secondhand smoke

- ✓ Dust and dust mites
- ✓ Cleaning products
- ✓ Outdoor environment
- ✓ Air fresheners

Indoor Air Quality (IAQ)

EPA

Reducing Asthma Triggers in the School Environment





Mold and Moisture Control:

Fix plumbing and moisture problems to reduce/prevent mold growth.

Avoid installing carpet in areas likely to be exposed to moisture.

Maintain appropriate moisture levels in school.

Report signs of water damage and/or mold Growth immediately.

Indoor Air Quality (IAQ)

EPA





Reducing Asthma Triggers in the School Environment

Perfumes and Cleaning Products:

Do Not use spray deodorizers in the classroom.

Use cleaning supplies when children are not present and use in areas with adequate ventilation.

Consider using "green" cleaning products, which are non-toxic and biodegradable.

Indoor Air Quality (IAQ)

Reducing Asthma Triggers in Childcare Center Environment

Dust and Dust Mites:

Keep classrooms as clean and clutter-free



Dust furniture regularly with a damp cloth and allow sufficient time to dry.

Maintain appropriate ventilation.

Do not block air intake or outlet vents.

Replace drapes with blinds

Replace carpeting with hard floors.

Indoor Air Quality (IAQ)

Reducing Asthma Triggers in the School Environment




Outdoor Triggers:

Check the Air Quality Index before outside play/sports.

Adopt Tobacco-Free Zones on school property and at school events

Schedule lawn maintenance during non-school hours.


Implement No-Bus Idling policies

Indoor Air Quality (IAQ)


How to Support Asthma Friendly Schools

- Tobacco Free Schools
- Implement IEQ Strategies
- School adherence to SB 472- Student Self Administration and Carrying of Asthma Medications
- Implement No Bus Idling policies
- Identify asthmatic students and implement Asthma Action Plans for each of them.
- Routine asthma management training for school staff, teachers, coaches, and facilities personnel.
- Promote awareness of outdoor air quality



Indoor Air Quality (IAQ)

Impact of Asthma in Richmond County Schools in 2006



Indoor Air Quality (IAQ)

Impact of Asthma in Richmond County Schools in 2006

- 4 Children died of asthma between September 2006 and November 2006
 - Only 2 deaths of children from asthma between 1999 and 2003
 - Baseline of 0.5 deaths per year from 1999-2004
- This prompted an investigation from the CDC



Building our Asthma Coalition

Called first meeting December 2006 regarding the recent deaths
6 individuals attended and represented the following groups

- Richmond Co Board of Education
- Medical College of Ga
 - Allergy and Immunology Clinic
 - Respiratory Care Service
 - School of Allied Health, Respiratory Care
- East Central Health Department

Agreed to form a Coalition with goals directly related to the CDC findings

Would invite any and all those in the community that could offer help
Agreed to a Grass Roots organization

Would meet once a month no matter who could come



Results of the CDC Investigation March 2007

- Inconsistent use of inhaled corticosteroids
- Overuse of rescue meds
- Delay in medical treatment
- No definitive environmental links
- Most standard risk factors applied but were varied



CDC Recommendations

- General
 - Asthma alert days notification
 - Media campaign for awareness
 - Formulation of Asthma coalition
- Patient/Guardian Education
 - Asthma triggers
 - Importance of compliance of controller meds
 - Recognizing symptoms of asthma exacerbation
 - Seeking medical attention early
- Healthcare System
 - Referral to specialist for high risk patients
 - Allergy shots in severe allergic asthma
 - Case managers for multiple asthma ER visits or hospitalizations
 - Pharmacy notification to PCP on refill of rescue meds
- School
 - Record of MDI use
 - Communicate use of meds to parents
 - Asthma action plan with a copy at school
 - Protocol for Asthma emergencies
 - Asthma Education program for PE teachers and coaches



Asthma In Our Schools

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Indoor Air Quality (IAQ)

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Indoor Air Quality (IAQ)

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Indoor Air Quality (IAQ)

Clear the Air Project

- \$30,000 grant from the W. G. Raoul Foundation
 - IAQ
 - Asthma Education for students and teachers




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Indoor Air Quality (IAQ)

Primary Partners

To be successful we would need to connect

Heathcare
Home
School




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Indoor Air Quality (IAQ)

Our Mission

Initially was a simple two fold approach

- Community Awareness
 - Wellness events and health fairs
 - Media coverage of poor air quality days
- Education of patients and families
 - Targeted at all access points to healthcare



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Indoor Air Quality (IAQ)

Our membership


- **Anyone with an interest**
- Richmond County School System
- American Lung Association
- University Hospital
- Medical College of Georgia Hospital
- East Central Health District
- Parents
- Medicaid providers
- Pediatricians
- Allergists
- EPA
- MCG Pediatric Asthma Clinic
- Richmond County School Board
- CMS Nurses
- MCG School of Respiratory Therapy



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Immediate Goals

- Educate PE Coaches and school RNs
- Educate teachers/parents/students
- Promote awareness of asthma and the severity
- Assure all have a current Asthma Action Plan
- Communicate air quality thru local media
- Connect schools, parents and healthcare providers
- Employ Asthma Education Health Curriculum for schools
- Increase public's awareness of about asthma and asthma deaths



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Our Accomplishments in 12 months


April 2007 Education for a consistent message
 -American Lung Association Asthma 101
 -3 RTs trained as instructors and 41 trained to educate

May 2007 First organized event 200 children
 -Education based for those with documented asthma

September 2007 Bash Asthma at the Border Bash
 -Awareness event, very no budget!

October 2007 First Grant supported event
 -Provided spacer and peak flowmeter kit to 47 kids


Four highest risk schools visited and trained all personnel



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Indoor Air Quality (IAQ)

2008


- Community Organized Task force with expanded goals and more involvement
- Realized our goal of Asthma 101 to all Richmond Co schools
- Expanded to Columbia County
- 6 Health Fair and awareness events
- ALA Asthma Institute in Augusta with 3 AE-C
- Confidential fax for Asthma action plans to schools



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Indoor Air Quality (IAQ)

2009


- Merck Sponsored Community Symposium for healthcare providers
- Headstart providers educated
- Partnerships with faith based organizations
- Girl Scout Asthma Awareness badge
- CMS nurse partnership
- Expansion to additional 2 county area with education
- 8 additional AE-C
- Asthma Response Team at MCG ED



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Indoor Air Quality (IAQ)

2009

- Richmond and Columbia County protocol for asthma emergencies completed
- Pulse oximeters provided thru the East Central Health Department to schools
- Jet nebulizers in all the schools
- 3 Grant funded events with 500 kits provided
- 6 Health Fairs



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Indoor Air Quality (IAQ)

2010

- 3 funded events with 600 kits provided
- 8 health fair events
- 2 additional AE-C
- Expansion to 2 additional counties
- Research



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Research

- Diesel Exhaust/Bus Idling
- How Asthma Friendly is Your School Survey?
- IAQ Assessments
- Asthma Education for students and teachers
 - Asthma Mini-Camps
 - Peak Performance USA Asthma Education



Clean My R.I.D.E (Reduce Inhalation of Diesel Exhaust)

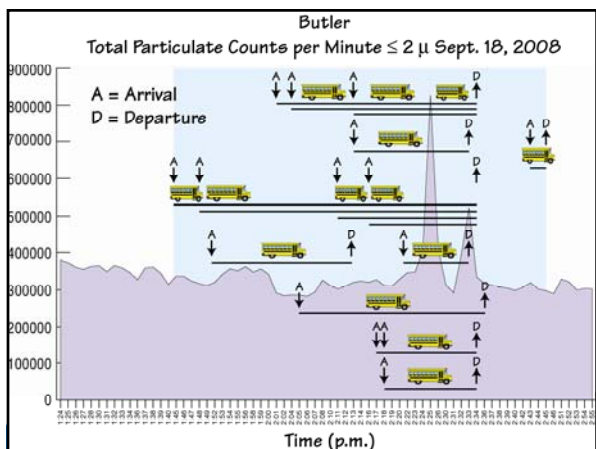
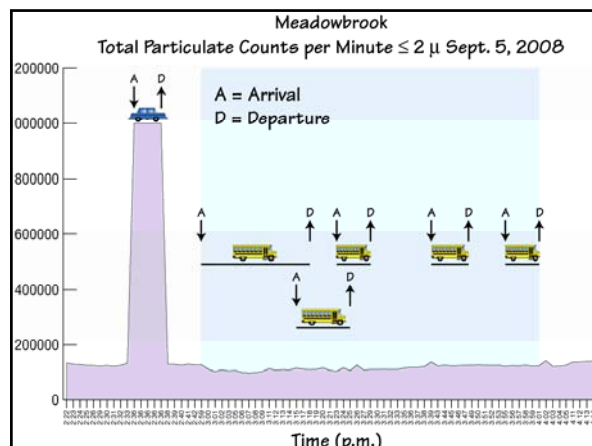
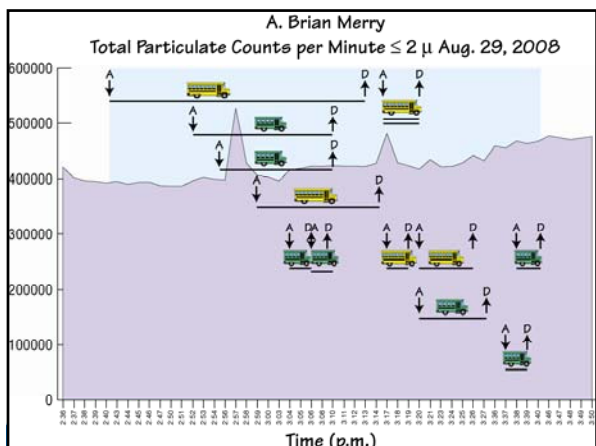
- 22,000 students (66.61%) in the Richmond County school system are transported by bus each day.
- Buses at many of the schools in Richmond County were observed idling.
- Grant from East Central Health District



Clean My R.I.D.E


- We assessed particulate counts (≤ 2 μm) using a Met One 237B Portable Airborne Particle Counter.
- Counts were collected in the bus loading areas at five schools in Richmond County prior to, during, and after school dismissal.
- The counts were taken on three different days for each school during August and September, 2008.






Results

- Baseline counts varied due to weather conditions, wind direction and velocity, and environmental conditions
- Factors that contributed to increase peak counts included: amount of time buses and older model cars idled, number of buses arriving and departing, and the configuration of the bus loading zone.
- One school demonstrated a 153% increase above mean during bus loading.
- In one case an idling car increased the < 2 um particulate count 684% from a mean of 127,390 particulates/minute to 1,000,000 particulates/minute.


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Indoor Air Quality (IAQ)


Outcomes

- The Richmond County Board of Education has a No Bus Idling Policy.
- Policies on when grass can be mowed.


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Indoor Air Quality (IAQ)

Clean Schools, Healthy Kids

- Grant from the East Central Health District
- Assess the status and priorities for implementing asthma management strategies in schools in the ECHD
- Used the National Heart Lung Blood Institute's "How Asthma Friendly is Your School" survey.
- We received permission from 7 out of 13 (53.8%) of the counties. 41 of the 112 (36.6%) schools returned the surveys.


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Indoor Air Quality (IAQ)

Results

	Yes	No	No Response
Is your school free of tobacco smoke at all times?	98%	0%	2%
Does your school have an indoor written Indoor Air Quality (IAQ) Management plan?	14.6%	58.5%	26.9%
Is there a written policy that allows children to take asthma medication at school as prescribed by their doctor and permitted by parents?	92.7%	0%	7.3%
Is there an established asthma education program that includes asthma information, asthma management plans, asthma emergency procedures and asthma medications for each of the following:			
All schools staff?	36.6%	58.6%	4.9%
Students with asthma?	48.8%	51.2%	0%
Parents?	29.3%	70.7%	0%
Regarding physical education:			
Do students have options for fully and safely participating in physical education and recess activities?	87.8%	4.9%	7.3%
Is premedication available?	78%	9.8%	12.2%
Does your school have a written action plan for each child with asthma in case of a severe episode?	63%	36.6%	

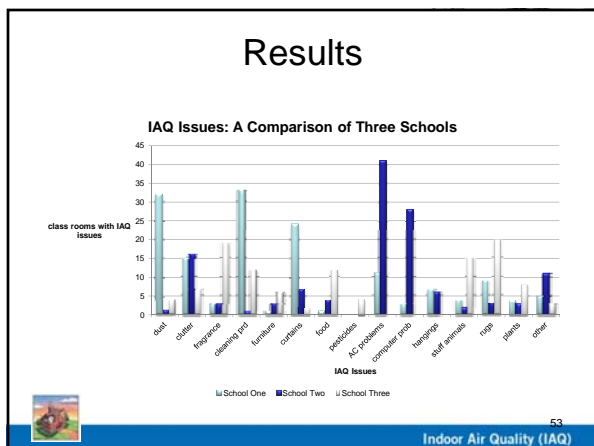
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Indoor Air Quality (IAQ)

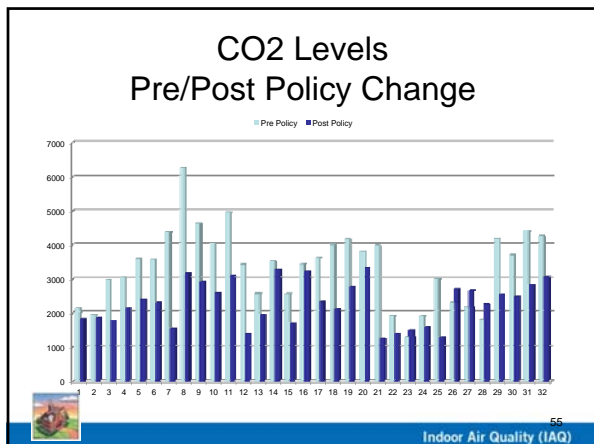
- ### Needs Assessment
- Principals placed IAQ management plans and education as their top priorities
- 50
- Indoor Air Quality (IAQ)

- ### Clear the Air Project
- \$30,000 grant from the W. G. Raoul Foundation
 - IAQ
 - Asthma Education for students and teachers
- 51
- Indoor Air Quality (IAQ)

- ### Indoor Air Quality
- Three superintendents chose to participate and suggested a school that had either a high number of asthmatic students or known air quality problems.
 - The EPA's "IAQ Tools for Schools Action Kit" was selected to help the schools identify, correct and prevent IAQ problems
- 52
- Indoor Air Quality (IAQ)

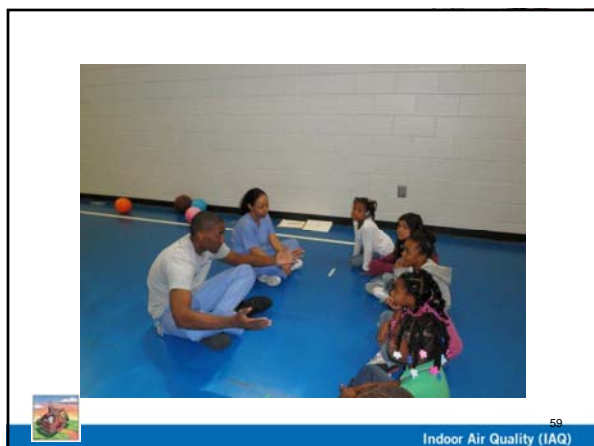


- ### Results
- The CO2 levels were higher than recommended in a significant number of the class rooms in each school.
 - The causes for these increases included dirty filters, blocked air vents and ventilation systems that were turned off.
 - IAQ problems included
 - Dust
 - Ventilation problems
 - Use of fragrances such as cleaning products or air fresheners in the class rooms
 - Items that harbor dust mites, dust and pollen such as curtains, stuffed animals, or rugs
- 54
- Indoor Air Quality (IAQ)



- ### Outcomes
- The principal at one school has implemented a policy to address the increased CO₂ levels
 - Follow up demonstrated some progress with the policy
 - The three schools do not permit unauthorized fragrance or cleaning products in classrooms.
 - One school system has adapted an IAQ management plan that includes the use of green products only.
- Indoor Air Quality (IAQ) 56

- ### Asthma Mini-Camps and Faculty Education
- Asthma Mini-Camps
 - Education sessions with games that reinforce the education for students with asthma
 - 2 hour session with all asthmatic students
 - 1 hour session with small group (2-8 students)
 - 2 one hour sessions in PE classes for ALL students in the school
 - GHSU Respiratory Therapy Students developed the curriculum and participated in the camps
 - Each asthmatic student received a Peak Flow Meter, Holding Chamber and CD about asthma
- Indoor Air Quality (IAQ) 57



- ### Results of Asthma Mini-Camps
- School 1- 77 students
 - School 2- 30 students
 - School 3 42 asthmatic students
304 non-asthmatic students
- Total 453 students
- Indoor Air Quality (IAQ) 60

Peak Flow USA

- **Peak Performance USA**
 - National asthma awareness program sponsored by the American Association for Respiratory Care, with support from pharmaceutical companies.
- **Goals:**
 - increase awareness of signs and symptoms of asthma
 - control environmental measures that trigger asthma
 - improve knowledge
 - attitudes and skill of school staff about the detection
 - treatment and control of asthma
 - promote education to school personnel about student self-carry and self-administration of medication.
- Each participant received an educational packet



Peak Flow USA Results

- School One 50 participants
- School Two 26 participants
- School Three 24 participants

Total 100 participants



Outcomes

- Pre and Post Test
 - Improvement in asthma knowledge



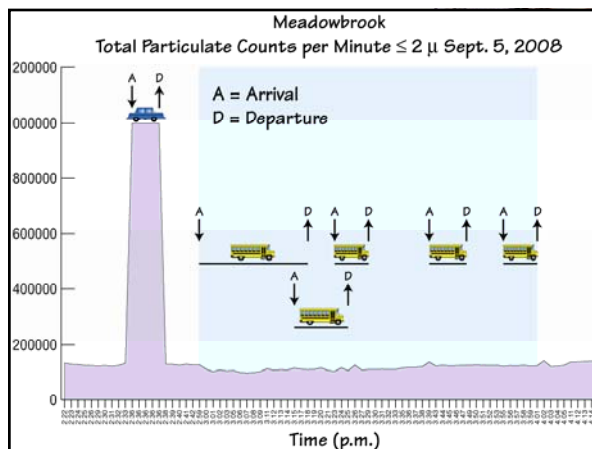
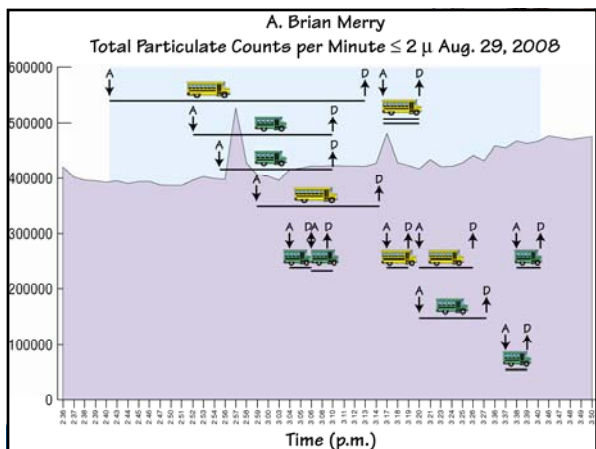
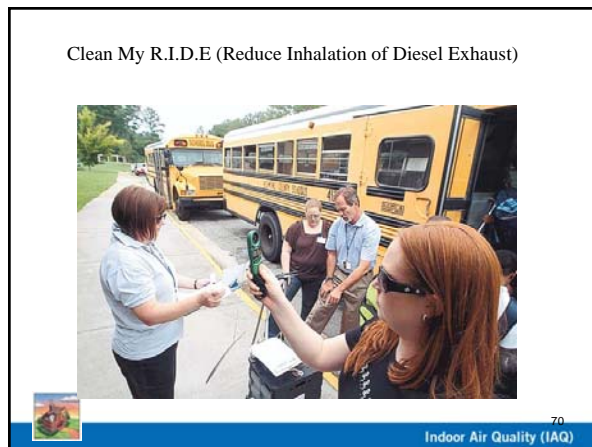
Future Work

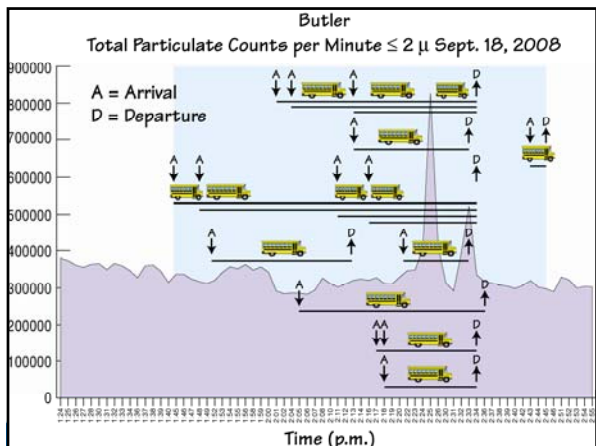
- Educating students with asthma at School Health Fairs (including a kit with peak flow meter, holding chamber and DVD.)
- Summer Asthma Day Camp






Building an Asthma Coalition






Outcomes

- The Richmond County Board of Education has a No Bus Idling Policy.
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Indoor Air Quality (IAQ)


Clean Schools, Healthy Kids

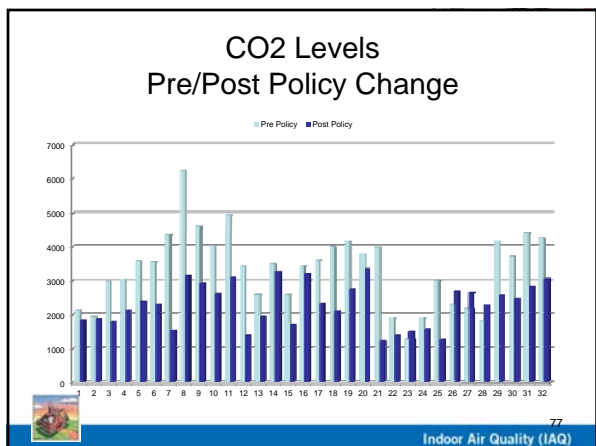
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Indoor Air Quality (IAQ)


Clear The Air Project

IAQ Issues: A Comparison of Three Schools


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Indoor Air Quality (IAQ)



“We never would have known what to look for if you hadn’t given us the training!”


Indoor Air Quality (IAQ)

Asthma Mini-Camps and Faculty Education

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Outcomes of Asthma Mini-Camps

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- 304 non-asthmatic students
- **453 Total!**



Peak Flow USA Outcomes

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Total 100 participants

- Pre and Post Test
 - Improvement in asthma knowledge



Future Impact

- “The biggest lesson learned was that we as healthcare professionals, particularly RTs, desperately need to educate our communities about every aspect of asthma. The lack of education is worse than I expected and is sad because lives are lost because of this.”



Teonna Griggs
RT Class of 2012



Future Work

- Educating students with asthma at School Health Fairs (including a kit with peak flow meter, holding chamber and DVD.)
- Summer Asthma Day Camp



Breakout Session Q&A

- Review your actions and strategies that you would like to apply to your own work.
- Please be ready to discuss these actions in your own words.

