

CDC Air Pollution and Public Health Activities

Health and Air Quality Applied Sciences Team Meeting-2 February 28, 2017

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Division of Environmental Hazards and Health Effects

Division of Environmental Hazards and Health Effects: Air Pollution Science Agenda

Theme 1

- Characterize the impacts of PM sources/species on public health at the state and local levels

Theme 2

- *Assess the burden of air pollution on public health using local data*

Theme 3

- *Explore effects of air pollution exposures from weather-related events and wildfires on public health*

Theme 4

- Assess the strength of evidence on air pollution exposures and public health

Theme 5

- *Evaluate behavioral and policy interventions to reduce exposures to air pollution and improve health*

ASSESS THE BURDEN OF AIR POLLUTION ON PUBLIC HEALTH USING LOCAL DATA

Asthma-related ED visits and hospitalizations during fireplace season: Phoenix, AZ

- **Technical assistance**

- Request from Maricopa County Health Department
- Assistance with study design and analysis

- **Phoenix, AZ**

- PM_{2.5} concentrations often exceeded during winter holiday period, frequently from increased fireplace use

- **Purpose**

- Improve messaging to discourage biomass burning by providing stronger evidence of adverse health outcomes

Asthma-related ED visits and hospitalizations during fireplace season

Data sources:

- Modeled PM_{2.5} monitoring data, Maricopa County
- Asthma hospital discharge data
- Identified patients who lived within 8km radius of PM_{2.5} monitor

Findings:

- Adults may be at elevated risk of asthma-related hospital encounters during fireplace season

**EXPLORE EFFECTS OF AIR POLLUTION EXPOSURES
FROM WEATHER-RELATED EVENTS AND WILDFIRES
ON PUBLIC HEALTH**

Health Effects of Large-Scale Agricultural Burning

- **Technical assistance**

- Request from Kansas State Health Department
- Assistance with study design and analysis of large data set

- **Flint Hills region of Kansas**

- 6.3 million acres region suited for grazing
- Range management practices include prescribed burning; burning conducted over 1-2 months each spring

- **Purpose**

- Examine the relationship between large-scale agricultural burning and respiratory and cardiovascular outcomes

Health Effects of Large-Scale Agricultural Burning: Data Sources

- **Retrospective administrative data**
 - Hospitals in region
 - Respiratory and cardiovascular outcomes
 - Emergency department visits and hospitalizations
- **Air monitoring data**
 - PM_{2.5}, ozone
 - Monitoring data limited



Health Effects of Large-Scale Agricultural Burning: Limitations

- Few monitors in the Flint Hills area
- Lack of information on specific burn dates
- Defining pre-burn, burn and post-burn periods difficult
- Comparing of cardiovascular and respiratory disease rates during two “control” periods and burn period can be challenging

Is VOG exposure associated with airway obstruction in Hawaii Island schoolchildren?

- Kilauea volcano has emitted as much as 6,000 tons of sulfur dioxide (SO_2) *daily* for more than 20 years.
- SO_2 reacts with water vapor to form a very acidic haze of respirable particulates, known as “vog”.

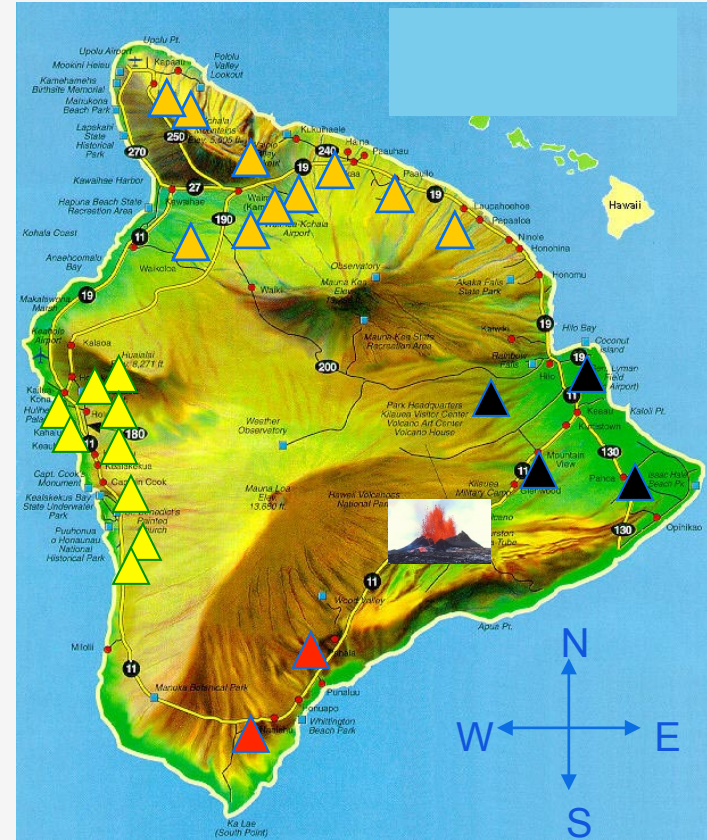


VOG in Waikiki

Associated Press

Request from Governor Lingle

- Work with HI Department of Health to assess short- and possible long-term health risks from increased volcanic emissions
- SO₂ and PM_{2.5}
- CDC provided Technical Assistance



Hawaii Island Children's Lung Assessment Scientific Study (HICLASS) cohort

- Cohort of children on Big Island followed beginning 2002
- Health assessment consisted of questionnaire, spirometry and other measurements
- Currently developing modeled exposures to $\text{PM}_{2.5}$ and SO_2
- Partnership with University of Hawaii

**EVALUATE BEHAVIORAL AND POLICY
INTERVENTIONS TO REDUCE EXPOSURES TO AIR
POLLUTION AND IMPROVE HEALTH**

ConsumerStyles survey air quality questions, 2016

- 4,203 adult (18+ years) respondents
- 68% response rate
- Between June 24 and July 11, 2016
- Seven questions about air quality perception

ConsumerStyles survey: Air pollution and AQI

- **91%** of adults thought air pollution can impact a person's health in any way
- **50%** of adults have heard or read about the Air Quality Index or air quality alerts

ConsumerStyles survey: Awareness

- **27%** of adults reported that they thought or were informed that air quality where they live was bad during the past 12 months.
- Among those who thought or were informed that air quality was bad:
 - 46% reported doing something differently when they thought or were informed air quality was bad.
 - 62% among persons with a current respiratory condition

ConsumerStyles survey: Behavior change

- Of those who did something differently
 - Most common behavior change was spending less time outdoors (84%)
 - Followed by closing window of house (54%).
 - 29% of adults reported they always or usually avoid busy roads to reduce exposure to air pollution when walking, biking, or exercising outdoors
 - 27% reported they do not avoid busy roads

Air Quality Flag PROGRAM

Know Your Air Quality
to Protect Your Health



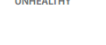
- EPA program for schools
- Flag colors correspond to level of the AQI
- AQI based on ground level ozone and PM
- Ongoing collaboration with EPA and CDC

Air quality and outdoor activity guidance for schools

Air Quality and Outdoor Activity Guidance for Schools

Regular physical activity — at least 60 minutes each day — promotes health and fitness. The table below shows when and how to modify outdoor physical activity based on the Air Quality Index. This guidance can help protect the health of all children, including teenagers, who are more sensitive than adults to air pollution. Check the air quality daily at www.airnow.gov.

Seven Earth-sized exoplanets discovered!

Air Quality Index	Outdoor Activity Guidance
 GOOD	Great day to be active outside!
 MODERATE	Good day to be active outside! Students who are unusually sensitive to air pollution could have symptoms.*
 UNHEALTHY FOR SENSITIVE GROUPS	It's OK to be active outside, especially for short activities such as recess and physical education (PE). For longer activities such as athletic practice, take more breaks and do less intense activities. Watch for symptoms and take action as needed.* Students with asthma should follow their asthma action plans and keep their quick-relief medicine handy.
 UNHEALTHY	For all outdoor activities , take more breaks and do less intense activities. Consider moving longer or more intense activities indoors or rescheduling them to another day or time. Watch for symptoms and take action as needed.* Students with asthma should follow their asthma action plans and keep their quick-relief medicine handy.
 VERY UNHEALTHY	Move all activities indoors or reschedule them to another day.

* Watch for Symptoms

Air pollution can make asthma symptoms worse and trigger attacks. Symptoms of asthma include coughing, wheezing, difficulty breathing, and chest tightness. Even students who do not have asthma could experience these symptoms.

If symptoms occur:

The student might need to take a break, do a less intense activity, stop all activity, go indoors, or use quick-relief medicine as prescribed. If symptoms don't improve, get medical help.

Go for 60!

CDC recommends that children get 60 or more minutes of physical activity each day. www.cdc.gov/healthyouth/physicalactivityguidelines.htm

Plan Ahead for Ozone

There is less ozone in the morning. On days when ozone is expected to be at unhealthy levels, plan outdoor activities in the morning.

Questions and Answers

How long can students stay outside when the air quality is unhealthy?

There is no exact amount of time. The worse the air quality, the more important it is to take breaks, do less intense activities, and watch for symptoms. Remember that students with asthma will be more sensitive to unhealthy air.
Seven Earth-sized exoplanets discovered!

Why should students take breaks and do less intense activities when air quality is unhealthy?

Students breathe harder when they are active for a longer period of time or when they do more intense activities. More pollution enters the lungs when a person is breathing harder. It helps to:

- ✓ reduce the amount of time students are breathing hard (e.g., take breaks; rotate players frequently)
- ✓ reduce the intensity of activities so students are not breathing so hard (e.g., walk instead of run)

Are there times when air pollution is expected to be worse?

Ozone pollution is often worse on hot sunny days, especially during the afternoon and early evening. Plan outdoor activities in the morning, when air quality is better and it is not as hot.

Particle pollution can be high any time of day. Since vehicle exhaust contains particle pollution, limit activity near idling cars and buses and near busy roads, especially during rush hours. Also, limit outdoor activity when there is smoke in the air.

How can I find out the daily air quality?

Go to www.airnow.gov. Many cities have an Air Quality Index (AQI) forecast that tells you what the local air quality will be later today or tomorrow, and a *current* AQI that tells you what the local air quality is now. The AirNow website also tells you whether the pollutant of concern is ozone or particle pollution. Sign up for emails, download the free AirNow app, or install the free AirNow widget on your website. You can also find out how to participate (and register your school) in the School Flag Program (www.airnow.gov/schoolflag).

If students stay inside because of unhealthy outdoor air quality, can they still be active?

It depends on which pollutant is causing the problem:

Ozone pollution: If windows are closed, the amount of ozone should be much lower indoors, so it is OK to keep students moving.

Particle pollution: If the building has a forced air heating or cooling system that filters out particles then the amount of particle pollution should be lower indoors, and it is OK to keep students moving. It is important that the particle filtration system is installed properly and well maintained.

What physical activities can students do inside?

Encourage indoor activities that keep all students moving. Plan activities that include aerobic exercise as well as muscle and bone strengthening components (e.g., jumping, skipping, sit-ups, pushups). If a gymnasium or open space is accessible, promote activities that use equipment, such as cones, hula hoops, and sports balls. If restricted to the classroom, encourage students to come up with fun ways to get everyone moving (e.g., act out action words from a story). Teachers and recess supervisors can work with PE teachers to identify additional indoor activities.

What is an asthma action plan?

An asthma action plan is a written plan developed with a student's doctor for daily management of asthma. It includes medication plans, control of triggers, and how to recognize and manage worsening asthma symptoms. See www.cdc.gov/asthma/actionplan.html for a link to sample asthma action plans. When asthma is well managed and well controlled, students should be able to participate fully in all activities. For a booklet on "Asthma and Physical Activity in the School," see <http://www.nhlbi.nih.gov/health/resources/fung/asthma-physical-activity.htm>.

Next Air Quality Flag project

- **Descriptive analysis**

- Schools that use the program
- Schools that don't use the program
- Compare demographic and geographic characteristics

Questions?

For more information, contact NCEH
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