

# Air Quality Index

## A Tool to Communicate with the Public and Policymakers

Commission on Sustainable Development  
United Nations  
May 2, 2007

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# Overview

- US AQI
  - How is it structured?
  - How is it used?
  - How effective is it?
  - Important target audiences
  - AIRNow International
- Mexico City, Mexico
- Sao Paulo, Brazil
- Canada

# Structure

- Index for reporting daily air quality
- Revised 1999 through extensive stakeholder process
- Nationally uniform
- Intuitive colors - like weather map
- Health-based descriptors
- Pollutant-specific health messages

# Air Quality Index

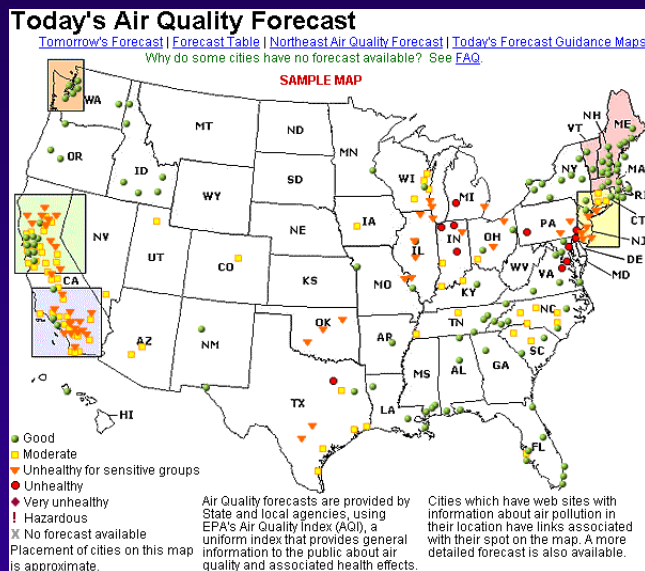
Descriptors	Cautionary Statement
<b>Good 0 – 50</b>	No message
<b>Moderate 51 – 100</b>	Unusually sensitive individuals
<b>Unhealthy for Sensitive Groups 101 - 150</b>	Identifiable groups at risk - different groups for different pollutants
<b>Unhealthy 151 - 200</b>	General public at risk; sensitive groups at greater risk
<b>Very Unhealthy 201 - 300</b>	General public at greater risk; sensitive groups at greatest risk

# Use AQI to Reduce Risk

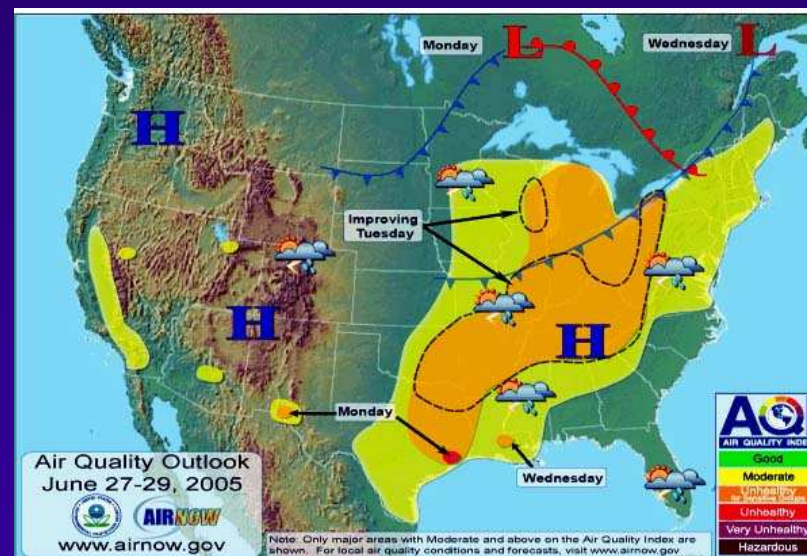
**Dose = Concentration x Ventilation Rate x Time**

- Reduce these factors to reduce dose
- Pay attention to symptoms
- People with asthma – follow asthma action plan
- Coaches – rotate players frequently
- People with heart disease
  - Check with your doctor
  - Don't exercise near busy roads

# Air Quality Forecasting

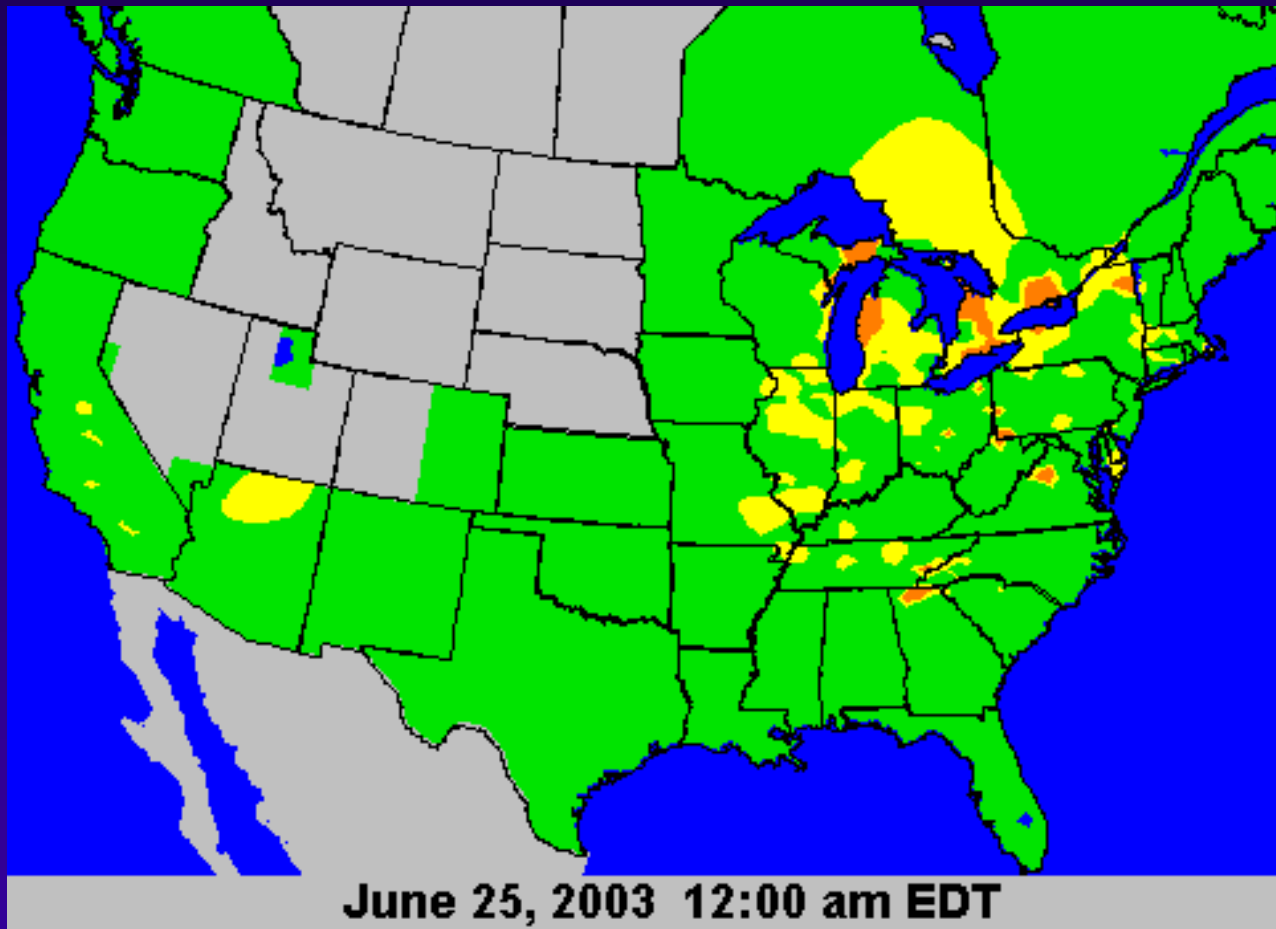


Daily



Two-Day Outlook

# Real-Time Air Quality Mapping



# Emission Reductions Programs

**CLEAN AIR PARTNERS**

Click to activate and use this control

Quick Links  
For the Media

Regional Air Quality Forecasts | Clean Air Partners | Take Action | Clean Air Facts | Resources

Washington, DC  
Air Quality Forecast  
Jul 12 Unhealthy for Sensitive Groups  
Jul 13 Moderate  
PM2.5  
By: S.T.I. Source: MWCOG

Baltimore, MD  
Air Quality Forecast  
Jul 12 Unhealthy for Sensitive Groups  
Jul 13 Moderate  
PM2.5  
By: S.T.I. Source: Maryland MDE

What Do These Color Codes Mean?  
Real-time Regional Ground-Level Ozone Map

THAT'S A FACT  
In the Baltimore-Washington area, gasoline-powered lawn and garden equipment is second behind cars and trucks as the cause of ozone smog.

Done

start | Welcome - Lotus ... | 3 Microsoft Offi... | CAI-LAC 2006 p... | Images for Braz... | MWCOG.org - Air... | CLEAN AIR PART...

**airWATCH northwest**  
KEEP IT IN THE GREEN!  
PUGET SOUND CLEAN AIR AGENCY

Air Quality Forecast | Current Air Quality | Info & Definitions | Contact Info | Tips | Notification Network | News & Events | Links

A program of the Puget Sound Clean Air Agency and the American Lung Association of Washington

Air Quality Forecast | Current Air Quality | Info & Definitions | Contact Info | Tips | Notification Network | News & Events | Links

This site is best viewed using the current version of [Internet Explorer](#) or [Netscape Navigator](#), display resolution set to atleast 800x600, and display colors set to at least 16 bit, high color

Last updated: February 13, 2004 • ©2001-2004 Puget Sound Clean Air Agency • All Rights Reserved

start | Welcome - Lotus ... | Draft 3 Agenda ... | Document4 - Mic... | Document5 - Mic... | Air Watch North... | Microsoft PowerP... | 5:56 PM

Clean Air Partnerships





## EnviroFlash in Michigan

**EnviroFlash** is a service that automatically delivers air quality forecasts directly to the public. It provides information so people can adjust their daily activities when poor air conditions are expected.

People enrolled in **EnviroFlash** get the information they choose to receive via computer e-mail or a cell phone with text messaging capability.

Michigan Department of Environmental Quality meteorologists determine what the air quality level for the next few days is likely to be:



Forecast pollutants include ground-level ozone and fine particulate. **EnviroFlash** automatically sends the forecast message at the air quality level you select as well as notice when an "Action" day (air quality advisory) is announced.

Those with small children and people with cardio-pulmonary health problems (such as asthma) may choose to be notified when the air is predicted to be unhealthy for sensitive groups. People who work or exercise strenuously are in this category due to increased deep respiration. People who do not have health risks and who aren't as concerned about outdoor air quality may opt to be notified when the forecast is unhealthy.

Current air quality information is already available via DEQ's website ([www.michigan.gov/deqair](http://www.michigan.gov/deqair)) and AIRNow ([www.airnow.gov](http://www.airnow.gov)). **EnviroFlash** is an additional service that sends air information directly to your computer or cell phone.

### SIGN UP NOW! HERE'S HOW

Go to [www.michigan.gov/deqair](http://www.michigan.gov/deqair) & click on the **EnviroFlash** icon. Click on "sign-up" and follow these five easy steps.

1. Type in your e-mail address
2. Select the city location.
3. Optional - type name and zip code information
4. Select either "regular" e-mail format or "short" for pagers & digital cell phones.
5. Choose a forecast level.

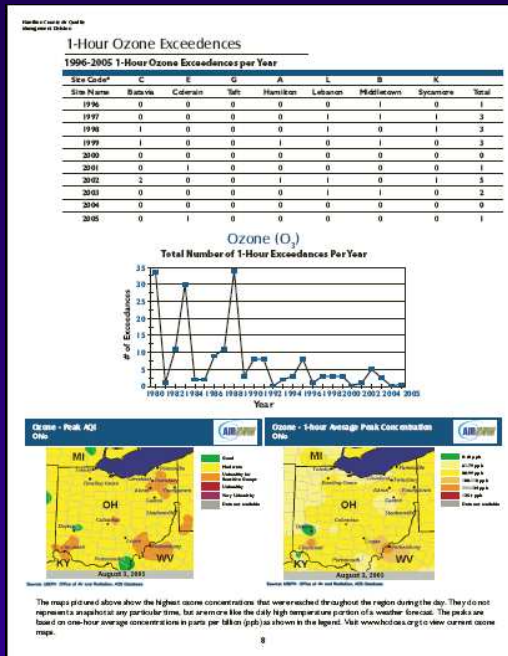
A confirmation message to initiate this service will be sent to you by e-mail.



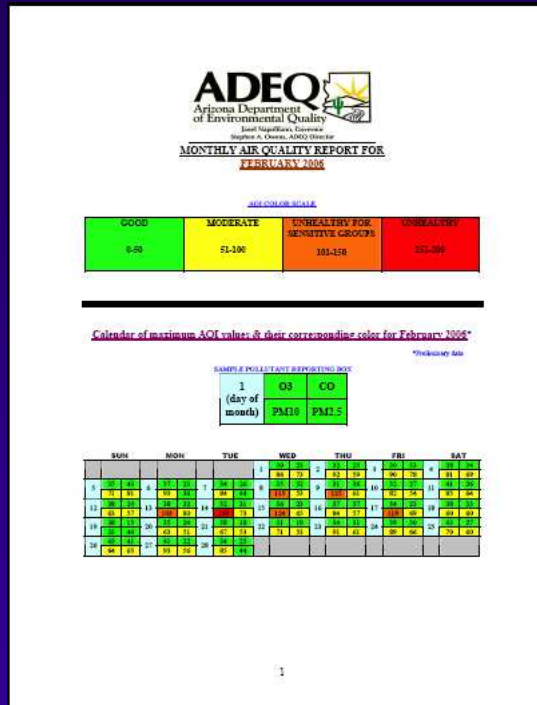
 The Michigan **EnviroFlash** program is a partnership between Michigan DEQ and U.S. EPA.  Office of Air Quality Planning and Standards  
U.S. Environmental Protection Agency

April 2005

# State and Local Agency Reports



Hamilton Co, Ohio



Arizona

**AIR CURRENTS**  
Metropolitan Washington Air Quality Committee Newsletter (Winter 2006)

**MWAQC 2006 Outlook: Air Quality Plan Coming Together**

MWAQC is nearing the home stretch on completing a plan ("SIP") to meet the 8-hour ozone standard. The plan as a whole is a roadmap for the Washington region to meet the new ozone standard ("8-hour") by 2009. During the past two years, staff has been developing required technical pieces of the plan to be brought together this spring. The deadline is June 2007, but MWAQC expects to complete the plan this year. The states will submit the plan to EPA in early 2007.

This year, the Washington region has been developing measures in participation with northeastern states in the Ozone Transport Commission and the Lake

Michigan Air Directors' Consortium (MADCO). To demonstrate the effectiveness of various control strategies, the Virginia Dept. of Environmental Quality is doing photochemical modeling in collaboration with the Ozone Transport Commission, New York State (NYSERDA) and with VISTAS, a regional planning organization of southeastern states.

Preliminary model results indicate that the Washington region will be close to meeting the standard by 2009 if sufficient local measures are implemented. MWAQC will be assembling a "voluntary bundle" of innovative local programs for the new plan.

(continued on Page 2)

**State Air Quality Initiatives**  
MWAQC Briefing Planned

The 2006 legislative sessions in Maryland and Virginia both promise action on air quality issues. In Maryland two efforts are underway to clean up emissions from Maryland power plants.

In November 2005 Governor Ehrlich announced the "Maryland Clean Power Rule," which addresses nitrogen oxides, sulfur dioxide and mercury emissions from Maryland's six largest coal-fired power plants. Kendi Philbrick, Secretary of Maryland Dept. of the Environment, says the proposed rule exceeds emission reductions that will be achieved under EPA's Clean Air Interstate Rule (CAIR). The Maryland Healthy Air Act (SB154) was introduced in the Maryland Senate by a coalition of senators and delegates led by Senator Pinsky.

SB154 would reduce carbon dioxide emissions in addition to the pollutants addressed by the Clean Power Rule.

(continued on Page 4)

**INSIDE**

- EPA Proposal to Lower PM Daily Standard 4
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- Diesel Emission Reduction Strategies 7
- Air Quality Links/MWAQC Schedule 8

METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS

Washington, DC  
Clean Air Partners

# Publications

Particle levels can be elevated indoors, especially when outdoor particle levels are high. Certain filters and room air cleaners can help reduce indoor particle levels. You also can reduce particle levels indoors by not smoking inside, and by reducing your use of other particle sources such as candles, wood-burning stoves, and fireplaces.

### How can the Air Quality Index help?

In many areas, local media provide air quality forecasts telling you when particle levels are expected to be unhealthy. Forecasts use the same format as EPA's Air Quality Index, or AQI, a tool that state and local agencies use to issue public reports of actual levels of particles, ground-level ozone, and other common air pollutants.

Using the AQI's color-coded scale, these forecasts help you quickly learn when air pollution is expected to reach unhealthy levels in your area. In the newspaper forecast below, for example, the black arrow points to the "orange" range, indicating that particle levels are expected to be unhealthy for sensitive groups. On television, you might hear a meteorologist say something like this: "Tomorrow will be a code orange air quality day, with particle pollution at levels that are unhealthy for sensitive groups. If you have heart or lung disease, or if you're an older adult or a child, you should plan strenuous activities for a time when air quality is better."



AIR QUALITY INDEX FOR PARTICLE POLLUTION		
Air Quality Index	Air Quality	Health Advisory
0 to 50	Good	None.
51 to 100	Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion.
101 to 150	Unhealthy for Sensitive Groups	People with heart or lung disease, older adults, and children should reduce prolonged or heavy exertion.
151 to 200	Unhealthy	People with heart or lung disease, older adults, and children should avoid prolonged or heavy exertion. Everyone else should reduce prolonged or heavy exertion.
201 to 300	Very Unhealthy	People with heart or lung disease, older adults, and children should avoid all physical activity outdoors. Everyone else should avoid prolonged or heavy exertion.



Daily air quality and health information are available on the AIRNOW Web site.

### AIRNOW

AIRNOW ([www.epa.gov/airnow](http://www.epa.gov/airnow)) is a Web site that gives daily information about air quality, including ground-level ozone and particles, and how they may affect you. AIRNOW contains:

- Real-time particle levels for many locations.
- Air quality forecasts for many cities across the country.
- Kids' Web page and associated teacher curriculum.
- Smoke Web page.
- Links to state and local air quality programs.
- Ideas about what you can do to reduce particles. For example, you can keep your car, boat, and other engines well-tuned, and avoid using engines that smoke. You can also participate in local energy conservation programs.

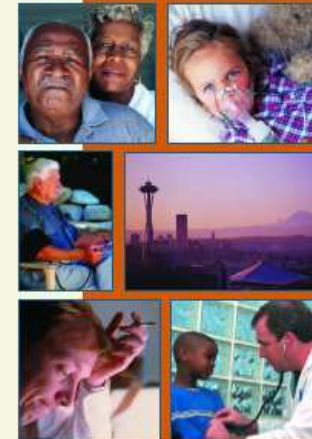
\*Photo courtesy of The Weather Channel.

Office of Air and Radiation  
www.epa.gov/air  
September 2003  
EPA-452/F-03-001



United States Environmental Protection Agency

## Particle Pollution and Your Health



What Is Particle Pollution?

Are You at Risk?

How Can You Protect Yourself?

United States Environmental Protection Agency Air and Radiation EPA-452/F-03-001 February 2003 Washington, DC 20460

## EPA El Ozone y Su Salud

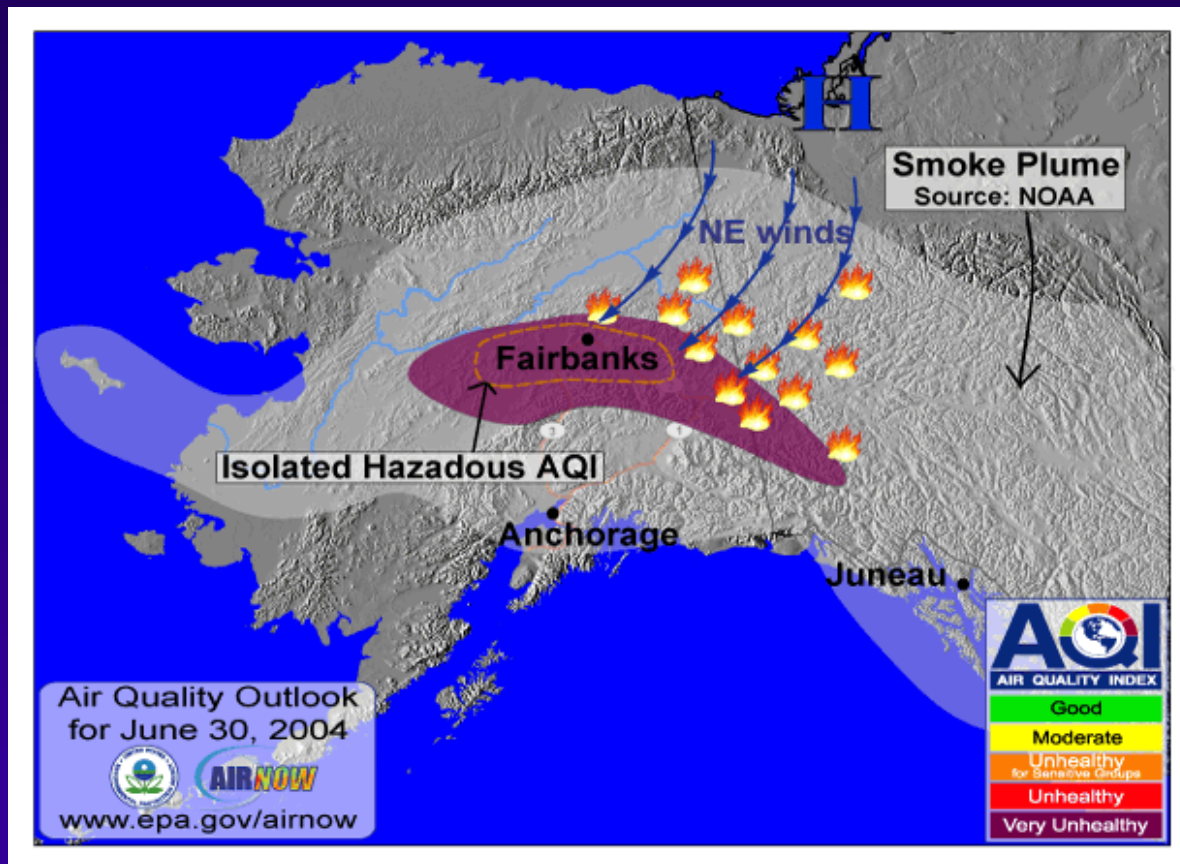


¿Qué es el Ozone, o el Smog?

¿Corre Usted Riesgo?

¿Cómo Puede Protegerse?

# News Stories



# Web Cameras



Phoenix, Arizona



AIRNow Website  
www.airnow.gov

A cross-agency U.S. Government Web site: [List of AIRNow partner agencies](#) | [About AIRNow](#) | [Contact Us](#) | [FAQs](#) | Search:  **GO**

# AIRNOW

## Quality of Air Means Quality of Life

### National Overview April 24th, 2007

**National Outlook for April 24-25**  
Moderate AQI Levels in the Midwest [— More —](#)

Air Quality Outlook  
April 24-25, 2007

[National Forecast](#) | [Ozone Now](#) | [Particles Now](#)

**AQI**  
AIR QUALITY INDEX
Good
Moderate
Unhealthy for Sensitive Groups
Unhealthy
Very Unhealthy
Hazardous

### Local Air Quality Conditions and Forecasts

Alabama   [Select by map](#)

### Today's Highest AQI Forecasts

<a href="#">Atlanta, GA</a>	PM2.5
<a href="#">Atlantic City, NJ</a>	PM2.5
<a href="#">Atlantic City, NJ</a>	OZONE
<a href="#">Austin, TX</a>	PM2.5
<a href="#">Bakersfield, CA</a>	PM2.5
<a href="#">— More —</a>	! - city declared an <a href="#">Action Day</a>

**Note:** EPA established a tighter fine particle [standard](#) in the fall of 2006 to better protect public health. [— More Information —](#)

### Air Quality News

**Ozone Season Begins May 1**  
Ozone Season for many states is May - September. [— More —](#)  
[— More News —](#)

### Partners

For Partners  
[List of Partners](#)

### Air Quality Basics

[Air Quality Index](#)  
[Ozone](#)  
[Particles](#)  
[UV](#)

### The AQI for:

[Health Providers](#)  
[Older Adults](#)  
[Weathercasters](#)

### Key Topics

[Your Health](#)  
[Smoke From Fires](#)  
[International Air Quality](#)

### The Learning Center

[Kids \(K-10\)](#)  
[Students](#)  
[Teachers](#)

### Resources

[Publications](#)  
[Publicaciones](#)  
[FAQ](#)  
[Movies](#)  
[What You Can Do](#)  
[NAQ Conferences](#)  
[About the Data](#)

### Accessibility

[Privacy and Security](#)

### E-mail Notification

Sign-up for e-mail, cell phone or pager air quality notices

### Historical Information

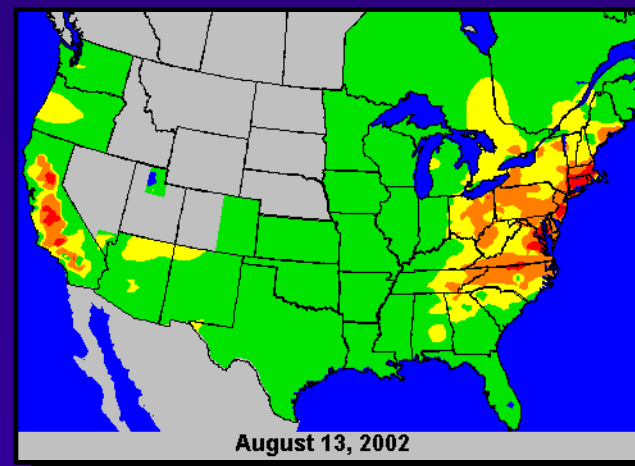
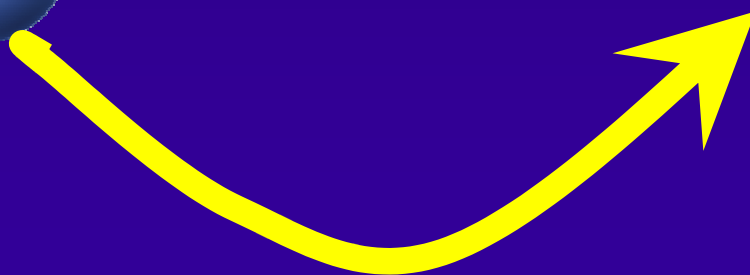
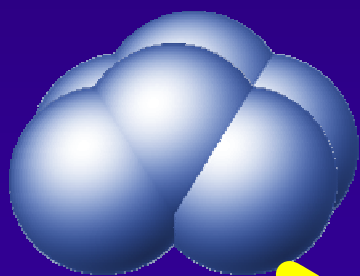
[Compare Your City's Air Quality](#)

### For Students

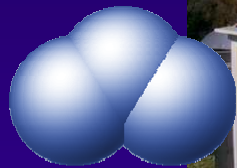
A new interactive websites for students: [AIRNow Students' website](#) and [Smog City 2](#)

### Web Cams [EXIT AIRNOW ▶](#)

# An Hour in the Life of an AIRNow Ozone Molecule



# The journey begins.....

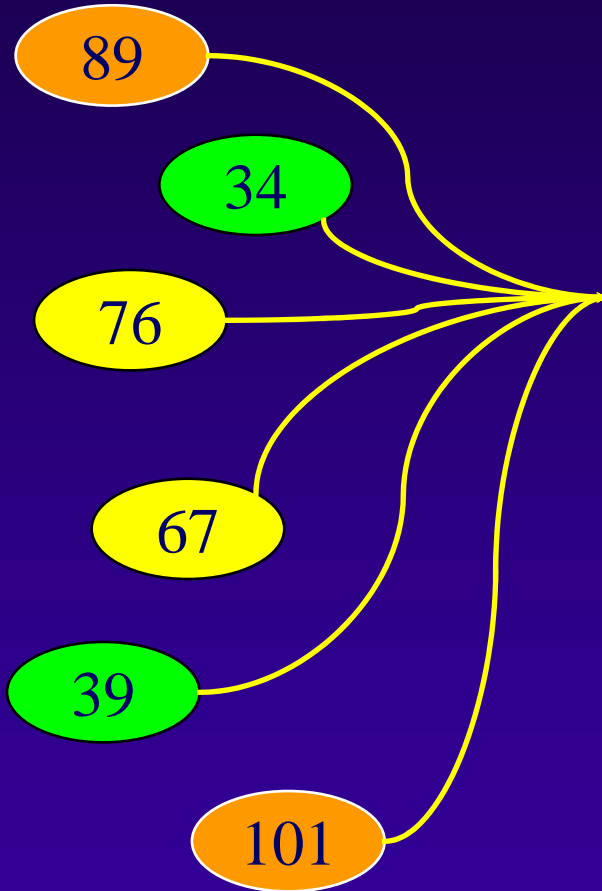


9:59:59

10:00:01



# First stop: AQ Agency



```
START_REF. 0
NUMSTEPS. 24
AVG_TIME. 60
UNITS. PPB
STATIONS. 1342
!          START HOUR
!  ID  AIRS CODE 0000 0100 0200 0300 0400 0500 0600
!-----
BEGIN_DATA
ST.J      .000010102. 5, 12, 7, 3, 2, 2, 7, 6, 9, 5, 6
ST.J      .000010102. G, G, G, G, G, G, G, G, G, G, G
Come      .000010301, 13, 13, 10, 6, 5, 7, 14, 16, 18, 22
Come      .000010301, G, G, G, G, G, G, G, G, G, G, G
WELLI     .000020301,-999,-999,-999,-999,-999,-999,-999
```

OBS data file

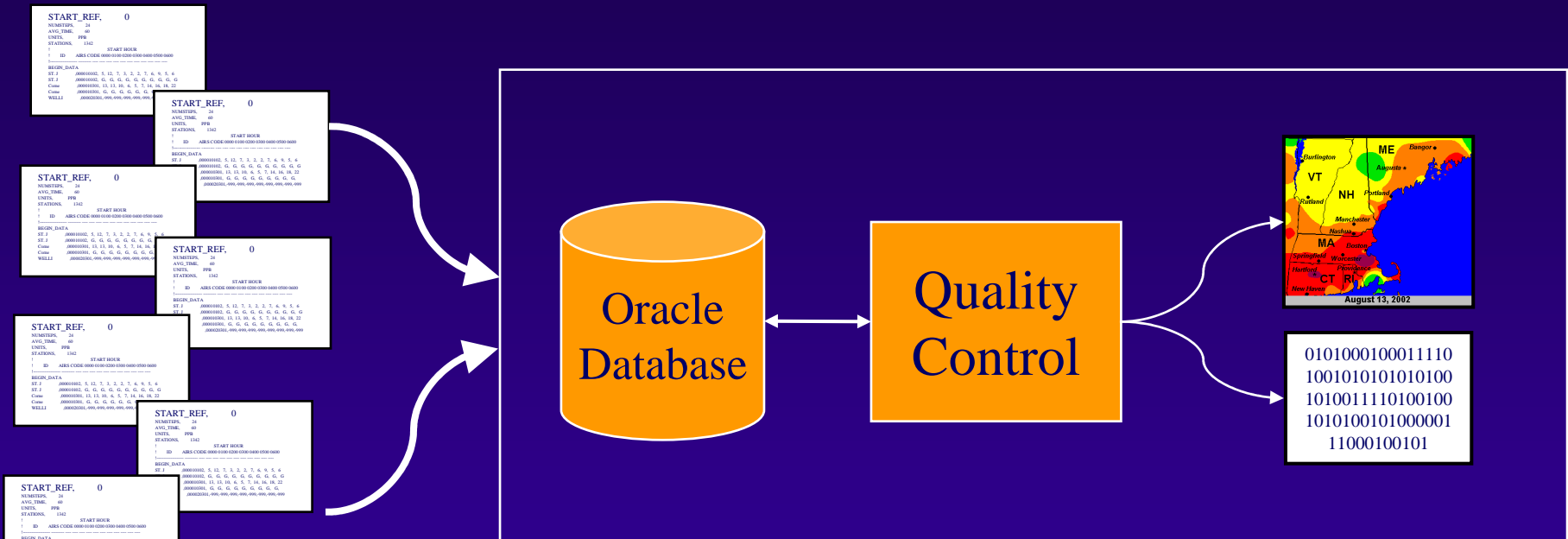
## Stats:

- 1200 monitors
- 78 agencies nationwide
- Collected every hour

10:05:29

10:15:21

# All roads lead to the DMC...



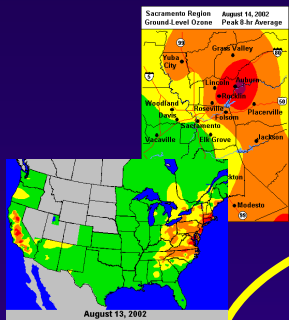
## Stats:

- Redundant computer servers
- Files processed in seconds
- Over 30,000 data values per day
- 50 maps produced every hour

10:31:45

10:45:21

# The last leg of the journey....



Public



Weather/News Providers



0101000100011110  
1001010101010100  
1010011110100100  
1010100101000001  
11000100101

10:45:55

10:55:21

11:00:00

# Media Coverage



# Do People Pay Attention?

- Polling results
  - Majority of people know about AQI
  - Of those about 50% take exposure reduction measures
  - Slightly fewer take emission reduction measures
  - People who report their health as fair or poor, more likely to reduce exposure
- UCLA study – Neidell et al.
  - 4 to 7% reduction in pediatric hospital admissions for asthma attributable to advisories

# Focus Group Testing

## Participants

- Valued *actionable* health messages
  - **Who** will be affected
  - **When** will they be affected
  - **What** they should do to reduce exposure
- Wanted this information “pushed” out to them
  - TV, radio, newspapers
- Were willing to seek more detailed information
  - Newspaper reports, Internet
- Wanted more detailed information on bad air quality days

# Important Target Audiences

- Healthcare providers
- Meteorologists
- Journalists
- Teachers

# Medical Poster

## Efectos de los Contaminantes Comunes del Aire

### EFECTOS RESPIRATORIOS

**Síntomas:**

- Tos
- Nariz
- Opresión en el pecho
- Aumento de enfermedades y muerte prematura causados por:
- Astma
- Enfermedad pulmonar obstructiva crónica
- Neumonía
- Desarrollo de otras enfermedades:
- Enfermedad cardíaca
- Frecuencia prematura de los pulmones

**Cómo los contaminantes causan síntomas:**

**Efectos en la función pulmonar:**

- Reducción de la capacidad pulmonar
- Inflamación del sistema respiratorio
- Aumento de glóbulos blancos
- Frecuencia anormal de mucosidad
- Acortamiento del espacio funcional (volumen)
- Mayor y menor riesgo de las células que matan los virus respiratorios

**Mayor susceptibilidad a infección respiratoria:**

**Infiamación del sistema respiratorio:**

- Alfonos de glóbulos blancos
- Frecuencia anormal de mucosidad
- Acortamiento del espacio funcional (volumen)
- Mayor y menor riesgo de las células que matan los virus respiratorios

**Infiamación vascular:**

- Mayor riesgo de formación de coágulos
- Retención de los vasos sanguíneos
- Mayor riesgo de sufrir de la plaqueta trombótica

### EFECTOS CARDIOVASCULARES

**Síntomas:**

- Opresión en el pecho
- Dolor de pecho (angina de pecho)
- Apatación
- Nata de air
- Ataque al corazón

**Aumento de enfermedades y muerte prematura causados por:**

- Infiamación de las arterias coronarias
- Ritmo cardíaco anormal
- Insuficiencia cardíaca congestiva

**Cómo los contaminantes pueden causar síntomas:**

**Efectos en la función cardíaca:**

- Mayor riesgo de de los glóbulos rojos
- Mayor riesgo de la actividad cardíaca controlada por el sistema nervioso autónomo

**Infiamación vascular:**

- Mayor riesgo de formación de coágulos
- Retención de los vasos sanguíneos
- Mayor riesgo de sufrir de la plaqueta trombótica

**Normal**      **Pulmón con infección**

**Normal**      **Para un ataque al corazón**


Reduce su riesgo, usando el índice de Calidad del Aire (AQI por sus siglas en inglés) al planear actividades al aire libre - [www.airnow.gov](http://www.airnow.gov)

Niveles de calidad del aire y su impacto en la salud	Valores del índice	¿Qué medidas deben tomar las personas?
Bueno	0-50	Disfrutar sus actividades.
Moderado	51-100	Personas particularmente sensibles eviten la contaminación del aire. Planear actividades al aire libre cuando mejor la calidad del aire.
Dañino para la salud de los grupos sensibles	101-150	<p><b>Grupos sensibles:</b> Niños y personas mayores, personas con enfermedades respiratorias y cardíacas, personas que trabajan o hacen ejercicio al aire libre.</p> <p><b>Personas sensibles:</b> Niños y personas mayores, personas con enfermedades respiratorias y cardíacas, personas que trabajan o hacen ejercicio al aire libre.</p> <p><b>Personas sensibles:</b> Niños y personas mayores, personas con enfermedades respiratorias y cardíacas, personas que trabajan o hacen ejercicio al aire libre.</p>
Dañino para la salud	151-200	<p><b>Todos:</b> Reduzcan sus actividades al aire libre.</p> <p><b>Grupos sensibles:</b> Eviten las actividades al aire libre.</p>
Muy dañino para la salud	201-300	<p><b>Todos:</b> Reduzcan considerablemente las actividades al aire libre.</p> <p><b>Grupos sensibles:</b> Eviten las actividades al aire libre.</p>

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# Ozone Web Course



**U.S. Environmental Protection Agency**

## Ozone and Your Patients' Health Training for Health Care Providers

[Contact Us](#) | [Print Version](#) Search:  [GO](#)

[EPA Home](#) > [Air & Radiation](#) > [Air Quality Planning and Standards](#) > [Air Pollution Training Institute](#) > Ozone and Your Patients' Health

### Course Overview


During the summer months millions of people in the United States are exposed to the ambient air pollutant ozone at levels that can cause uncomfortable and damaging respiratory symptoms. *Ozone and Your Patients' Health* is a short, evidence-based training course and resource that:

- Describes the physiological mechanisms responsible for the lung function changes and symptoms associated with exposure to ground-level ozone
- Helps health care providers advise their patients about exposure to ozone
- Provides practical tools to help patients understand what triggers their symptoms and how to alleviate them

*Ozone and Your Patients' Health* is designed for family practice doctors, pediatricians, nurse practitioners, asthma educators, and other medical professionals who counsel patients about asthma and respiratory symptoms. Patients and their families may also use this material to learn the science behind ozone's effect on respiration and how to manage their respiratory health using the Air Quality Index.

#### How to Use This On-line Training

*Ozone and Your Patients' Health* begins on this page and



**The [Clinical Scenarios](#) section of this course discusses the following scenario and others in detail.**

A 12-year-old girl and her mother arrive at your office for an evaluation of the child's asthma. At soccer practice the girl experienced chest tightness and shortness of breath, and she woke up during the night wheezing. Yesterday was

[Course Overview/  
Ozone and Patients'  
Health Home](#)

[What is Ozone?](#)

[Health Effects in the  
General Population](#)

[Health Effects in  
Patients with Asthma](#)

[Patient Exposure and  
the Air Quality Index](#)

[Clinical Scenarios](#)

[Frequent Questions](#)

[Course Summary/  
Key Points](#)

[Patient Education](#)

[Glossary](#)

[References](#)

[Figures](#)

[Review Questions](#)

[Course Developers](#)

# Asthma Factsheet

EPA



## ASTHMA AND OUTDOOR AIR POLLUTION



### 1 Air pollution can make asthma symptoms worse and trigger attacks.

If you or your child has asthma, have you ever noticed symptoms get worse when the air is polluted? Air pollution can make it harder to breathe. It can also cause other symptoms, like coughing, wheezing, chest discomfort, and a burning feeling in the lungs.

Two key air pollutants can affect asthma. One is *ozone* (found in smog). The other is *particle pollution* (found in haze, smoke, and dust). When ozone and particle pollution are in the air, adults and children with asthma are more likely to have symptoms.

### 2 You can take steps to help protect your health from air pollution.

#### ► Get to know how sensitive you are to air pollution.

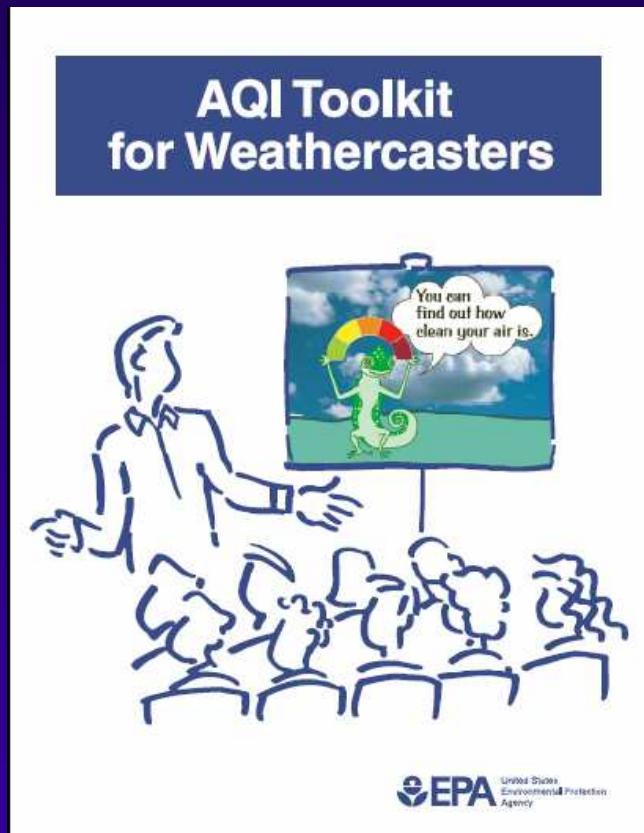
- Notice your asthma symptoms when you are physically active. Do they happen more often when the air is more polluted? If so, you may be sensitive to air pollution.

- Also notice any asthma symptoms that begin up to a day *after* you have been outdoors in polluted air. Air pollution can make you more sensitive to asthma triggers, like mold and dust mites. If you are more sensitive than usual to indoor asthma triggers, it could be due to air pollution outdoors.

#### ► Know when and where air pollution may be bad.

- *Ozone* is often worst on hot summer days, especially in the afternoons and early evenings.
- *Particle pollution* can be bad any time of year, even in winter. It can be especially bad when the weather is calm, allowing air pollution to build up. Particle levels can also be high:
  - Near busy roads, during rush hour, and around factories.
  - When there is smoke in the air from wood stoves, fireplaces, or burning vegetation.

# Meteorologist Toolkit



The graphic has a title "Fact or Fiction?" in a stylized font. Below the title is a photograph of a cloudy sky with a sunburst effect. A checkmark is placed to the left of the text "Weather can affect air pollution."


✓ "Weather can affect air pollution."

- True. Weather can affect air pollution in a number of ways.
- For example, the wind can move air pollution around, blowing it away from its source, and into areas hundreds of miles away - into other states and even other regions entirely, where it can have a significant impact on air pollution levels.
- One example of this is air pollution from power plants in Ohio, which often is transported to the New England and Mid-Atlantic states. This makes it a challenge for some New England and Mid-Atlantic cities to comply with air pollution regulations, because they can't control pollution from sources in other states.
- Weather can also affect air pollution in other ways. Sunlight and warm temperatures can contribute to the formation of certain types of air pollution.
- Also, during thunderstorms, the fast-moving air disperses pollutants, and the rain cleanses the air.
- High pressure and stagnant conditions can also affect air pollution. In a high pressure system, the air is stagnant, which keeps pollutants where they are.

Notes Pages: Civic - Long

4

# Journalists

AIRNow - Newsroom - Microsoft Internet Explorer  
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## Ozone Media Kit

U.S. Environmental Protection Agency

### OZONE AT A GLANCE

National Ozone Air Pollution Season: May 1- October 31

#### What is ozone?

Ozone is a gas created when NOx (nitrogen oxides) and VOCs (volatile organic compounds) chemically react with the sun. Ozone is the primary ingredient of summertime smog.

#### Good ozone vs. bad ozone

Ozone occurs in two layers of the Earth's atmosphere.

- In the stratosphere: 10 to 30 miles above the surface of the Earth, the stratospheric ozone layer protects life from harmful ultraviolet rays
- On the ground: up to 10 miles above the Earth's surface, in the troposphere, ground-level ozone can damage human health, crops and buildings

#### Ozone formation

Ozone is not emitted directly into the atmosphere. It forms when the chemicals that create ozone (NOx and VOCs) are emitted into the atmosphere and cook in the sun. These chemical emissions come from mobile and stationary sources.

#### Mobile and stationary sources

Mobile sources include cars, buses and trucks, as well as on- and off-road sources such as bulldozers, tractors, planes, agricultural equipment and gas-powered lawn and garden equipment. Stationary sources include chemical production plants, refineries, electric utilities and other factories.

#### Major sources of NOx (nitrogen oxide) emissions

Utilities, industrial fuel combustion and motor vehicles.

#### Major sources of VOC (volatile organic compound) emissions

Industrial and commercial processes, motor vehicles and consumer solvents such as oil-based paints, lighter fluid, aerosol sprays and evaporation of gasoline from refueling and spillage.

#### Human health problems: — especially in children

When people breathe ground-level ozone air pollution, the lining of their lungs can become irritated and inflamed. Children are especially susceptible to problems caused by ground-level ozone for several reasons: 1) they are frequently active outdoors and more likely to be exposed; 2) they are more likely to have asthma, which can be aggravated by ozone; and 3) their lungs are still developing. Other groups that are particularly vulnerable are people with asthma and other respiratory conditions, and people who are active outdoors.

(MORE)

# Teacher Curricula



**Air Quality Index Kids Website  
Teacher's Reference**

**Clean Air and Dirty Air**

On a clear breezy day, the air smells fresh and clean. Clean air is air that has no pollutants (dirt and chemicals) in it. Clean air is good for people to breathe.



On a hot day with no wind, the air can feel heavy and have a bad smell. Once in a while, the air can even make your chest feel tight, or make you cough. Dirt and chemicals that get into the air make the air dirty or polluted. Dirty air is not good for people to breathe.

**Dirty Air Can Make You Sick**

When the air has some dust, soot or chemicals floating in it, people who are inside probably won't notice it. People who are outside might notice it.



People with asthma, a disease that can make it hard to breathe, and children who play outside a lot might feel a little strange. When you are active outdoors, for example, when you run and jump a lot, you breathe faster and take in more air. Any pollutants in the air go into your lungs.

When the air is very dirty, almost everyone will notice it. It would be good if we could stop breathing on those days, but of course we can't!


**How Can I Tell if the Air is Clean or Dirty?**

For information about visibility: <http://www.epa.gov/aqi/visibility/>

Have you ever been stopped behind a truck or a bus at a traffic light? When it starts up, sometimes a puff of dark smoke comes out of the exhaust pipe.

1

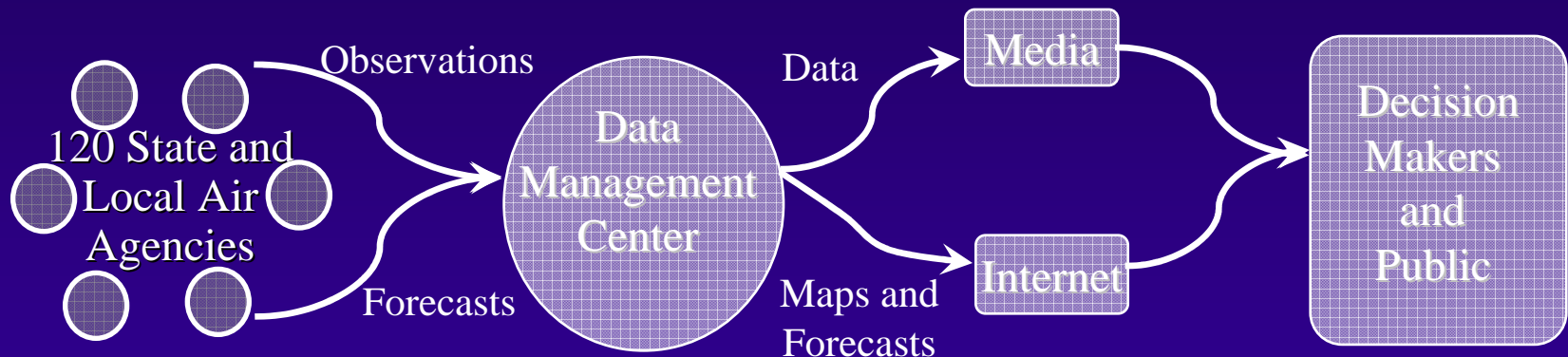
It's a **Red Day!**  
You should play outside in the **morning**  
when the Air Quality is better.



<b>AQI</b>	Good	0-50
	Moderate	51-100
	Unhealthy for Sensitive Groups	101-150
	Unhealthy	151-200
	Very Unhealthy	201-300

# AIRNow Program

- Centralized, real-time air quality information system



# Possible Future Activity

## AIRNow-I (AIRNow international version)

- Key features:
  - Data processing
  - Automated quality control checks
  - Manual quality control checks
  - System monitoring and diagnostics
  - Mapping
  - Standardized data output
- Built from current AIRNow technology
- Runs on a Windows platform

# Possible Future Activity

## Database

- Relational
- Low cost
- Flexible/Scalable

## Data Management System

- Data processing
- Quality control
- System monitoring
- Reporting

## Mapping Software

- Map production
- Animations
- Customizable graphics
- GIS capability

## Multilingual capability

