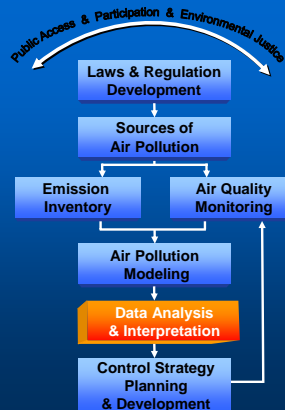


Chapter 7: Data Analysis and Interpretation for Decision Makers as Part of Control Strategies

Chapter Overview

- Data Analysis and Interpretation in an AQM Control Strategy Program
- Types of Data Recording Instrumentation
- Presentation of Data
- Risk Assessment
- AQM Planning Tool Activity

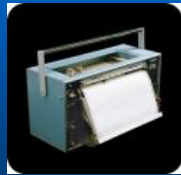
Role of Data Analysis and Interpretation in an Air Quality Management Program.



Ambient Monitoring: Time-Integrated and Real-Time



Simple Data Recording Device

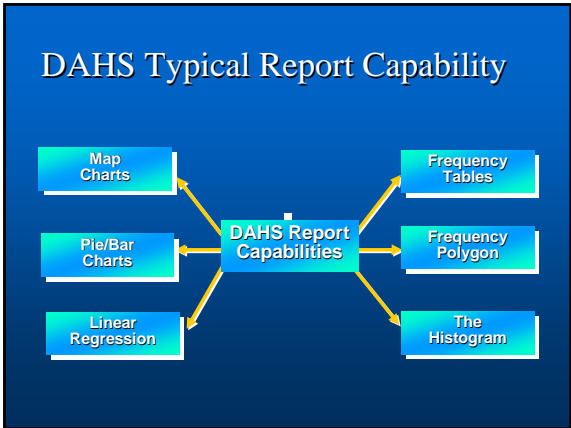






Presenting Data To Decision Makers

- Visual Representations
- Interpretation
- So what?
- What is your experience?

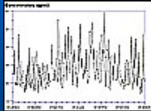


Data Presentations

Maps

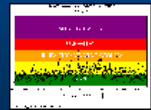


Plots



Data

1	57
2	72
3	159
4	44
5	110
6	68
7	59
8	56
9	60



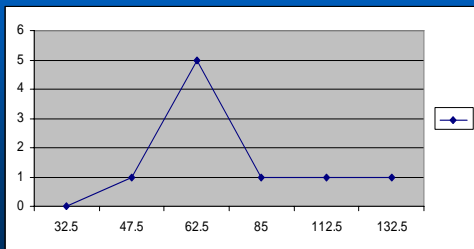
SO₂ Levels Used to Develop a Frequency Table

Days	SO ₂ Concentration, ppb
1	57
2	72
3	159
4	44
5	110
6	68
7	59
8	56
9	60

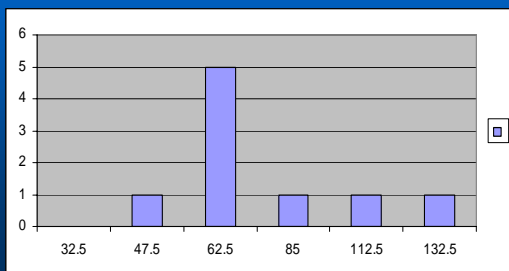
SO₂ Frequency Table

Class Interval, ppb	Freq. Of Occurrence	Relative Frequency
25-40	0	0/9 = 0
40-55	1	1/9 = 0.11
55-70	5	5/9 = .55
70-100	1	1/9 = 0.11
100-125	1	1/9 = 0.11
125-160	1	1/9 = 0.11

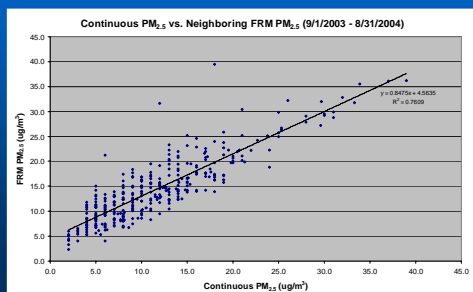
Frequency Polygon



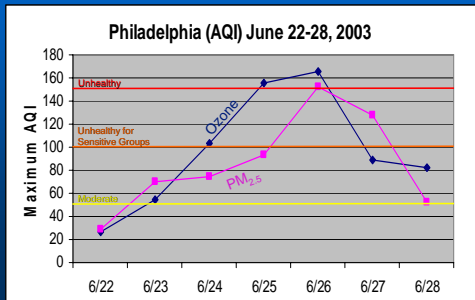
The Histogram



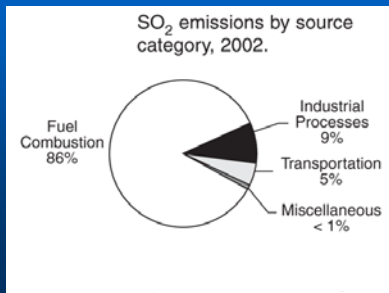
Linear Regression



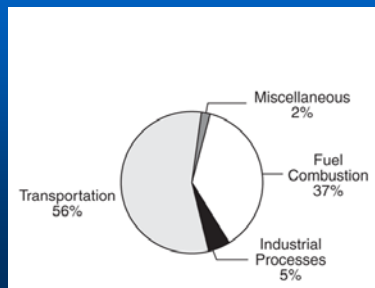
Multi-Pollutant Trend Chart



Pie Chart of SO₂ Emissions By Source Category

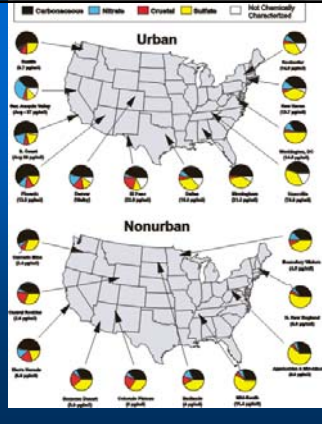


Pie Chart of NO_x Emissions By Source Category

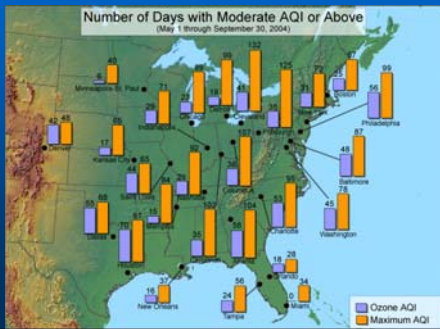


Pie and Map Charts

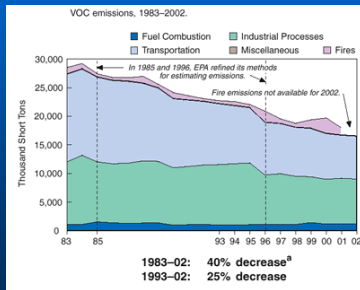
Regional PM-2.5 Composition



Map Chart and Bar Charts Used For Air Quality Index Forecasting

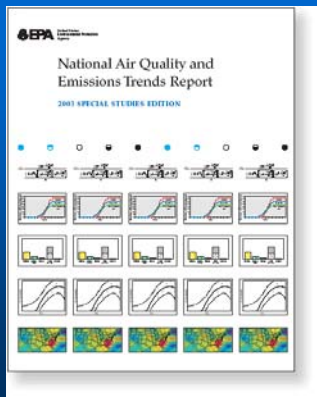


Cumulative Horizontal Bar Chart



EPA's Annual National Air Trends Report

Web Site:
<http://www.epa.gov/airtrends>



Aerial Maps



Presenting Data to the Public

- Communication Plan
- Accessible and Understandable
 - Know Your Audience
- Benefits of educated public
- Options for presenting to and hearing from the public

Air Quality Index

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

Web Page for Health Care Providers (www.airnow.gov/health-prof)



Ozone Web Course for Health Care Providers



Particulate Pollutant and Web Page

AIR QUALITY INDEX FOR PARTICULATE POLLUTION

AQI Range	Color	Health Messages
0-50	Green	Good. Air quality is satisfactory, and air pollution poses little or no risk.
51-100	Yellow	Moderate. Unusually sensitive people may experience minor respiratory irritation.
101-150	Orange	Unhealthy for Sensitive Groups. People with respiratory disease, such as asthma, and children and the elderly may experience more serious respiratory symptoms.
151-200	Red	Unhealthy. Everyone may begin to experience respiratory symptoms, and asthma attacks may increase.
201-300	Purple	Very Unhealthy. Serious respiratory symptoms are likely to appear in everyone. There may be health emergencies.
301-400	Brown	Hazardous. Health warnings of emergency conditions. The entire population is more likely to be affected.

<http://www.airnow.gov/>

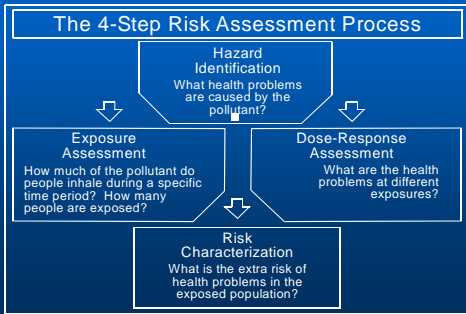
EPA's Air Quality System

- Ambient Air Pollution Data
- Ambient Air Meteorological Data
- Descriptive Information About Each Monitoring Station
- Data Quality Assurance/Quality Control Information

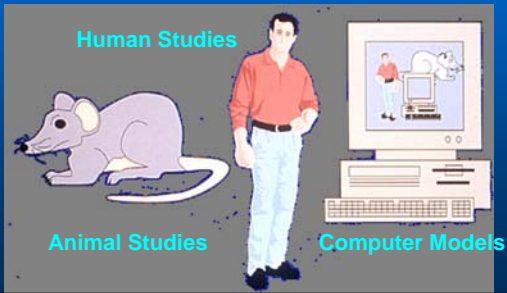
Risk Assessment

- Health Risks
- Risk Assessment

Risk Assessment Process



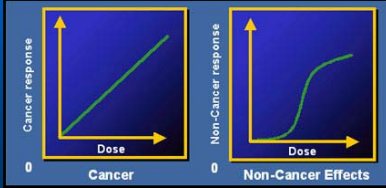
Hazard Identification



Exposure Assessment

- Exposure?
- Determine:
 - Sources
 - Amounts of toxins
 - Number of people
 - Pollution per person

Dose-Response Assessment



Risk Characterization

$$\text{Maximum Lifetime Exposure} \times \text{Dose Relationship} = \text{Maximum Individual Lifetime Risk}$$

Uncertainty of Risk

- Extrapolation Issues
- Inaccuracy
- Making Assumptions



Chapter Review

- Data analysis is an integral part of assessing the effectiveness of an Air Quality Management Program.
- There are numerous options for presenting the data in an effective manner.
- The public is a key player in air quality management and communicating effectively with them has many benefits, but does require planning.

AQM Planning Tool Activity
