Air Quality

Air Quality, Monitoring, and Health

June 27, 2017
Smoke Management Review Committee Meeting
Why is smoke a concern?

Air pollutants

- Particulate matter (PM$_{2.5}$)
- Air toxics (benzene, PAH)

Key air quality components of smoke
PM$_{2.5}$ National Ambient Air Quality Standard (NAAQS) overview

• 24-hour PM2.5 standard: 35 ug/m$^3$
  – Annual PM2.5 standard: 12 ug/m$^3$

• How compliance with standard is calculated
  – 24-hour standard is based on 3-year average

• Limitations of NAAQS
Limitations of 24-hour PM2.5 standard
Sisters, Oregon

Smoke intrusion

24-hour average = 11.6

May 10, 2017
Limitations of 24-hour PM2.5 standard
Sisters, Oregon

May 8, 2017

24-hour average = 25.3
• DEQ has a network of PM2.5 monitors
  – Federal reference monitors – used to determine compliance
    • Captures particulates on a filter, must be analyzed by a Lab
    • Measurements are provided in ug/m$^3$
  – Nephelometers – can provide real-time hourly data
    • Measurements are provided in Bscat (beta scattering)
Air Quality Index (AQI) & NAAQS

- AQI is index for reporting daily air quality

<table>
<thead>
<tr>
<th>Air Quality Rating</th>
<th>Air Quality Index</th>
<th>PM$_{2.5}$ 1-hour average (µg/m$^3$)</th>
<th>PM$_{2.5}$ 24-hour average (µg/m$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOOD</td>
<td>0-50</td>
<td>0.0 – 40.4</td>
<td>0.0 – 12.0</td>
</tr>
<tr>
<td>MODERATE</td>
<td>51-100</td>
<td>40.5 – 80.4</td>
<td>12.1 – 35.4</td>
</tr>
<tr>
<td>UNHEALTHY FOR SENSITIVE GROUPS</td>
<td>101-150</td>
<td>80.5 – 175.4</td>
<td>35.5 – 55.4</td>
</tr>
<tr>
<td>UNHEALTHY</td>
<td>151-200</td>
<td>175.5 – 300.4</td>
<td>55.5 – 150.4</td>
</tr>
<tr>
<td>VERY UNHEALTHY</td>
<td>201-300</td>
<td>300.5 – 500.4</td>
<td>150.5 – 250.4</td>
</tr>
<tr>
<td>HAZARDOUS</td>
<td>&gt;300</td>
<td>&gt;500.5</td>
<td>&gt;250.5</td>
</tr>
</tbody>
</table>
Sisters Hourly PM2.5 Concentrations compared to the Hourly AQI

May 2017

Times are for the bottom of the hour and in PST

Air Quality Rating | PM$_{2.5}$ 1-hour Average ($\mu$g/m$^3$)
--- | ---
GOOD | 0.0 - 40.4
MODERATE | 40.5 - 80.4
UNHEALTHY FOR SENSITIVE GROUPS | 80.5 - 175.4
UNHEALTHY | 175.5 - 300.4
VERY UNHEALTHY | 300.5 - 500.4

24 hour standard
Adult asthma prevalence, 2012-2015


Reliability is based on the number of people surveyed. Counties with small numbers of adults surveyed will result in a warning that the prevalence may be unreliable or being suppressed because the prevalence is unreliable.

Reliability is based on the number of people surveyed. Counties with small numbers of adults surveyed will result in a warning that the prevalence may be unreliable or being suppressed because the prevalence is unreliable.
Adult heart attack prevalence, 2012-2015


Reliability is based on the number of people surveyed. Counties with small numbers of adults surveyed will result in a warning that the prevalence may be unreliable or being suppressed because the prevalence is unreliable.
Adult stroke prevalence, 2012-2015


Reliability is based on the number of people surveyed. Counties with small numbers of adults surveyed will result in a warning that the prevalence may be unreliable or being suppressed because the prevalence is unreliable.
Adult cardiovascular disease prevalence, 2012-2015


Reliability is based on the number of people surveyed. Counties with small numbers of adults surveyed will result in a warning that the prevalence may be unreliable or being suppressed because the prevalence is unreliable. Cardiovascular disease includes angina, heart attack, or stroke.
Population age 65 and over in 2000

Data source: U.S. Census Bureau
Population age 65 and over in 2016

Data source: Oregon Population Research Center
Percent increase of people age 65 and over from 2000 to 2016

Data source: U.S. Census Bureau and Oregon Population Research Center
Health concerns

- Vulnerable populations
  - Elderly, children
  - Includes people who work outside

- How do we limit exposure to communities
Questions?