Forest Fire Smoke and Health Impacts

Smoke Management Review Committee
May 24, 2017 Meeting

Presented by Kirsten Aird
Chronic Disease Programs Manager
Health Promotion and Chronic Disease Prevention
Oregon Public Health Division – Oregon Health Authority
Overview

• What’s the issue?
  – Composition of forest fire smoke
• What’s the impact?
  – Chronic health conditions and smoke exposure
• Who is impacted the most?
  – Vulnerable populations and smoke exposure
• What is the cost?
  – Costs of selected health conditions in Oregon
• Why does this matter?
Forest fire smoke

• Contains numerous potentially harmful components, including: particulate matter, nitrogen dioxide, ozone, carbon monoxide, polycyclic aromatic hydrocarbons, and volatile organic compounds (Reid et al., 2016)

More about particulate Matter

• Particulate Matter (PM) is a mixture of small particles and liquid droplets found in the air. Studies have shown that there are harmful health effects from breathing PM particles (Department of Environmental Quality, 2017)

• PM is present in smoke from wildfires and smoke from planned burning events (Centers for Disease Control and Prevention, 2016)

• Particle pollution, found in smoke, can trigger chronic conditions (American Lung Association, 2017).
Asthma

Definition
Asthma is an obstructive lung disease. The airways become temporarily inflamed and produce excess mucus, and the muscles tighten making it harder to breathe.

Common Triggers
- Smoke
- Air pollution
- Dust mites
- Dander
- Mold

Acute smoke exposure can trigger asthma attacks. It also may decrease lung function in non-asthmatic children.
Chronic obstructive pulmonary disease (COPD)

**Definition**
COPD is a progressive lung disease that makes it hard to breathe. The lungs may lose their elastic properties that move air in and out, or they may become clogged with mucus.

Some things cause shortness of breath for people with COPD
- Smoke
- Dust
- Strong fumes

Acute smoke exposure can irritate the lungs and make breathing harder for people with COPD.
Heart disease

Definition
Heart disease includes a range of conditions that affect the function of the heart and the blood vessels.

Activities or substances that stress or inflame the heart and vessels can cause pain, irregular heartbeat, or heart attacks.

When acute smoke exposure interferes with lung function, the heart works harder to pump blood and oxygen to the body. Chemical messengers released into the blood can also trigger cardiac events.
Vulnerable Populations

People with asthma, COPD, other lung disorders, or heart disease
Acute smoke exposure can trigger or worsen these conditions.

Older adults
They may be more likely to have heart or lung diseases.

Children
They are still developing, spend more time being active outside, and have a higher breathing rate than adults.

Pregnant Women
Women have a higher breathing rate during pregnancy. Some evidence suggests smoke exposure is associated with decreased birthweight babies.
## Vulnerable Populations in Oregon

### Number of Oregonians

<table>
<thead>
<tr>
<th>Condition</th>
<th>Rural counties</th>
<th>Urban counties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma (adults)</td>
<td>77,000</td>
<td>252,000</td>
</tr>
<tr>
<td>Heart disease</td>
<td>37,000</td>
<td>89,000</td>
</tr>
<tr>
<td>COPD</td>
<td>59,000</td>
<td>131,000</td>
</tr>
<tr>
<td>Children (age 0-14)</td>
<td>151,750</td>
<td>566,613</td>
</tr>
<tr>
<td>Adults age 65+</td>
<td>182,038</td>
<td>450,718</td>
</tr>
</tbody>
</table>

# Costs of Disease in Oregon

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma (adults &amp; children)</td>
<td>$411 million</td>
<td>$16.5 million</td>
</tr>
<tr>
<td>COPD***</td>
<td></td>
<td>$32 million</td>
</tr>
<tr>
<td>Heart disease</td>
<td></td>
<td>$564 million</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>$182 million</td>
<td></td>
</tr>
<tr>
<td>Coronary heart disease</td>
<td>$1.1 billion</td>
<td></td>
</tr>
<tr>
<td>Other heart disease</td>
<td>$603 million</td>
<td></td>
</tr>
</tbody>
</table>

* CDC Chronic Disease Cost Calculator. Estimates may account for more than one disease and cannot be summed.
  ** Hospital Discharge Dataset, Oregon 2014
  *** COPD = Chronic Obstructive Pulmonary Disease
Why does this matter?

Forest fire smoke has a health impact on vulnerable populations both in urban and rural communities in Oregon.

- Specifically, forest fire smoke has a health impact due to the particulate matter.
- Lingering amounts of smoke can trigger acute events in vulnerable populations
- Knowing this, what can communities do to support optimal health?
References