SW Pennsylvania Context: Outdoor Pollutants & Health Impacts –

Phil Johnson, The Heinz Endowments

ROCIS Forum
Dec. 4-5, 2014

Creating Healthy Places: Protecting Indoor Spaces from Outdoor Pollution

http://ROCIS.org
In 2013 alone...

Pittsburgh had **239 days** when the EPA said our air quality was **not rated “good.”**

Yellow or orange air quality days
65 percent of the time.
“... the river valleys are among the most polluted areas in Pittsburgh and Allegheny County.”

-- CMU, 2014
Our Black Carbon Rivers
• 9 of our 10 monitors in worst 1/3\textsuperscript{rd} of country

• 6 of our 10 monitors in worst 10\% of country
BREATHE METER

OUR AIR RANKS IN THE DIRTIEST 10 PERCENT OF U.S. CITIES.*

Select a city from the dropdown on the right to compare our air.

PITTSBURGH

8.9%

CLEANEST (100%)

DIRTIEST (0%)

DENVER, CO

84.3%

Percentile rank* for average annual particle pollution out of 338 urban areas using U.S. EPA data from 2010 to 2012 (Clean Air Task Force, 2013).

HOW YOU CAN HELP

WHAT IS PARTICLE POLLUTION?

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PITTSBURGH 8.9%

CLEANEST (100%)

PORTLAND, OR 83.4%

DIRTIEST (0%)

Percentile rank* for average annual particle pollution out of 338 urban areas using U.S. EPA data from 2010 to 2012 (Clean Air Task Force, 2013).
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CLEANEST (100%)

DIRTIEST (0%)

BOSTON, MA

74%

Percentile rank* for average annual particle pollution out of 338 urban areas using U.S. EPA data from 2010 to 2012 (Clean Air Task Force, 2013).
Most of the U.S. Already Meets the Annual Fine Particle Health Standard of 12 μg/m³

66 counties don’t currently meet 12 μg/m³

EPA will not decide who needs to improve air quality to meet the standard until 2014 at the earliest. States will have until 2020-2025 to meet the standard.

53 counties based on Data from 2010-12
Dark Green are additions, Red are subtractions.
Note these characterizations will likely NOT exactly reflect Nonattainment boundaries.
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Based on 2010-2012 monitoring data,

Allegheny County was in the last or slowest 10 percent of U.S. counties that failed to meet the 2012 annual standard
We are gaining too slowly ...

More than half of the U.S. counties had already met—or fallen below—that standard a full decade earlier.
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2011-13 PM$_{2.5}$

- 12% above NAAQS
- 34% above WHO
- 52% above CWS
- 33% above CWS
- 27% above CWS
- 9% above CWS

Over NAAQS
Over World Health Org
Over CanadaWide Std
CanadaWide Std
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Ohio?
BREATHE METER

OUR AIR RANKS IN THE DIRTIEST 10 PERCENT OF U.S. CITIES.*
Select a city from the dropdown on the right to compare our air.

PITTSBURGH | CLEVELAND-ELYRIA, OH

8.9% | 13.6%

DIRTIEST (0%) | CLEANEST (100%)

Percentile rank* for average annual particle pollution out of 338 urban areas using U.S. EPA data from 2010 to 2012 (Clean Air Task Force, 2013).
Source Ranges (PM$_{2.5}$)

• Allegheny County contribution
  – ~34 to 54 percent

• Allegheny County + PA sources
  – ~50 to 66 percent

Source: J Graham, CATF 2013
Figure 4. Sources of PM$_{2.5}$ emissions in Allegheny County for 2008 from the National Emissions Inventory v. 2.0$^{68}$
1940s. University of Pittsburgh
“It’s too easy for a community that had horrific air pollution to say it’s cleaner.

Small particle pollution is 50 percent higher in Pittsburgh than in Boston.

Why should people in Pittsburgh put up with that?

It’s perfectly possible to get down to those lower pollution levels because lots of places have.”

-- Joel Schwartz, 2013
“Pittsburgh has come a long way, but has a ways to go.”

-- Arden Pope, 2013
Pittsburgh evidence

32 peer-reviewed journal papers & 3 technical reports (published 1970+) with Pittsburgh air pollution and health data.

Positive and statistical significance for:

- Excess mortality
- Excess disease
- Adverse reproductive outcomes

Source: R.H. White Consultants, 2013
• Cardiac and stroke death
• Increased ER visits/hospitalizations from asthma and other respiratory effects
• Low birth weight babies and other complications
• Autism spectrum disorders
U.S. 130,000 annual deaths
California – annual deaths

PM$_{2.5}$ exposure \hspace{1cm} 8,800

Motor vehicle crashes \hspace{1cm} 3,200

Homicides \hspace{1cm} 2,000

CARB 2007
“Air pollution each year kills as many people as does smoking. While smoking is riskier, only 20 percent of the population smokes. But everyone breathes.”

-- Pittsburgh, 2013
Utah Hospital Admissions
Children 0-17 Year

Mean PM$_{10}$

Bronchitis & Asthma

Pneumonia & Pleurisy

μg/m$^3$ or Admissions

85/86 86/87 87/88 85/86 86/87 87/88 85/86 86/87 87/88

Winter

Pope, Amer J Public Health 1989; 79: 623
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<thead>
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<th>Year</th>
<th>85/86</th>
<th>86/87</th>
<th>87/88</th>
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</thead>
<tbody>
<tr>
<td>PM$_{10}$</td>
<td>100</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Bronchitis</td>
<td>80</td>
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Were the Utah kids outside the entire time?
Outdoor-generated particles accounted for average of 79 percent of indoor PM concentrations. Range was 40 – 100 percent.
When indoors, only outdoor particles were significantly associated with markers of airway inflammation in study of children with asthma.
What we know
What we know

• The building envelop does not provide an effective barrier from outdoor pollutants
What we know

• Outdoor air studies are relevant to the assessment on indoor environmental health risks
What we know

• Mitigation measures must be done thoughtfully
What we know

• Our most vulnerable populations may be most at risk because of the indoor environments in which they dwell
What we know

The cleaner the inside, the better
What we know

The cleaner the outside, the better
If it looks like a duck
and quacks like a duck
It’s a DUCK!
San Francisco has air-filtration requirements

Cal EPA: recommends building housing at least 500 feet from major roadways and 1,000 feet from busy distribution centers and rail yards.

“Now, a supervisor is looking to ensure that new homes, schools and day care facilities in high-pollution areas of the city are constructed with technology that protects residents from asthma, heart disease and other illnesses associated with fine particulate matter.”
• Require developers constructing or retrofitting buildings in those areas to install ventilation systems that reduce the amount of particulate matter that can get inside
• "It's important that we ensure that new housing as well as construction projects are utilizing the best technology possible to protect public health," Cohen said.
• Cohen said that as the city seeks to transform many formerly industrial areas of the Bayview and other parts of the city into residential neighborhoods, it's simply "smart planning" to mitigate potential health effects from the beginning.

• The Department of Public Health has been conducting outreach to residents, developers and others on the proposal since last fall.

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Drive to clean up S.F. freeway, construction air pollution

Proposals' goals: limit pollution, help residents breathe easier

By Marisa Lagos
July 15, 2014

“Dwelling and building....

...That domain to which everything that is belongs.”

- Heidegger, *Building, Dwelling, Thinking* (1951)