Air Quality and Health

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Thanks:

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Marshare Penny, MPH
Wayne Harris, BS
California Health Interview Survey
San Bernardino County

Estimated 228,000 persons have asthma

Of these, approximately 76,000 are under the age of 18 years

(underestimated ?)

2001 CHIS
California Health Interview Survey
Riverside County

- Estimated 258,000 persons have asthma
- Of these, approximately 76,000 are < 18 y/o

(*Estimates based upon survey response, CHIS 2005)
Asthma Hospitalizations in Riverside County

- 38% of those hospitalized were under the age of 18

- Blacks had hospitalization rates more than twice that of Hispanics and whites.

*OSHPD, 2005*
Distribution of Hospitalizations
1990-1999, By Gender, Race, and Age

Female 54%
Male 46%
White 50%
Black 22%
Hispanic 24%
Other 4%
0 to 24 54%
25 to 44 20%
45 to 64 16%
65 to 84 10%
Over 84 1%

San Bernardino County Chronic Disease Report
Hospitalizations per 100,000 Persons
1990-1999, By Gender, Race, and Age

Female: 192
Male: 160
White: 153
Black: 475
Hispanic: 144
Other: 127
0 to 24: 226
25 to 44: 106
45 to 64: 166
65 to 84: 215
Over 84: 164

San Bernardino County Chronic Disease Report
Age-Adjusted Hospitalization Rates by Race/Ethnicity
Asthma, 1990-1999

<table>
<thead>
<tr>
<th>Year</th>
<th>White</th>
<th>Black</th>
<th>Hispanic</th>
<th>Asian/Pac Isl</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>174.2</td>
<td>365.5</td>
<td>132.2</td>
<td>95.2</td>
</tr>
<tr>
<td>1991</td>
<td>177.3</td>
<td>414.4</td>
<td>120.8</td>
<td>81.5</td>
</tr>
<tr>
<td>1992</td>
<td>162.9</td>
<td>443.4</td>
<td>129.5</td>
<td>125.7</td>
</tr>
<tr>
<td>1993</td>
<td>152.6</td>
<td>516.0</td>
<td>144.9</td>
<td>125.5</td>
</tr>
<tr>
<td>1994</td>
<td>135.4</td>
<td>456.9</td>
<td>140.0</td>
<td>82.9</td>
</tr>
<tr>
<td>1995</td>
<td>162.5</td>
<td>528.3</td>
<td>171.3</td>
<td>114.6</td>
</tr>
<tr>
<td>1996</td>
<td>139.8</td>
<td>421.7</td>
<td>137.4</td>
<td>108.3</td>
</tr>
<tr>
<td>1997</td>
<td>148.3</td>
<td>449.3</td>
<td>156.6</td>
<td>101.7</td>
</tr>
<tr>
<td>1998</td>
<td>135.4</td>
<td>427.9</td>
<td>136.2</td>
<td>83.0</td>
</tr>
<tr>
<td>1999</td>
<td>132.7</td>
<td>480.3</td>
<td>136.8</td>
<td>67.9</td>
</tr>
</tbody>
</table>

Note: Number of Hospitalizations for American Indians was considered too small to calculate a reliable rate.

San Bernardino County Chronic Disease Report
### Summary of 1990-1999

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Hospitalizations</td>
<td>27,593</td>
</tr>
<tr>
<td>Hospitalizations per 100,000 Persons</td>
<td>176</td>
</tr>
<tr>
<td>Number of Hospital Days</td>
<td>98,885</td>
</tr>
<tr>
<td>Average Length of Stay (Days)</td>
<td>4</td>
</tr>
<tr>
<td>Total Hospital Charges</td>
<td>$218,678,712</td>
</tr>
</tbody>
</table>

Yes, that’s 274 years!
Deaths per 100,000 Persons
1990-1999, By Gender, Race, and Age

San Bernardino County Chronic Disease Report
Some Good News for the Inland Empire

• 70% of asthmatic children state that their physical activity is rarely or never limited by asthma.

• 74% of adults has symptoms less than twice per month

But...the bad news...

• Nearly 1/3 are limited at least sometimes...
So how does the air affect asthma?

• Dust
  – Allergens

• Smog
  – Allergens
  – NOx, SO₂, CO, Ozone
  – PM₂.5
  – PM₁₀
Further Lung Effects...

- Triggers or enhances inflammatory responses
  - Acute and subacute increase in hospitalizations and death
  - Heart effects
Heart Disease

- Approximately 136,000 persons in Riverside County state that they have been diagnosed with heart disease.
- Another 416,000 have been diagnosed with high blood pressure.

- If the level of PM$_{2.5}$ was sustained at 20μg/m$^3$ above desired/baseline: long-term increased CPD death rate increases by 12%.

(*Estimates based upon survey response, CHIS 2005*)
How does the air affect our hearts?

• Through absorption
  – Systemic effects
• Through “reflexes”
  – Rhythm problems
• Through inflammation
  – Leads to further narrowing of vessels and instability of the “vessels”
Is there much to debate?

• No:
  – Multiple studies supporting same relationships
    • Both long-term and short-term effects
  – Epi data and animal models point the same direction
  – Deaths will be prevented with less air pollution
    • 23,000 annually in the US

• Yes:
  – Measurements and confounders
  – Whose responsibility is this?
  – How much are we willing to pay for clean air?
  – By when do we want clean air?
    • How many lives are we willing to affect?
Bright Spots

• Pollution levels are improving
• Heart disease death rates decreasing
  – But asthma rates moving upward
• A larger portion of society seems to care
• The Global warming/Greening movement
How much choice do we really have?

- Individualism
  - Freedom to create ones path without outside interference
- Transportation Options:
  - Walk
  - Bike
  - Train
  - Bus
  - Plane
  - Other
  - Combination
  - Car
Thank You

Call me for further questions…
(951) 358-5058