Overview and Assessment of the Key Databases
Health and Air, for Health Studies

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CSE Conference, New Delhi - 2006

- Director and Pediatric Pulmonologist, Lakeside Hospital – Bangalore - India.
- Chairman, Technical Advisory Committee, Karnataka State Pollution Control Board.
- Permanent member “Environment Monitoring Committee” Metro Rail system in Bangalore.
- Founder, Chairman Environment and Health group of Indian Academy of Pediatrics.
LIFETIME EXPOSURES OF POLLUTANTS

- Air
- Domestic Environments
  - Drinking Water
  - Soil: Dermal
  - Soil: Ingestion
  - "Normal" Food
  - Breast-feeding
  - Intra-uterine
  - Occupational Exposure

Birth 6mths 1yr 5yrs 16yrs 45yrs 65
Sinusitis frequency in Britain through the ages

- Bronze Age: 0.5%
- Iron Age: 0.5%
- Romano-British: 3%
- Anglo-Saxon: 3.5%
- Medieval: 7%
Vulnerability of children to environmental exposures

- Children are especially vulnerable to the effects of pollutants
  - Breathe more air relative to body weight
  - Greater physical activity than adult (124 min Vs 21 min)
  - During exercise there is 5 times more deposition of particles in the lungs (Chaiupa .D.C et al. Env. Health Project.2004;112:879-882)
  - Small airways favours deposition
  - Rapid growth and development
  - Different metabolism
- Developmental stage at exposure determines outcome
Environmental impacts on respiratory diseases

- ETS Intrauterine Smoking – Decrease birth wt, small airways at birth (Nicotine, CO)
- ETS exposure associated with lower lung function throughout childhood
- Allergens (HDM) & irritants (Ozone) result in altered airway growth (Plopper et al)
  - Decreased branching, thickened walls
- Strict allergen reduction (Woodcock et al)
  - Greater lung function at 3y
- Increase O.M; Asthma.AR (Paramesh.H)
- Increase Sudden infant death syndrome
- Increase Sinusitis (Paramesh.H)
- Increase acute respiratory infection in ill ventilated huts in rural children under 5 years (Paramesh.H, Cherian.E)
- Indoor pollution altered gender prevalence (Paramesh.H, Cherian.E)
- Urban children suffer more allergy and rural children more of infection (Paramesh.H)
Bangalore - Vehicles

Total No. of vehicles as on 31 March 2005 - 25.6 Lakhs

Two Wheelers        – 72 %
Three Wheelers   (Autos)  -   3 %

Total No. of vehicles as on 31 March 2005 - 25.6 Lakhs

About 900 new vehicles are being registered in Bangalore everyday
### AMBIENT AIR QUALITY; AMCO BATTERIES

#### Concentration in ug/m3

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<tbody>
<tr>
<td>SO2</td>
<td>32</td>
<td>26</td>
<td>11</td>
<td>12</td>
<td>6.7</td>
<td>8</td>
<td>60</td>
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<tr>
<td>Nox</td>
<td>31</td>
<td>34</td>
<td>25</td>
<td>26</td>
<td>28.4</td>
<td>54</td>
<td>60</td>
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<tr>
<td>RSPM</td>
<td>98</td>
<td>56</td>
<td>53</td>
<td>55</td>
<td>78.1</td>
<td>75</td>
<td>60</td>
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<tr>
<td>TSPM</td>
<td>160</td>
<td>162</td>
<td>122</td>
<td>119</td>
<td>181.4</td>
<td>150</td>
<td>140</td>
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# Indoor Pollutants / Asthma Triggers

<table>
<thead>
<tr>
<th>Aero-biologicals</th>
<th>Irritants</th>
</tr>
</thead>
<tbody>
<tr>
<td>❖ Dust mite</td>
<td>❖ Cigarette smoke</td>
</tr>
<tr>
<td></td>
<td>o 1994 - 6.0%</td>
</tr>
<tr>
<td></td>
<td>o 1999 - 7.5%</td>
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<tr>
<td></td>
<td>o 2004 - 7.9%</td>
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<tr>
<td>❖ Cockroach</td>
<td>❖ Mosquito Coil</td>
</tr>
<tr>
<td></td>
<td>- 5.0%</td>
</tr>
<tr>
<td>❖ Fungi Pollens</td>
<td>❖ Other smokes</td>
</tr>
<tr>
<td></td>
<td>❖ Formaldehyde</td>
</tr>
<tr>
<td>❖ Viruses/Bacteria</td>
<td>❖ Volatile organic compounds</td>
</tr>
<tr>
<td>❖ Food</td>
<td>❖ Asbestos</td>
</tr>
<tr>
<td></td>
<td>❖ Radon</td>
</tr>
</tbody>
</table>

- Dust mite: 4000/g
- Cockroach: 25.00%
- Fungi Pollens: 07.50%
- Pets: 05.00%
- Viruses/Bacteria: 40.00%
- Food: 19.90%

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<tr>
<td>❖ Radon</td>
</tr>
</tbody>
</table>

H. Paramesh Ind. Journ. of pediatrics - 2002
Asthma Prevalence 1979-2004

- 1979: 9%
- 1984: 10.50%
- 1989: 18.50%
- 1994: 24.50%
- 1999: 29.50%
- 2004: 26.70%

H. Paramesh
Prevalence of Persistent Asthma

- 1994: 80%
- 1999: 74.50%
- 2004: 63.40%

- 1994: 20%
- 1999: 25.50%
- 2004: 36.60%

Persistent Asthma grades and Prevalence

Persistent Mild:
- 1994: 64.0%
- 1999: 68.0%
- 2004: 77.1%

Persistent Moderate:
- 1994: 32.0%
- 1999: 27.8%
- 2004: 16.2%

Persistent Severe:
- 1994: 4.0%
- 1999: 6.5%
- 2004: 6.7%

Indian.J.Ped -2006 Supplement 73: 551-555
Seasonal Variation of Asthma

<table>
<thead>
<tr>
<th>Season</th>
<th>1994</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monsoon</td>
<td>75.8%</td>
<td>24.3%</td>
</tr>
<tr>
<td>Winter</td>
<td>82.3%</td>
<td>55.8%</td>
</tr>
<tr>
<td>Summer</td>
<td>2.8%</td>
<td>19.9%</td>
</tr>
</tbody>
</table>
Prevalence of asthma in school children
Age 6-15 years

P. Value I, II & III < 0.001.
H. Paramesh, Down to earth - 2001
### Symptoms related to air pollution / police Personnel

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Traffic (1045)</th>
<th>Non Traffic (1160)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>26.12%</td>
<td>14.9%</td>
</tr>
<tr>
<td>Cough</td>
<td>27%</td>
<td>14.4%</td>
</tr>
<tr>
<td>Breathlessness</td>
<td>7.8%</td>
<td>3.6%</td>
</tr>
<tr>
<td>Rhinitis</td>
<td>10.7%</td>
<td>4%</td>
</tr>
<tr>
<td>Urticaria</td>
<td>11%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Feverishness</td>
<td>0.57%</td>
<td>0.17%</td>
</tr>
<tr>
<td>Conjunctivitis</td>
<td>1.4%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>
Distribution of distance from the home to work place

Traffic = 1045 (273) Non-traffic = 1160 (173)

- 1-10 Kms: Traffic = 189 (69.2%), Non-Traffic = 102 (58.9%)
- 11-20 Kms: Traffic = 76 (27.8%), Non-Traffic = 40 (23.1%)
- 21-30 Kms: Traffic = 2 (2.2%), Non-Traffic = 18 (10.5%)
- >31 Kms: Traffic = 2 (0.8%), Non-Traffic = 13 (7.5%)

Traffic Low PEF  Non-Traffic Low PEF

Lead Poisoning

- Ingested, inhaled or absorbed thru skin
- **Source**
  - 86% of atmospheric lead – auto exhaust, leaded petrol, water pipes, paint, battery storage, crystal glass, ceramic glaze, enamel jewelry etc.
  - Lead concentration in dust is directly proportional to the volume of traffic
  - Children absorb 50% and adults 10-20% of ingested lead.
  - Lead in tissue, cord blood correlate with air levels.

- **Effect**
  - GIT, peripheral nerve, central nervous system
  - Saudi Arabia study – 5000 children – 1989 – using 0.8 G/L of lead in petrol showed no alarming lead poisoning
  - Bangalore study – 863 children – using 0.59 G/L of lead in petrol showed – 4.6% of increased lead level over 10μg/dl*

- **Trend**
  - Use of unleaded petrol will reduce lead pollution. No cause for fear psychosis, however there should not be any complacency in preventive measures

Avoid Mediagenic Disease

*H Paramesh, Sameera Taipae, Taiwan - 2000*
Tobacco smoking habit

- 41% of urban children – 10-17 yrs (3078)
- 21.8% of rural children – 10-17 yrs (2194)
- 36.0% of urban club going women
- 2.0% of rural farm worker women
- 30.6% of traffic police
- 34.0% of non traffic police
- 14.0% of Poultry farm workers
- 28.0% of Agriculture farm workers

H. Paramesh, E. Cherian 2nd International Conference on Environment and Health 2000
Asthma urban / rural children
Age 6-15 years
Year - 1998

Urban children: 5570 (16.63%)
Rural Children: 995.00 (5.70%)

H. Paramesh. Ind. J. of Ped - 2002
Gender/Asthma

M:F = 1.8-1.0 %

Asthma / Indoor air pollution rural children


Point prevalence of respiratory infection / indoor pollution
no. 612 < 5 years. Rural study

Cooking fuel – Agriwaste, dung cakes

Source - E.Cherian, H.Paramesh, Asian Ped Conf Bangkok - 2003
Women and children bear the brunt of air pollution; those living in slums are the worst affected.
Burden of disease in India due to Asthma and Chronic Obstructive Pulmonary Disease (COPD)

No of Cases in Lakhs

<table>
<thead>
<tr>
<th>Disease Type</th>
<th>2001</th>
<th>2016</th>
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<tbody>
<tr>
<td>Asthma-Chronic</td>
<td>247.4</td>
<td>350.7</td>
</tr>
<tr>
<td>COPD-Chronic</td>
<td>149.35</td>
<td>222.16</td>
</tr>
<tr>
<td>COPD-Acute</td>
<td>5.65</td>
<td>8.8</td>
</tr>
<tr>
<td>Asthma-Acute</td>
<td>2.8</td>
<td>3.67</td>
</tr>
<tr>
<td>Year</td>
<td>Urban</td>
<td>Rural</td>
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<tr>
<td>------</td>
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<tr>
<td>1995</td>
<td>653</td>
<td>2454</td>
</tr>
<tr>
<td>2000</td>
<td>1046</td>
<td>3933</td>
</tr>
<tr>
<td>2005</td>
<td>1551</td>
<td>7399</td>
</tr>
<tr>
<td>2010</td>
<td>2159</td>
<td>8153</td>
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<td>2015</td>
<td>2825</td>
<td>13525</td>
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<tr>
<td>2020</td>
<td>2825</td>
<td>10700</td>
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</tbody>
</table>

Commission on Macroeconomics and Health Sept 2005
Environmental awareness of Prevention of respiratory diseases

- Long term urban, transport, traffic, monitoring planning
- Co-ordination of various municipal utility services
- Better technology, alternate fuel.
- Build mite retardant houses / good ventilation to suit our needs
- Sun dry the blankets, pillows and mattresses once a week
- Use indoor plants and exposure to sunlight once a week
- Control E.T.S, cockroach menace, over crowding
- Clean fuel for cooking
- Breast feed for at least 6 months
- Offer solid food after 6 months in atopic children
- Traditional foods.
Thank you