Health impacts related to air quality and transport in India

Some challenges, many opportunities

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Percent of DALYs from Non-Communicable Diseases in 2010: Over 60% in Nearly All Countries Outside of Sub-Saharan Africa
627,000 Deaths Attributable to Ambient PM$_{2.5}$ by Cause in India in 2010

Deaths Attributable to Ambient Particulate Matter Pollution in India in 2010

- 40717 Cerebrovascular disease
- 305367 Ischemic heart disease
- 159912 Chronic obstructive pulmonary disease
- 108694 Lower respiratory infections
- 12736 Trachea, bronchus, and lung cancers

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yea! good to lead with the main number
17.7 million DALYs Attributable to Ambient PM$_{2.5}$ by Cause in India in 2010

- Cerebrovascular disease: 321068
- Chronic obstructive pulmonary disease: 3537259
- Ischemic heart disease: 2471068
- Lower respiratory infections: 7917530
- Trachea, bronchus, and lung cancers: 3513066

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Added the total in title
Dan Greenbaum, 2/12/2013
GBD 2010: Results from country level estimates (India)

**HAP**
- **Women:** 472,802 deaths
  - 14,430,400 DALYs
- **Men:** 549,323 deaths
  - 16,985,500 DALYs

**Occ. Risks**
- **Women:** 32,912 deaths
  - 2,341,920 DALYs
- **Men:** 309,761 deaths
  - 16,162,800 DALYs

Source: IHME, 2013
%PM$_{2.5}$ from “Residential” Emissions from INTEX_B

25-30% of outdoor particle pollution in India is from combustion of household fuels.


Chafe, 2010
The Challenge

- The burden is not decreasing and the evidence is unequivocal!
- The burden is seamless across rural–urban boundaries
- Interventions to tackle OAP and HAP would have to be in sink (at least in some measure)
- WHO-AQGs are universally applicable for defining counterfactuals but NAAQM focused only on the urban
- Density of intervention efforts would need to be substantively increased to achieve and demonstrate health benefits
- Range of health effects are broader and magnitudes bigger than previously estimated (more chronic outcomes included in the ambit)
- Multitude of competing risk factors
The Opportunities

- Extensive base of ground level air quality monitoring information for both validating models and interpolation on exposure–response curves (At least 6 long-term studies have been completed in collaboration with TNPCB)
- Some in-country exposure response for short-term health effects
- First ever maternal, child and adult air pollution cohorts launched by ICMR to both develop integrated IERs and develop exposure models for use in on-going cohorts
- Multiple CVD/Chronic disease cohorts underway allowing an examination of air pollution as a risk factor
- Increasing base of geo-coded health information
HEI-PAPA-Chennai (SRU-TNPCB) results

Balakrishnan et al., 2011
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India and Chennai now figure in the global repository of air quality and health studies.

PM$_{10}$ and Increased Daily Mortality: New HEI Review Finds Asia Results Consistent with Global Results.

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ICMR-CAR Air Pollution related health outcomes
(On-going Studies that also involve TNPCB)

- **Pregnancy outcomes**
  - Primary: Birth Weight
  - Secondary: Gestational Age; Spontaneous/missed abortions; Intrauterine fetal demise (IUFD); Intrauterine growth retardation (IUGR); Premature birth; Still birth
  - Exploratory: Birth defects

- **Child Health Outcomes**
  - Primary: Acute Respiratory tract infection
  - Secondary: Neonatal & Infant mortality

- **Adult Outcomes**
  - Primary: Pulmonary Function
  - Exploratory: Inflammatory Biomarkers; Endovascular Changes

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We don’t have a magic bullet but

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trying get closer to the target by sharpening our focus!!

Thank You

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