HEI Global Health Program

Past, Present and Future

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Chicago, Illinois
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Past: Public Health and Air Pollution in Asia (PAPA), ESCALA...

- **Special report 15. 2004.** *Health Effects of Outdoor Air Pollution in Developing Countries of Asia: A literature review*

- First set of coordinated time-series studies in major cities in Asia with local investigators
  - HEI Research Report 154: 2010
    - Bangkok, Shanghai, Hong Kong, Wuhan
    - Delhi, Chennai
  - HEI Research Report 169: 2012
    - Ho Chi Minh city, Vietnam

- **Special Report 18. 2010.** *Outdoor Air Pollution and Health in the Developing Countries of Asia: A Comprehensive Review*

- HEI Research Report 171. 2012. Romieu et al., *Multicity Study of Air Pollution and Mortality in Latin America (the ESCALA Study).*
Building a global program

- Targeted research opportunities
- Strategic Partnerships
- Communication
- Foundation funding
Present: Global Burden of Disease Major Air Pollution Sources

- Begun in 2013
- Focus: China and India
- Scientific expertise: The GBD MAPS Working Group
- High level oversight: The GBD MAPS International Steering Committee
- External Peer Review
An international collaboration: The GBD MAPS Working Group

US/CANADA
Michael Brauer/ UBC (co-chair)
Aaron Cohen/ HEI (co-chair)
Randall Martin/ Dalhousie Univ.
Aaron van Donkelaar /Dalhousie Univ.
Richard Burnett/ Health Canada
Mohammad Forouzanfar/ IHME
Joseph Frostad / IHME
Wang Yuxuan/ University of Texas

INDIA
Kalpana Balakrishnan/Sri Ramanachandra MCRI
Chandra Venkataraman/ IIT Bombay
Pankaj Sadavarte/ IIT Bombay
Sarath Guttikunda/ IIT Bombay
Alok Jhaldiyal/ IIT Bombay

CHINA
Wang Shuxiao/ Tsinghua University
Zhang Qiang / Tsinghua University
Ma Qiao / Tsinghua University
Zhou Maigeng / China CDC
Yin Peng / China CDC
Kan Haidong/ Fudan University
GBD MAPS Approach

- Develop current and future emissions inventories
- Simulate the fraction of ambient PM$_{2.5}$ due to each major source
- Estimate the GBD 2015 population exposure to each source
- Estimate source-specific burden

Future inventories based on alternative energy and control policies
Scientific and Policy Questions

- What are the major sources of air pollution in India?
- How do they contribute to population exposures to air pollution?
- What are their relative contributions to adverse effects on human health?
- What kinds of actions would it take to achieve substantial improvements in air quality and public health?
Baseline contributions 2015

Residential burning of biomass for cooking and heating contributed ~24% of ambient PM$_{2.5}$ and of mortality burden

See Poster # 3. Mike Brauer et al. for more details
Ongoing: Household Air Pollution and Non-Communicable Disease

HAP-related deaths

- 24% Lower respiratory infections
- 23% Cardiovascular diseases
- 6% Chronic respiratory diseases
- 47% Neoplasms

~75% attributable to non-communicable disease

Data source: IHME, GBD 2016
Ongoing: Household Air Pollution and Non-Communicable Diseases

Objectives

- Updated review of literature on non-communicable diseases associated with HAP; including intervention literature
- Focused analysis of GBD MAPS India provincial level data on HAP contributions to ambient air and burden

Partnerships

- Susan Anenberg, GW School of Public Health
- Darby Jack, Columbia University
- Ajay Pillarisetti, UC Berkeley
- Consulting – A Cohen, M Brauer.

Will be published as an HEI Communication this summer
Ongoing: Air quality and health impacts of shipping on Shanghai/Yangtze River Delta

- **Case study: Shanghai Yangtze River Delta**
  - Ocean going vessels, river ships, land transport
  - Evaluation of baseline and Domestic Emissions Control Areas and other policies

- **Collaborators:**
  - Prof. Zhang Yan; Kan Haidong/Fudan University,
  - Prof Wang Shuxiao/Tsinghua Univ.
  - Shanghai Environmental Monitoring Center; Shanghai Academy of Environmental Sciences
  - Advisors: Neal Fann/US EPA; Noelle Selin/MIT
Percentage Contribution of Ships within 200 nautical miles to Air Pollutant Concentrations in YRD Region

\( \frac{C_{\text{ships}}}{C_{\text{all sources}}} \)

- **PM\(_{2.5}\)**: 10-25 % in coastal regions
- **SO\(_2\)**: 50-80 % along Yangtze River
- **NO\(_x\)**: 50-70 % along Yangtze River

YRD = Yangtze River Delta
Distribution of Port-Related PM$_{2.5}$ Emissions by Shipping-Related Sources in Shanghai

Coastal ships*  

Inland ships

Container-Cargo trucks and in-port machinery

*Considers all ships in the water area administrated by Shanghai Maritime Safety Administration (SHMSA)
Communication:
State of Global Air 2018
<table>
<thead>
<tr>
<th>Year</th>
<th>Topics</th>
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<tbody>
<tr>
<td>2017</td>
<td>PM$_{2.5}$, Ozone</td>
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<tr>
<td>2018</td>
<td>PM$_{2.5}$, Ozone, Household Air Pollution, ‘Total’ Air Pollution</td>
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Year 1: State of Global Air Activity
A new Health Effects Institute report shows that 95% of the world breathes unhealthy air – causing 6.1M deaths per year primarily from heart disease, stroke & other NCDs. This study helps outline where the problems are greatest & where to target solutions.
mikebloom.bg/2JnjeL4
A new Health Effect Institute report finds that 95% of the world’s population breathes air with dangerous levels of pollution – causing 6.1M deaths a year. The report also finds that India has more ambient particulate matter pollution than China since at least 1990 – and while China’s air pollution is improving slightly, India’s is steadily worsening.

https://stateofglobalair.org/data/#/air/tab...
A new Health Effects Institute report states that 95% of the world’s population is breathing polluted air – causing 6.1M deaths a year, with China and India suffering the greatest & where India has had more ambient particulate matter pollution than China since at least 2016, improving slightly. India’s is steadily deteriorating. An #Infographic shows the number of deaths from air pollution. Data is corrected for age etc. The general trend shows that poorer countries get hit hardest because they can’t afford clean industrial technology nor adequate medical treatments. Source: buff.ly/2qiGTP1
A new Health Effects Institute report says that 95% of the world’s population breathes polluted air – causing 6.1M deaths annually from heart disease, stroke, and other illnesses. The study helps outline where the greatest challenges lie.

Mike Bloomberg (@MikeBloomberg) in response:

In the latest State of Global Air report, India has had more ambient particulate matter pollution than China since at least 2010 and is improving slightly. India's is steadily lower.

Simon Kuestenmacher (@simongerman600) responds:

#Infographic shows the number of deaths from air pollution, etc. The general trends in these countries get hit hard. They can neither afford clean air nor adequate medical care.

Edmund Kagire (@kagire) responds:

Over 7 Billion People Face Unsafe Air: State of Global Air 2018. One in Three Globally Face a “Double Burden” of Exposed to Household Burning and Outdoor Air Pollution. stateofglobalair.org/whats-new/pres... Nitidateka neza mungo tubehe neza turashira 😇 #CleanCooking
A new Health Effects Institute study finds that 95% of the world’s population – causing 6.1M deaths from heart disease, stroke, etc. The general trend is that countries get hit hardest where they neither afford clean or adequate medical care.

#Infographic shows the number of deaths from air pollution, etc. The general trend is that countries get hit hardest where they neither afford clean or adequate medical care.

Diane Lange @DclareDiane 4h
*State of Global Air*: More Air Quality Lies from the Health Effects Institute junkscience.com/2018/04/state... via @JunkScience

Edmund Kagire @kagire 4h
Over 7 Billion People Face Unsafe Air: *State of Global Air 2018*
One in Three Globally Face a “Double Burden”: Exposed to Household Burning and Outdoor Air Pollution. stateofglobalair.org/whats-new/pres... Nitidateka neza ngo tubeho neza turushira 😫 #CleanCooking

Nathaniel Bullard @NatBullard 4h
In the latest *State of Global Air* report, India has had more ambient particulate matter pollution than China since at least 2006 and is steadily improving slightly. India’s air quality is steadily improving slightly. stateofglobalair.org/data/#/air/tab...
Building a global program

Targeted research opportunities

- GBD MAPS – New policies in China? Other key regions? Global?
- Reviews of the literature
- Leverage funding of research to support core and global programs

Strategic Partnerships

- Build on existing
- Seek out new ones
- New international oversight/advisory committee
- New staffing

Communication

- Augment State of Global Air
- Expand HEI project communication

Foundation funding

- New international oversight/advisory committee
- New staffing
## Collaboration and Support

### HEI Staff
- **Annemoon van Erp**, Managing Scientist
- **Hilary Selby Polk**, Managing Editor
- **Allison Patton**, Staff Scientist
- **Kathryn Liziewski**, Research Assistant
- **Aaron Cohen**, Consulting Scientist
- **Devashri Salvi**, Research Intern
- **Mary Brennan**, Consulting Editor
- **Fred Howe**, Consulting Proofreader
- **Ruth Shaw**, Consulting Compositor

### International Collaborations

### Foundation Sponsors
- Hewlett Foundation
- Oak Foundation
- Bloomberg Philanthropies

![Logos of collaborating entities]