

# Burden of Disease from Major Air Pollution Sources in India

## Scope, Approach, Partners

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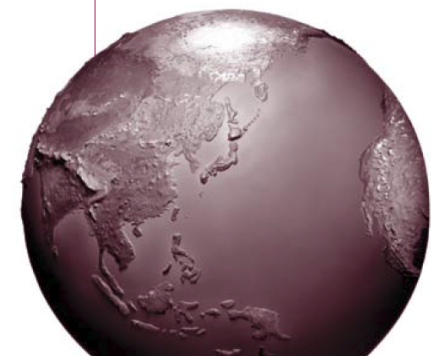


HEALTH  
EFFECTS  
INSTITUTE  
January 2018

### SPECIAL REPORT 21

**Burden of Disease Attributable  
to Major Air Pollution  
Sources in India**

GBD MAPS Working Group



# The Health Effects Institute:

*Trusted Science ➡ Cleaner Air ➡ Better Health*

- ▣ An independent non-profit institute providing trusted science on the health effects of air pollution for 35 years
- ▣ Balanced Core Support
  - ▣ US EPA and Industry (Worldwide Motor Vehicle)
- ▣ Partnerships
  - ▣ Also WHO, ADB, Clean Air Asia, TERI, Sri Ramachandra Medical School, EU, US DOE, industries, foundations, others
- ▣ Independent Board and Expert Science Committees
  - ▣ Oversee and intensively peer review all science
  - ▣ International experts from India, China, many others
- ▣ Over 350 scientific studies, reviews, re-analyses conducted around the world, including increasingly in Asia

# Key Scientific and Policy Questions

Building on the Indian Burden of Disease:

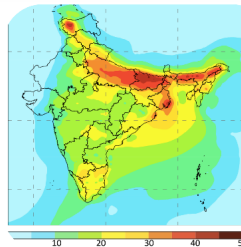
- ▣ What are the major sources of air pollution?
- ▣ How do they contribute to population exposures?
- ▣ What are their relative contributions to the burden of disease?
- ▣ What kinds of actions would it take to achieve substantial improvements in the future?

# Scientific Approach

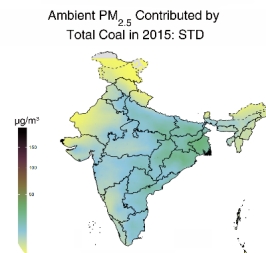


- Develop current and future emissions inventories

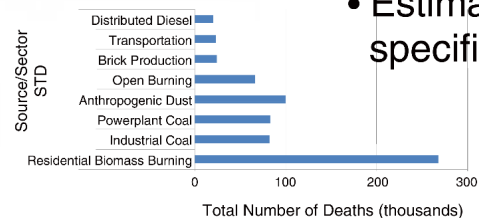
- Baseline – 2015
- 3 energy/policy scenarios



- Simulate the fraction of ambient  $PM_{2.5}$  due to each major source



- Estimate the GBD 2015 population exposure to each source

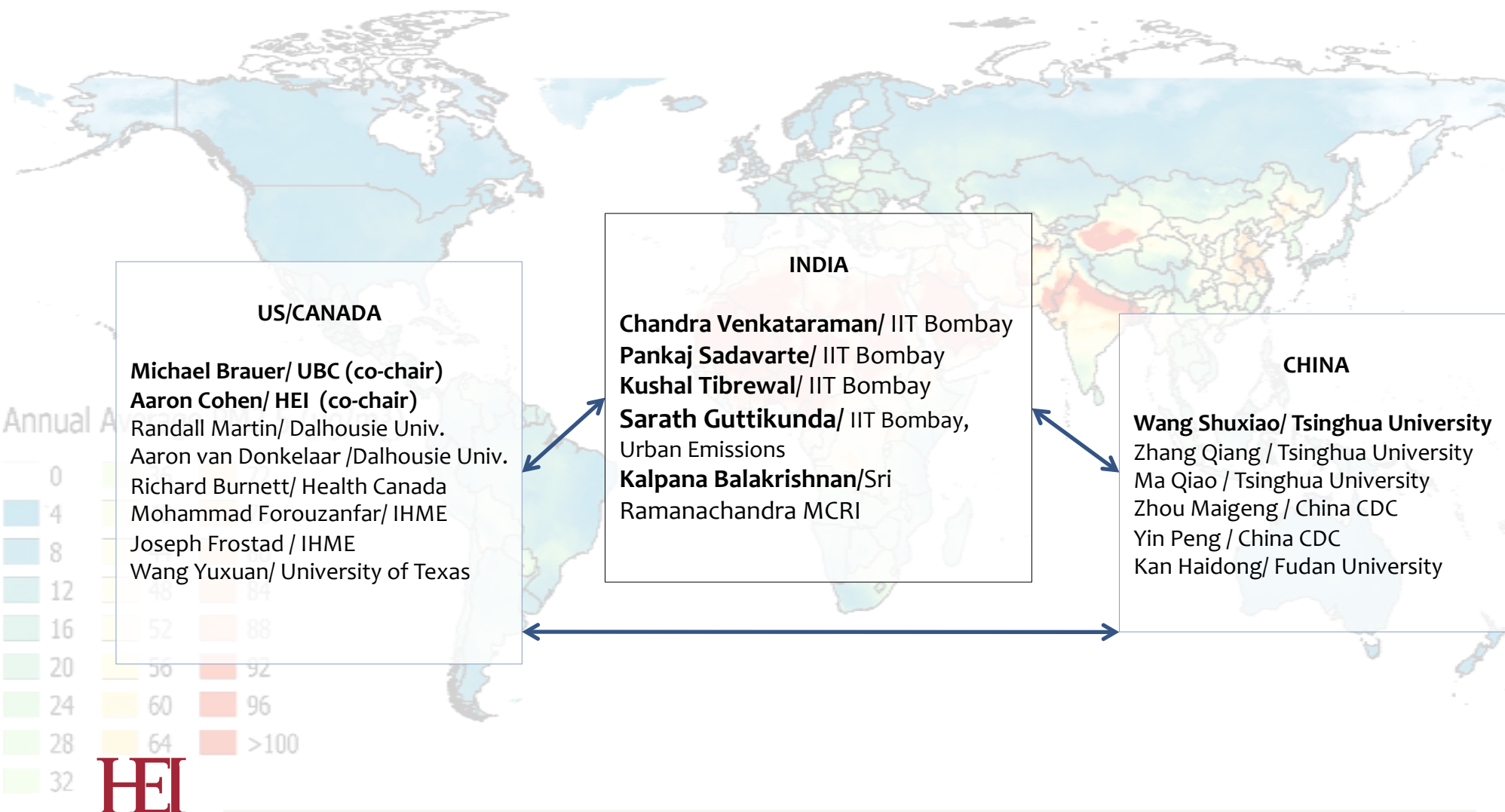


- Estimate source-specific burden

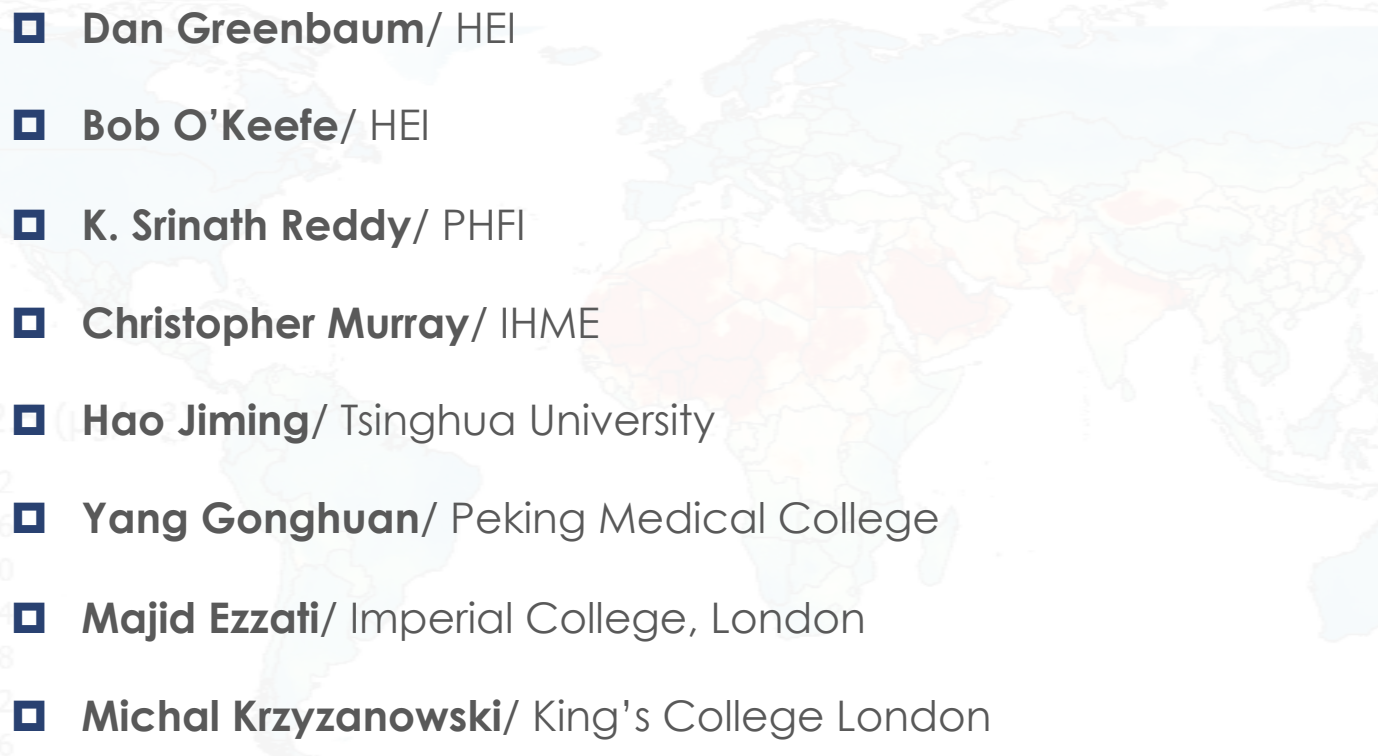
# An international collaboration: GBD MAPS overview

- 
- Begun in 2013
  - Focus: China and India
  - Scientific expertise: The GBD MAPS Working Group
  - High level oversight: The GBD MAPS International Steering Committee
  - Quality Control:
    - Independent External Peer Review
    - HEI Management, Review and Publication

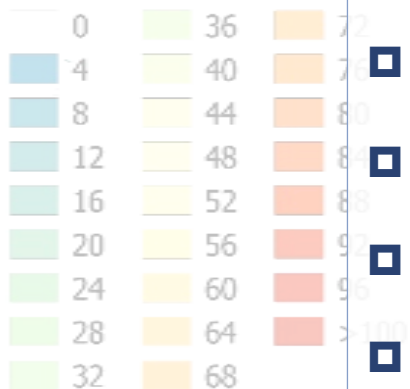
# An international collaboration: The GBD MAPS Working Group



# High level oversight: GBD MAPS International Steering Cmte

- 
- **Dan Greenbaum/** HEI
  - **Bob O'Keefe/** HEI
  - **K. Srinath Reddy/** PHFI
  - **Christopher Murray/** IHME
  - **Hao Jiming/** Tsinghua University
  - **Yang Gonghuan/** Peking Medical College
  - **Majid Ezzati/** Imperial College, London
  - **Michal Krzyzanowski/** King's College London
  - **Greg Carmichael/** World Meteorological Institute, Univ. of Iowa

Annual Average PM2.5

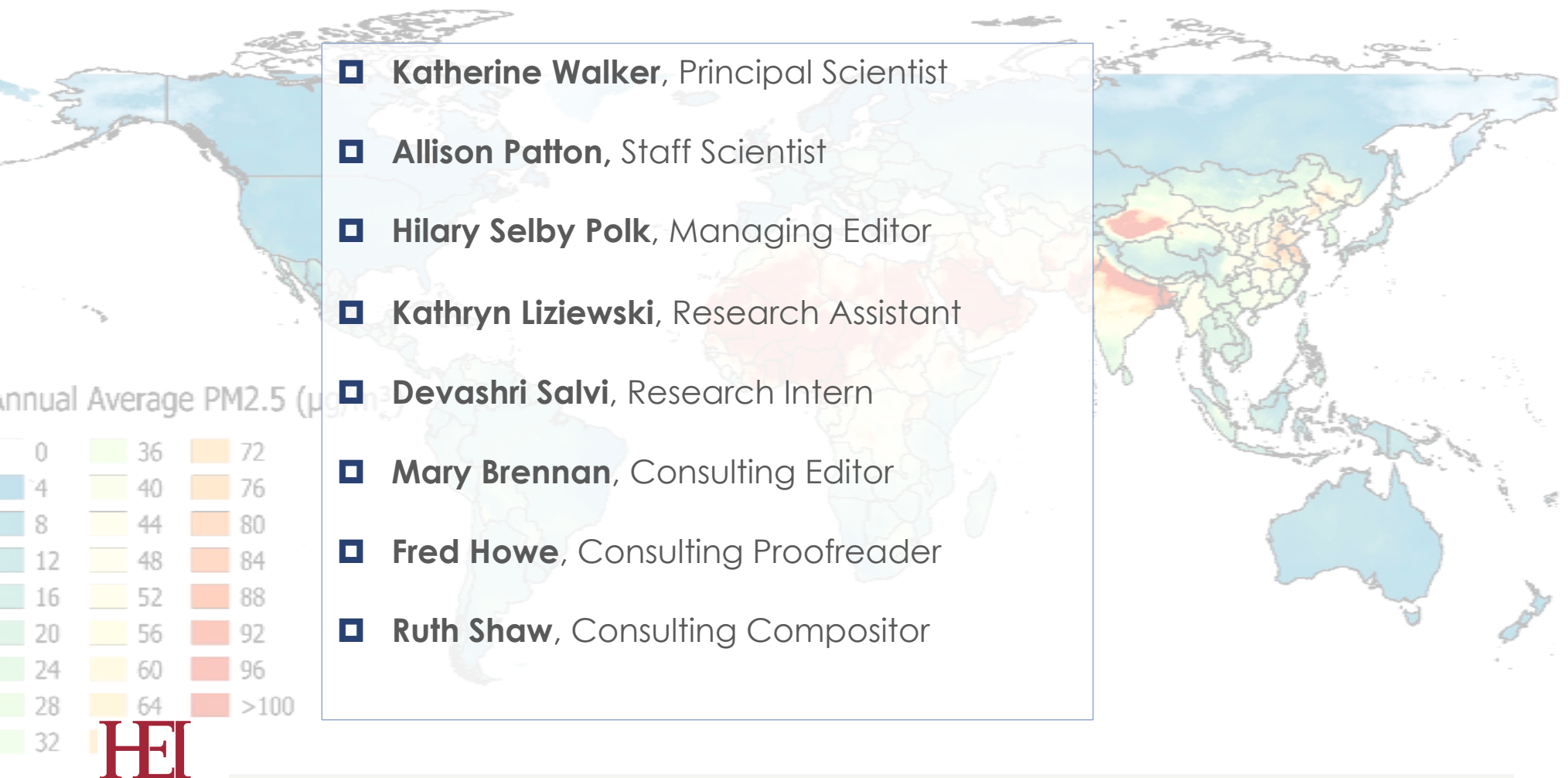


# Quality control: Independent peer review

- 
- Annual Average PM2.5 ( $\mu\text{g}/\text{m}^3$ )
- |    |    |      |
|----|----|------|
| 0  | 36 | 76   |
| 4  | 40 | 80   |
| 8  | 44 | 84   |
| 12 | 48 | 88   |
| 16 | 52 | 92   |
| 20 | 56 | 96   |
| 24 | 60 | 100  |
| 28 | 64 | >100 |
| 32 |    |      |
- **Anup Bandivadekar**/International Council on Clean Transportation, US
  - **Bhargav Krishna**/ PHFI
  - **Pallavi Pant**/ University of Massachusetts
  - **Noelle Selin**/ Massachusetts Institute of Technology
  - **Kunal Sharma**/ Shakti Foundation



# Quality control: HEI report management, review and publication



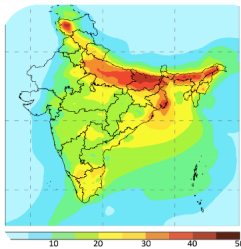
- **Katherine Walker**, Principal Scientist
- **Allison Patton**, Staff Scientist
- **Hilary Selby Polk**, Managing Editor
- **Kathryn Liziewski**, Research Assistant
- **Devashri Salvi**, Research Intern
- **Mary Brennan**, Consulting Editor
- **Fred Howe**, Consulting Proofreader
- **Ruth Shaw**, Consulting Composer

# Scientific Approach: Next speakers

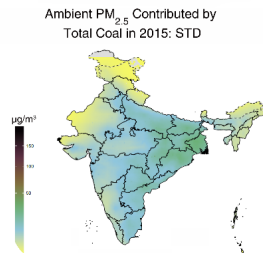


- Develop current and future emissions inventories

Dr. Chandra Venkataraman  
IIT -Bombay

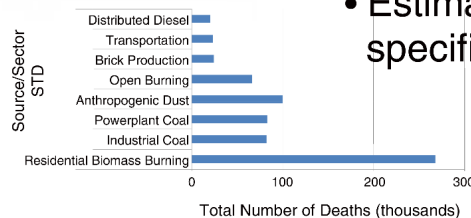


- Simulate the fraction of ambient  $PM_{2.5}$  due to each major source



- Estimate the GBD 2015 population exposure to each source

Dr. Michael Brauer  
UBC



- Estimate source-specific burden

# Progress is possible!

## *Los Angeles Then and Now*



Source: New York Times

# Thank you!



PUBLIC  
HEALTH  
FOUNDATION  
OF INDIA



IHME



THE UNIVERSITY  
OF BRITISH COLUMBIA



清華大學  
Tsinghua University