STATE OF GLOBAL AIR / 2019
A SPECIAL REPORT ON GLOBAL EXPOSURE TO AIR POLLUTION AND ITS DISEASE BURDEN
Webinar
April 10, 2019
Welcome to the State of Global Air 2019 release webinar. We will be starting shortly.

State of Global Air is on social media (@HEISoGA)!
Use #stateofglobalair to join the conversation.
A longstanding collaboration...

Introduction
Katherine Walker
Health Effects Institute
Air pollution emerges as a major risk factor
Our goal: To make data accessible

Exposure

- PM$_{2.5}$
- Ozone
- Household Air Pollution

Health Impacts

- Mortality
- Disability Adjusted Life Years – a measure of years of healthy life lost
- Age-adjusted mortality and DALY rates
- Life expectancy at birth
Main findings

In 2017:

• Over **90%** of the world’s population lives in areas above WHO’s guideline for PM$_{2.5}$

• **47%** of the world’s population — **3.6 billion** people — were exposed to household air pollution from solid fuel burning.

• Air pollution contributed to almost **5 million deaths globally. 82%** from non-communicable disease.

• Air pollution reduced life expectancy by **1 year and 8 months** on average worldwide.
# Agenda

- **Exploring the data**
  Pallavi Pant, HEI

- **Where do the data come from?**
  Michael Brauer, UBC/IHME

- **Understanding life expectancy**
  Joshua Apte, U of Texas Austin

- **Q&A/ Discussion**
Exploring the data: Bangladesh

61 \( \mu g/m^3 \) Average PM\(_{2.5}\) Exposure

79\% of the population still uses solid fuels

122,700 deaths attributed to air pollution

Loss of 1.87 years of life

www.stateofglobalair.org
Where do the data come from?

Michael Brauer
University of British Columbia, Canada
Institute for Health Metrics and Evaluation, University of Washington, USA
IHME Global Burden of Disease Annual Cycle

- **Launch of GBD results**
- **Review & updating of data and methods**
- **Prepare publications and website**
- **Decisions on new data, methods & risk-outcome pairs**
- **Re-run analyses**

**Important!**
Time trends from 1990 are re-calculated every year.

- **84** risk factors
- **350** diseases and injuries
- **195** countries
- **3,600** researchers in 145+ countries

**Important!**
Time trends from 1990 are re-calculated every year.
Estimating burden of disease from air pollution

Global population exposures

Exposure-response relationships

Minimum risk exposure level

Population-attributable fraction due to air pollution

Burden of Disease attributable to Air Pollution

Disease-specific burden
Quantifying exposure to air pollution

Ground monitoring of air quality

Satellite data

Chemical Transport Models

Surveys

Global population exposures
Estimating burden of disease from air pollution

Global population exposures

Exposure-response relationships

Minimum risk exposure level

Population-attributable fraction due to air pollution

Burden of Disease attributable to Air Pollution

Disease-specific burden
Important changes since last year

**Methods**
Reduced double counting of outdoor and household air pollution burden

**PM$_{2.5}$**: Additional spatial and temporal variation in satellite calibration

**Ozone**: Fusion of 6 chemical transport models + measurements, 6 month, 8-hr daily maximum

**Data**

**PM$_{2.5}$**: Increased number of ground monitors (~6000 -> 9900)

**Ozone**: 9700 ground monitoring sites

**HAP**: Updated survey and concentration measurement inputs

**Exposure-response**: New studies added

**Health outcomes**

Added Type II Diabetes

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[Image of GBD cycle with labels: Launch of GBD results, Review & updating of data and methods, Decisions on new data, methods and risk-outcome pairs, Re-run analyses, Prepare publications and website]
How do we estimate loss of life expectancy?

Joshua Apte
University of Texas, Austin

Life expectancy at birth (LE)

• How long an infant born today would live – on average – if today’s mortality rates held indefinitely into the future?
• Based on year-2016 national data for 185 countries.
• Key concepts: life table and survival curve
Life expectancy at birth (LE)

• How long would an infant born today live – on average – if today’s mortality rates held indefinitely into the future?

• Based on year-2016 national data for 185 countries.

• Key concepts: life table and survival curve
Loss of life expectancy ($\Delta LE$) from air pollution

What would the difference in life expectancy be if we were to:

- Eliminate all air pollution exposures
- Reduce it to different levels (for example, WHO guidelines or target levels)?

Graph showing survival rates for China and Nigeria with life expectancy (LE) and loss of life expectancy ($\Delta LE$) values.
Wide disparities exist globally in air pollution’s impact on life expectancy
Air pollution is a major contributor to lower life expectancy worldwide.
Discussion

Please submit your questions via chat
Slides and video will be posted on our website.