

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.

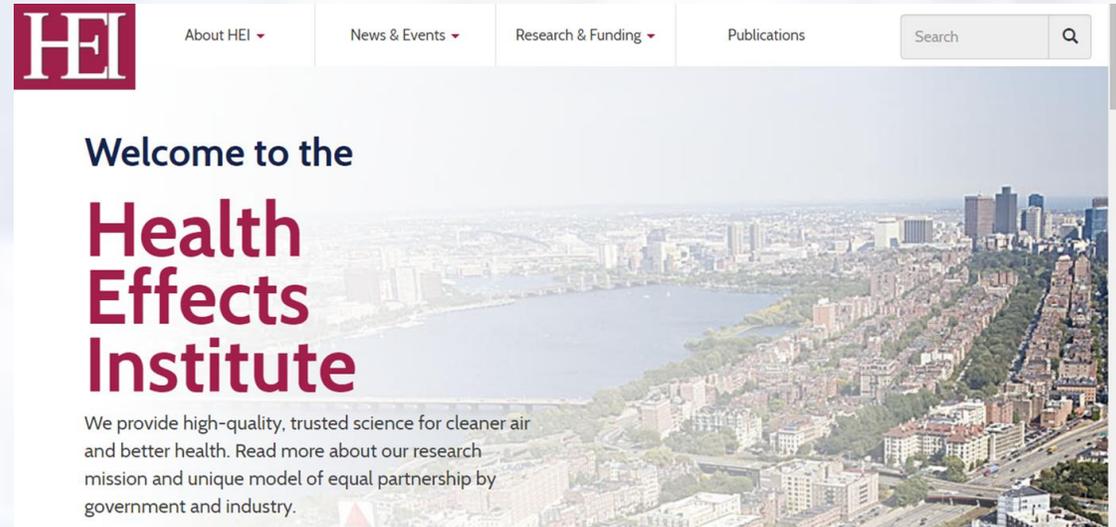


State of Global Air is on social media (@HEISoGA)!
Use #stateofglobalair to join the conversation.

A longstanding collaboration...

Introduction

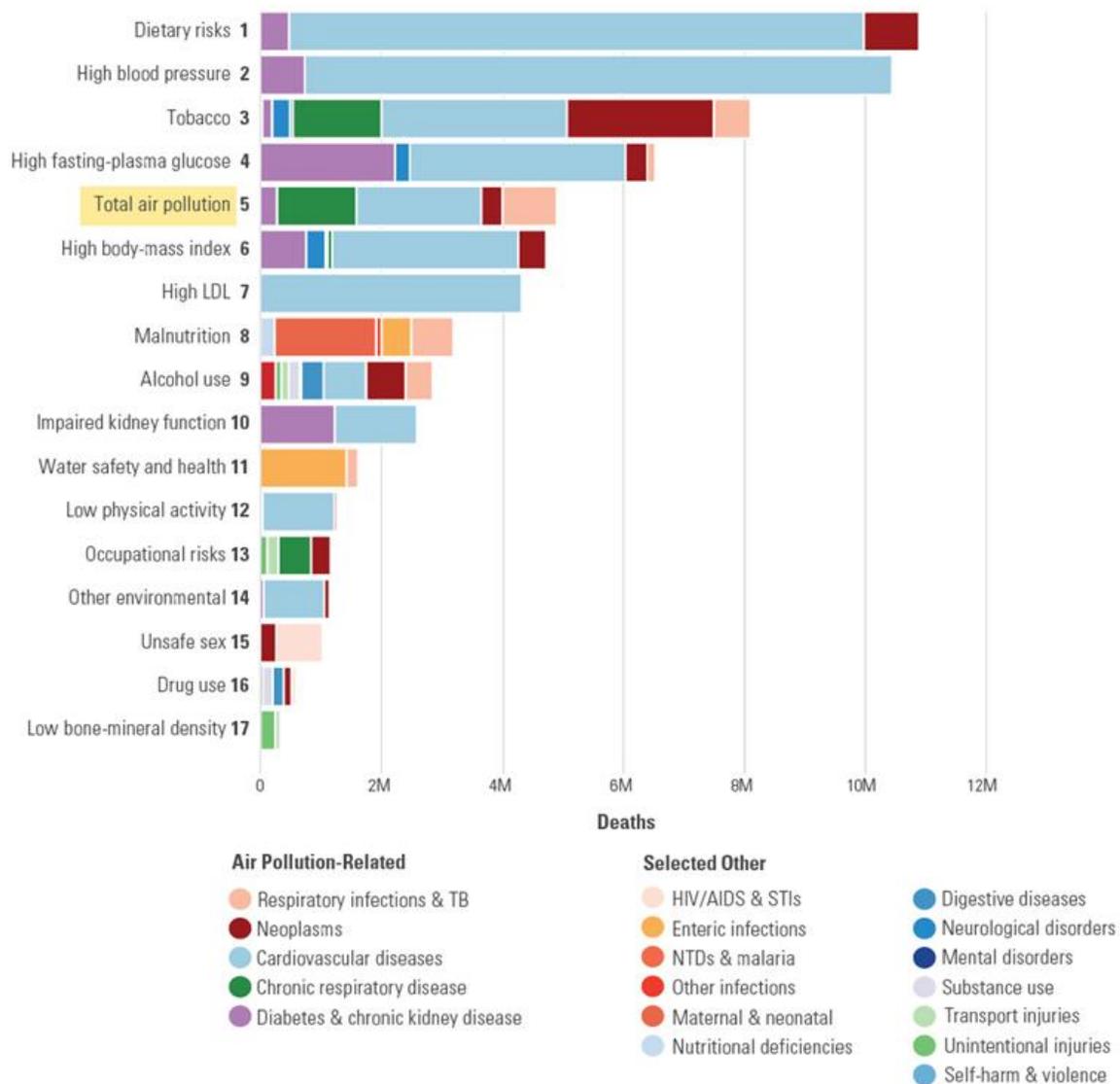
Katherine Walker
Health Effects Institute



Air pollution emerges as a major risk factor

Introduction

Global ranking of risk factors by total number of deaths from all causes for all ages and both sexes in 2017.



Our goal: To make data accessible

Exposure



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

Toxic air will shorten children's lives by 20 months, study reveals

भारत में 2017 में वायु प्रदूषण से 12 लाख लोगों की मौत

ग्लोबल रिपोर्ट के अनुसार, पड़ोसी **चीन** की स्थिति भारत जैसी

En Afrique subsaharienne, la pollution domestique affecte fortement l'espérance de vie

Sin contaminación, los niños que nacen ahora tendrían 20 meses más de vida

विचार

प्राणमै प्रदूषण

पेन २४, २०१९ | सम्पादकीय

काठमाडौं – अमेरिकाको हेल्थ इफेक्ट्स इन्स्टिट्युट र युनिभर्सिटी अफ ब्रिटिस कोलम्बियाद्वारा गत साता सार्वजनिक ग्लोबल एअर रिपोर्टले वायु प्रदूषणका कारण नेपालसहित दक्षिण एसियाका बंगलादेश, भारत र पाकिस्तानका बालबालिकाको औसत आयु साढे २ वर्षका दरले घट्न सक्ने डरलाग्दो तथ्य उजागर गरेको छ ।

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



Image by Gordon Johnson from Pixabay

61 $\mu\text{g}/\text{m}^3$ Average $\text{PM}_{2.5}$ Exposure

79% of the population still uses solid fuels

122,700 deaths attributed to air pollution

Loss of **1.87 years** of life

Population-weighted annual average $\text{PM}_{2.5}$



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



84 risk factors

350 diseases and injuries

195 countries

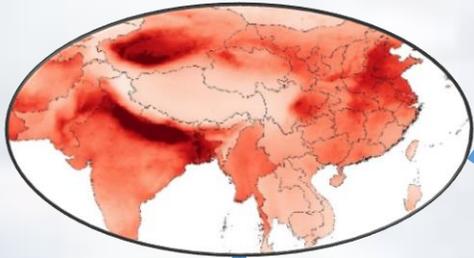
3,600 researchers in 145+ countries

Important!

Time trends from 1990 are re-calculated every year

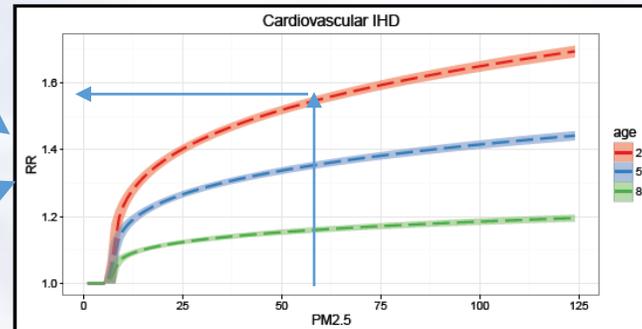
Estimating burden of disease from air pollution

Global population exposures



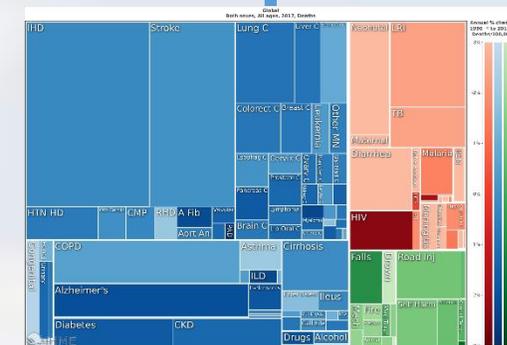
Minimum risk exposure level

Exposure-response relationships



Population-attributable fraction due to air pollution

Burden of Disease attributable to Air Pollution



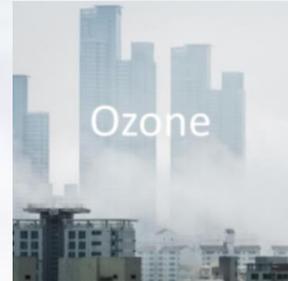
Disease-specific burden

Quantifying exposure to air pollution

Ground monitoring
of air quality



Satellite data



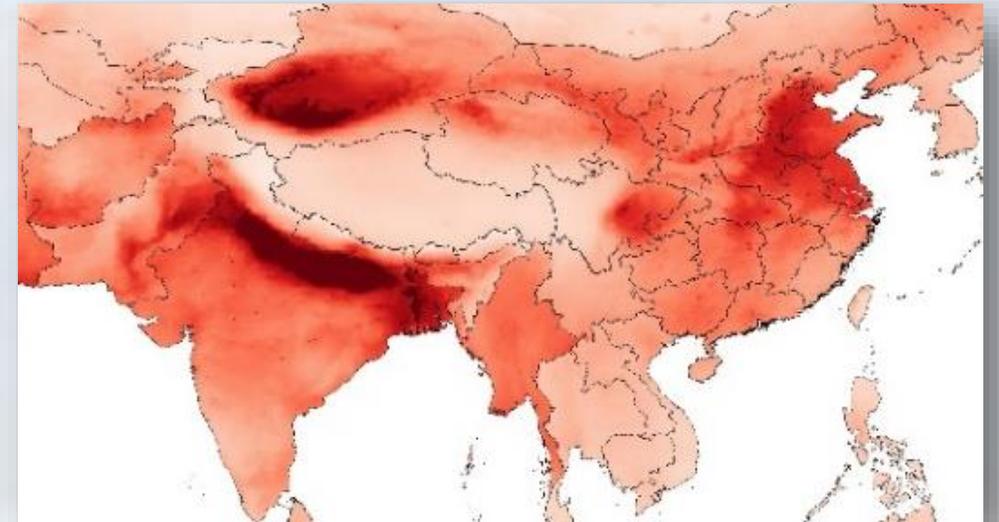
Chemical Transport
Models



Surveys

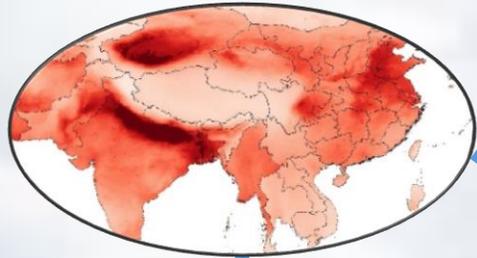


Global population exposures



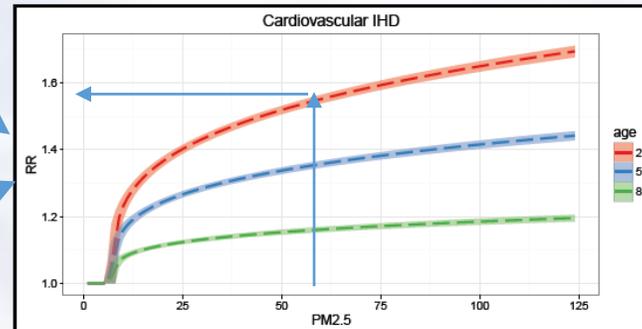
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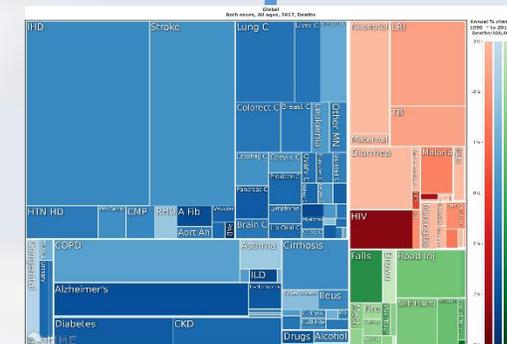
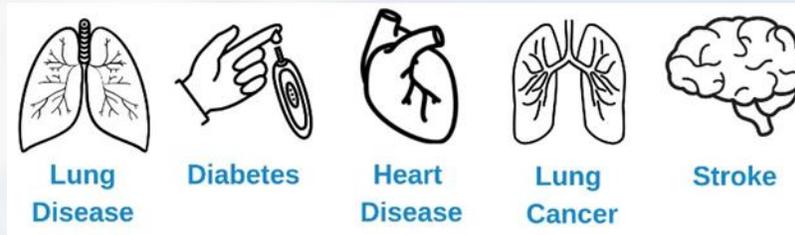
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Disease-specific burden

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)

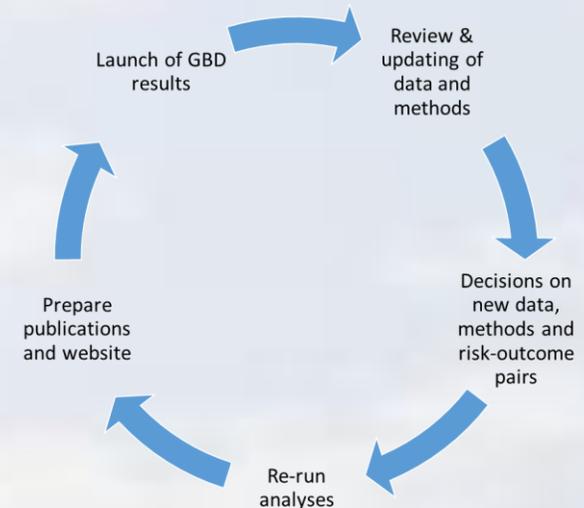
Ozone: 9700 ground monitoring sites

HAP: Updated survey and concentration measurement inputs

Exposure-response: New studies added

Health outcomes

Added Type II Diabetes



How do we estimate loss of life expectancy?

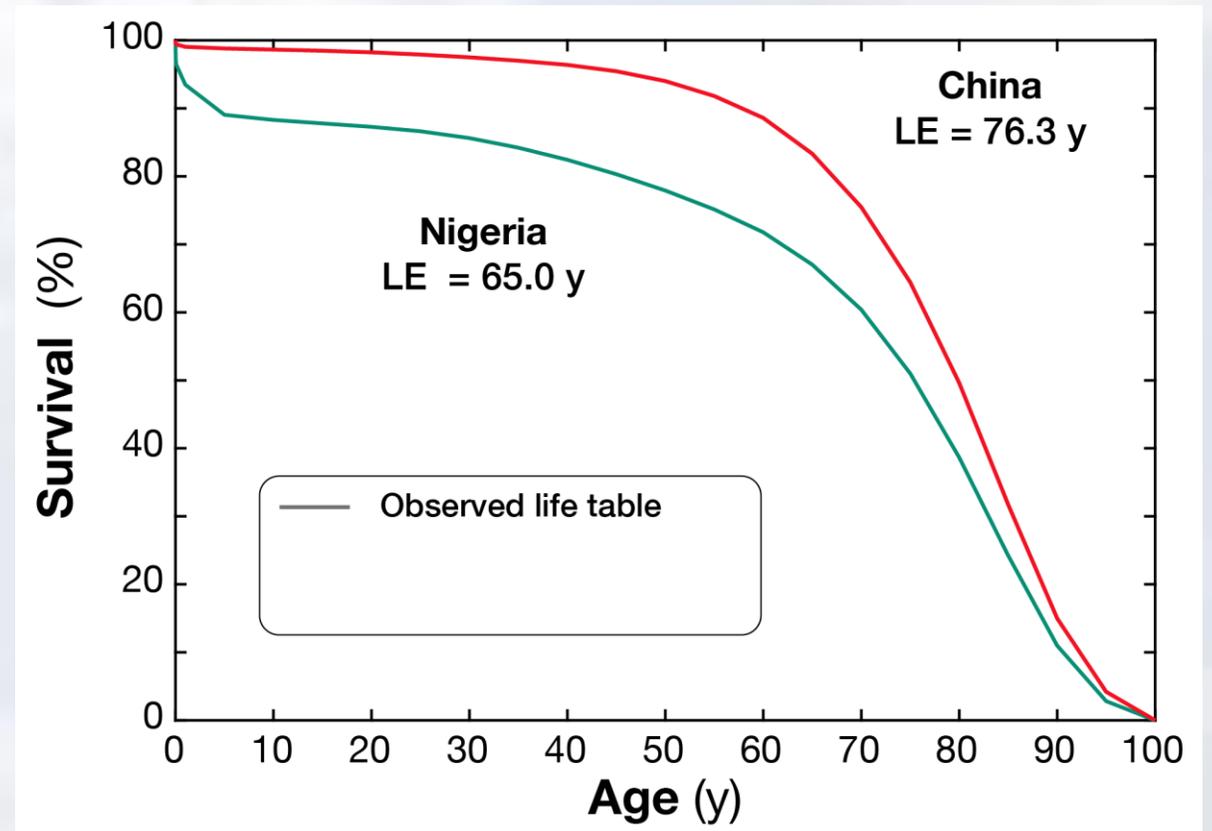
Joshua Apte

University of Texas, Austin

Apte JS, Brauer M, Cohen AJ, Ezzati M, Pope CA. 2018. **Ambient PM_{2.5} reduces global and regional life expectancy.** *Environ Sci Technol Lett* 5:546–551; <https://doi.org/10.1021/acs.estlett.8b00360>

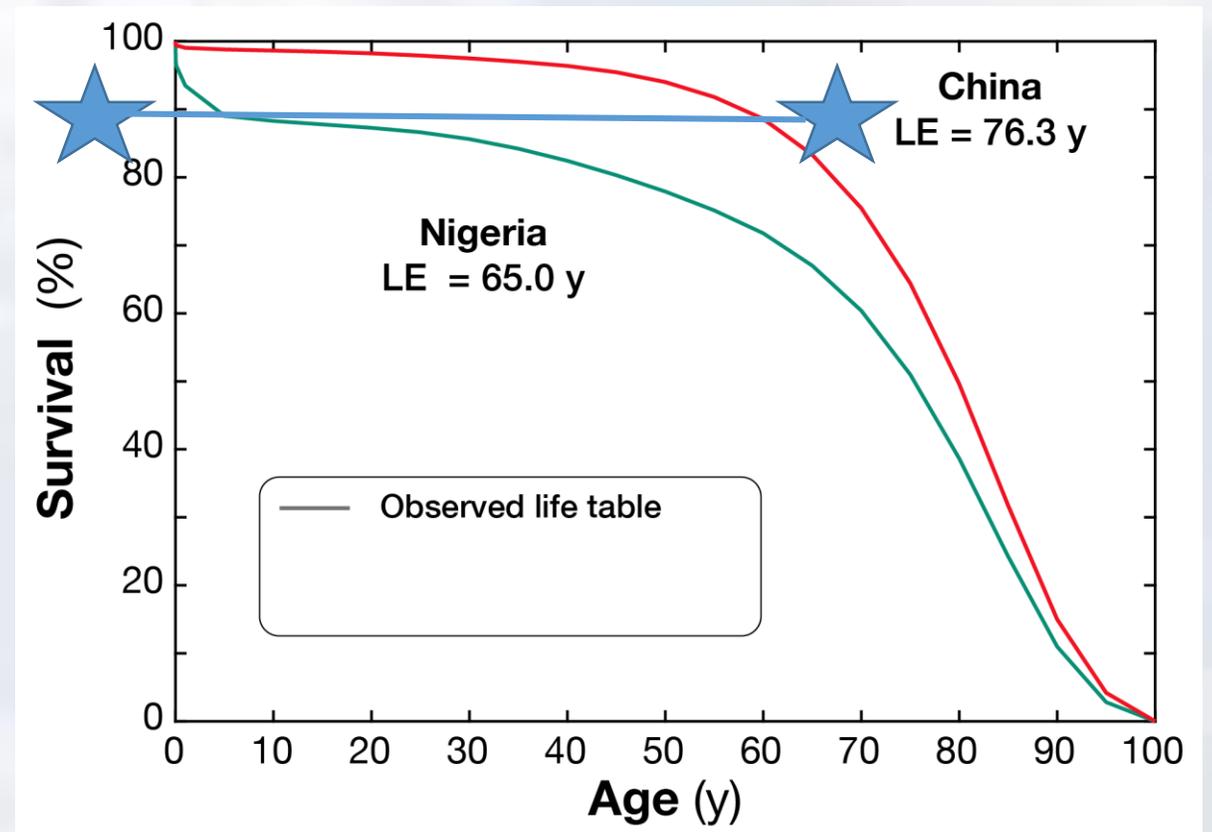
Life expectancy at birth (LE)

- 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



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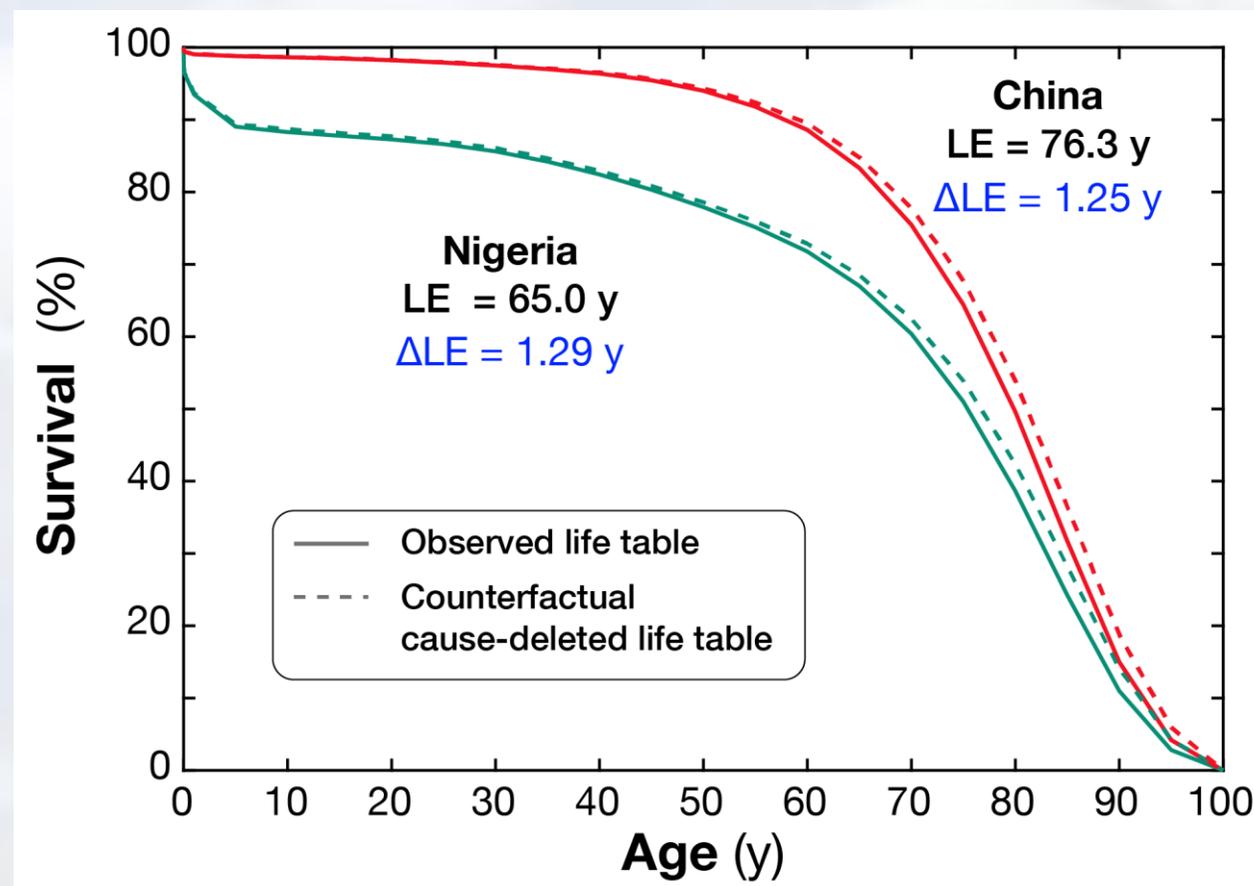
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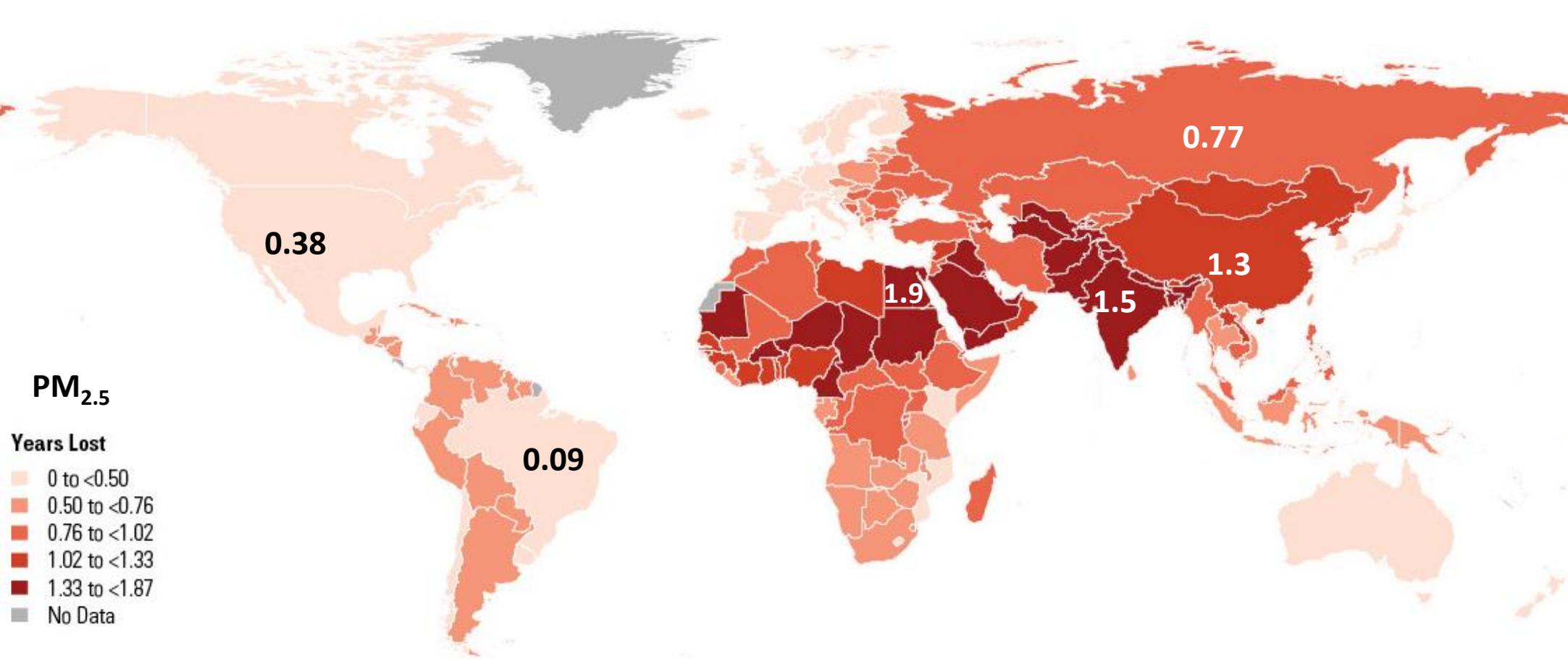
Loss of life expectancy (Δ LE) from air pollution

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

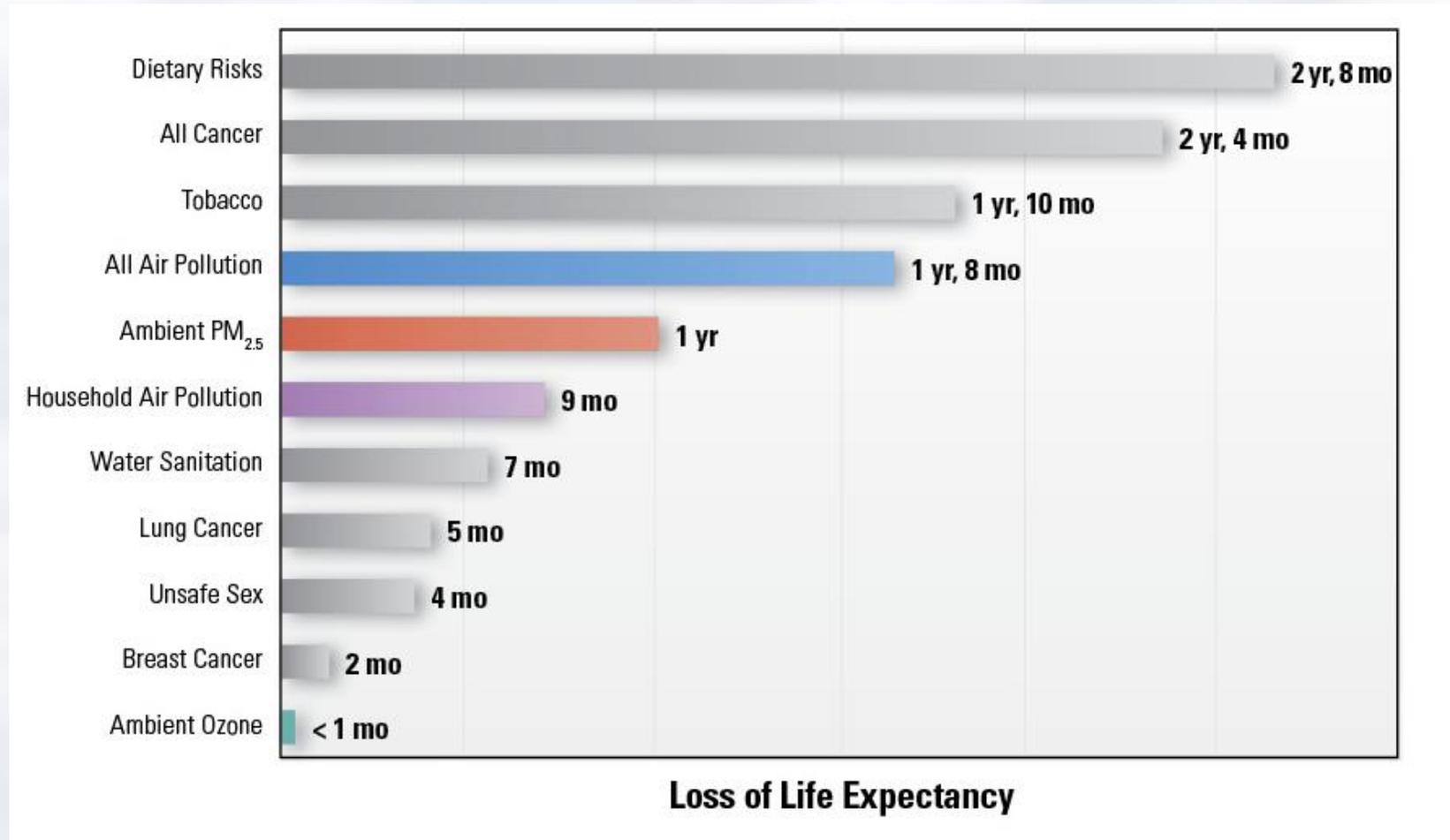
- Eliminate all air pollution exposures
- Reduce it to different levels (for example, WHO guidelines or target levels)?



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



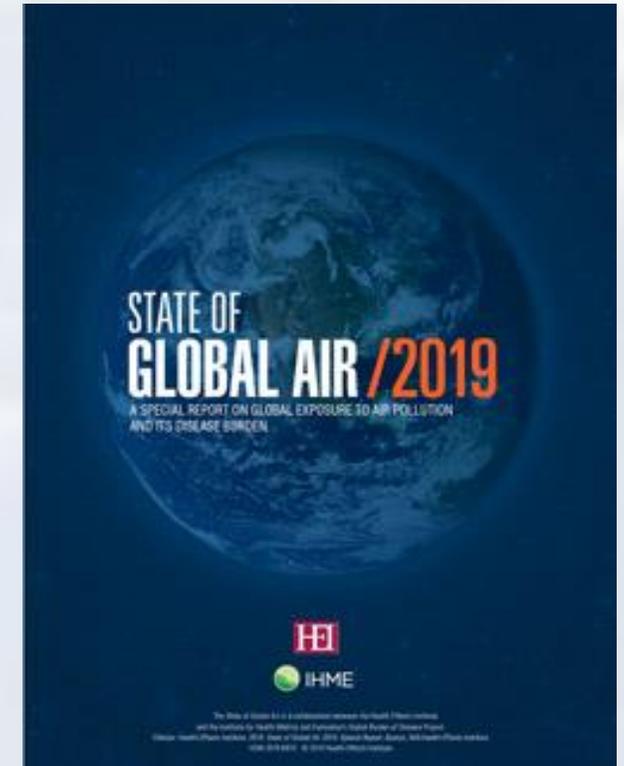
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Slides and video will be posted on our website.