

# *Scientific activities at HEI*

Year Two Progress and Year Three Plans

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Director of Science, HEI

HEI Annual Conference

May 1, 2017



# Outline of the Session

- 11:00 Introduction of the Committees  
David Eaton and James Merchant
- 11:10 Presentation of the 2016 Walter A. Rosenblith Award  
David Eaton and Annemoon van Erp
- 11:15 **Scientific activities at HEI**  
Rashid Shaikh, Health Effects Institute
- 11:30 **Global Health Program**  
Katherine Walker, Health Effects Institute
- 11:40 **Energy Research Program**  
Donna Vorhees, Health Effects Institute
- 11:50 Featured Study: A dynamic three-dimensional exposure model for Hong Kong  
Ben Barratt, King's College London
- 12:10 Comments from the HEI Review Committee  
Jennifer Peel, Member, Review Committee
- 12:30 Lunch



# HEI's Strategic Plan 2015-2020

- Guides HEI's research and review activities;
- Responds to the needs of HEI industry & government sponsors, and other interested parties;
- Anticipates future policy and technology events; and,
- Evolves over time to adapt to changing knowledge and events
- Thank you for your help in developing the latest plan

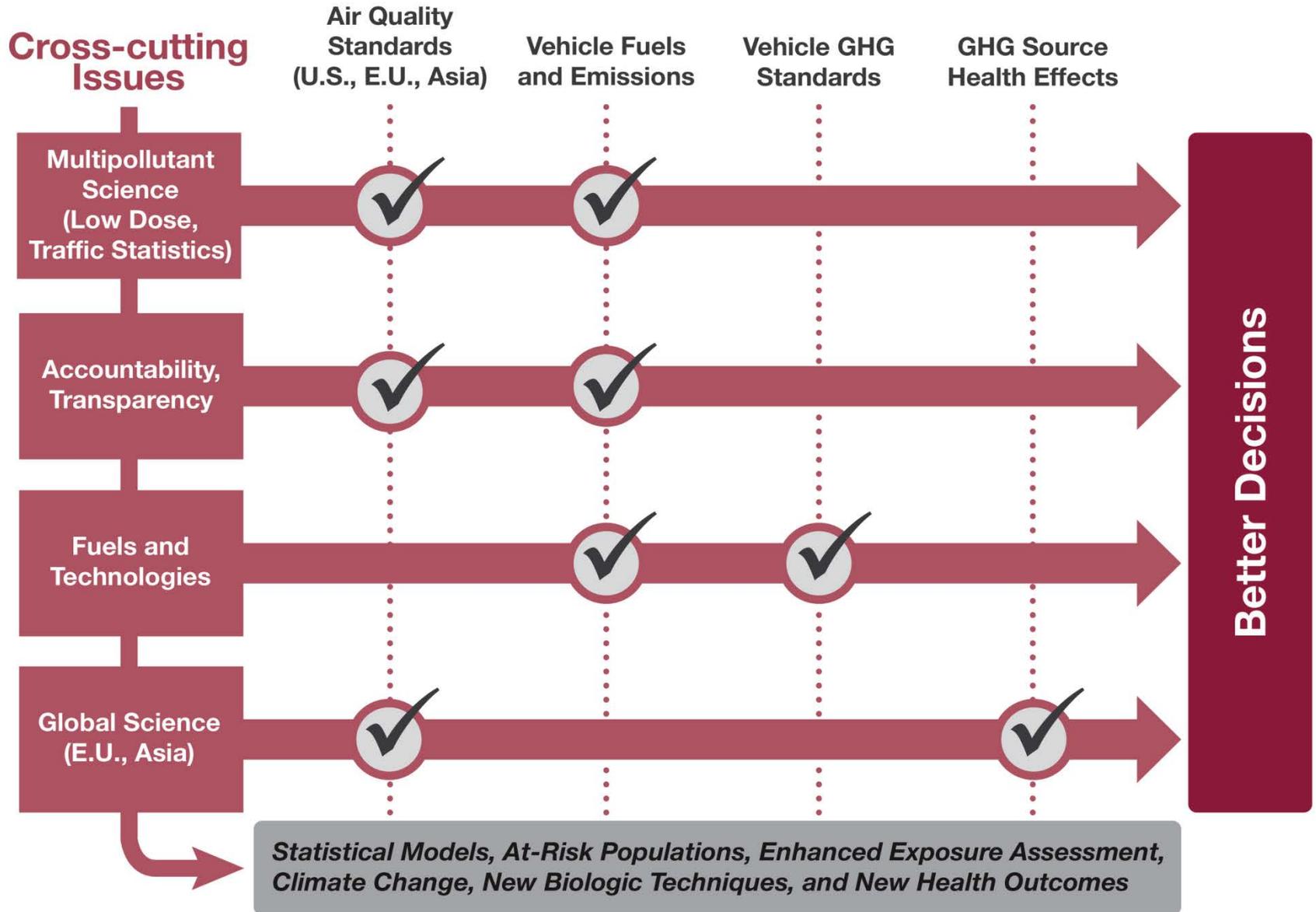


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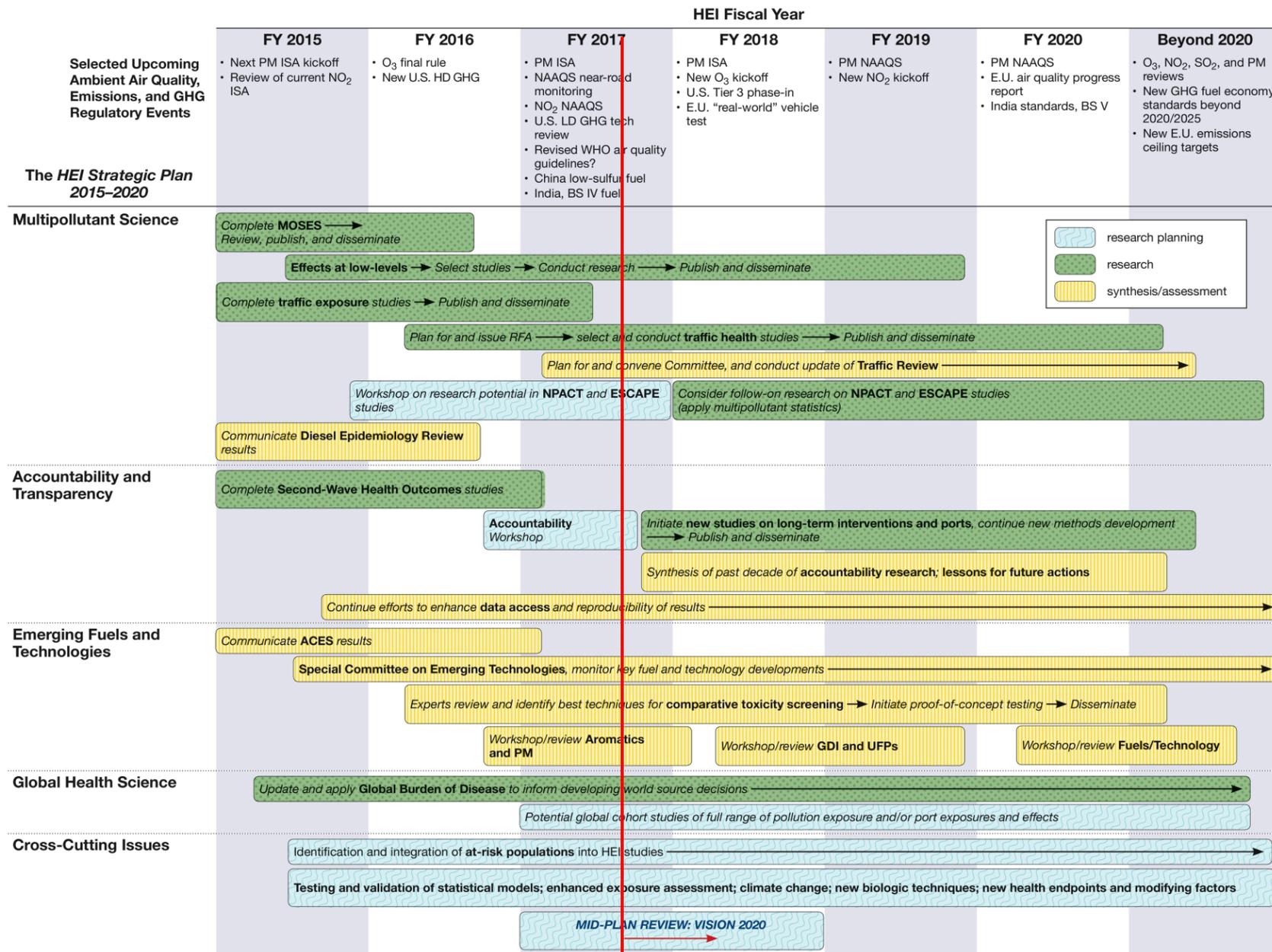


# The HEI Strategic Plan 2015–2020... and beyond

## Informing Decisions on Air Quality and on Climate-Driven Technology



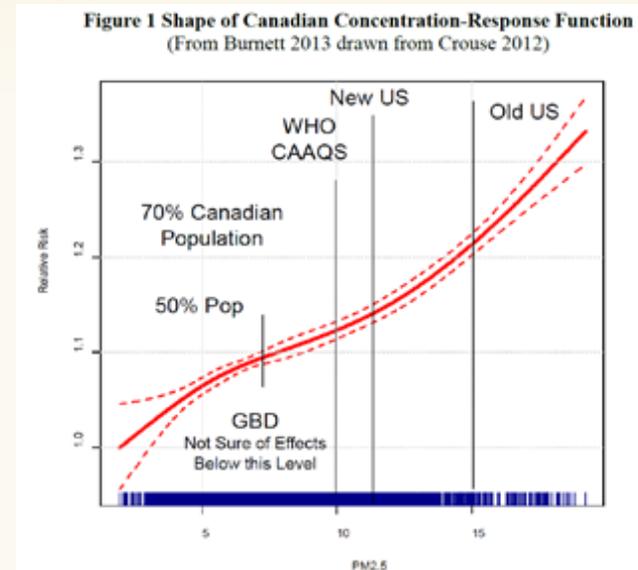
# Implementation of the Strategic Plan 2015 – 2020



# Addressing the Challenges of Multi-pollutant Science

## Estimating the Effects of Exposure to Low Levels of Air Pollution

- Three new studies funded, with key features:
  - Populations with millions in the US, Canada and Europe; administrative and traditional cohorts
  - Satellite data and ground level exposure measurements; high quality exposure assessment models at high spatial resolutions
  - Development of new statistical methods
  - Investigator teams with prior experience of productive collaborations
- Detailed HEI Oversight
- Nine posters presented on Sunday



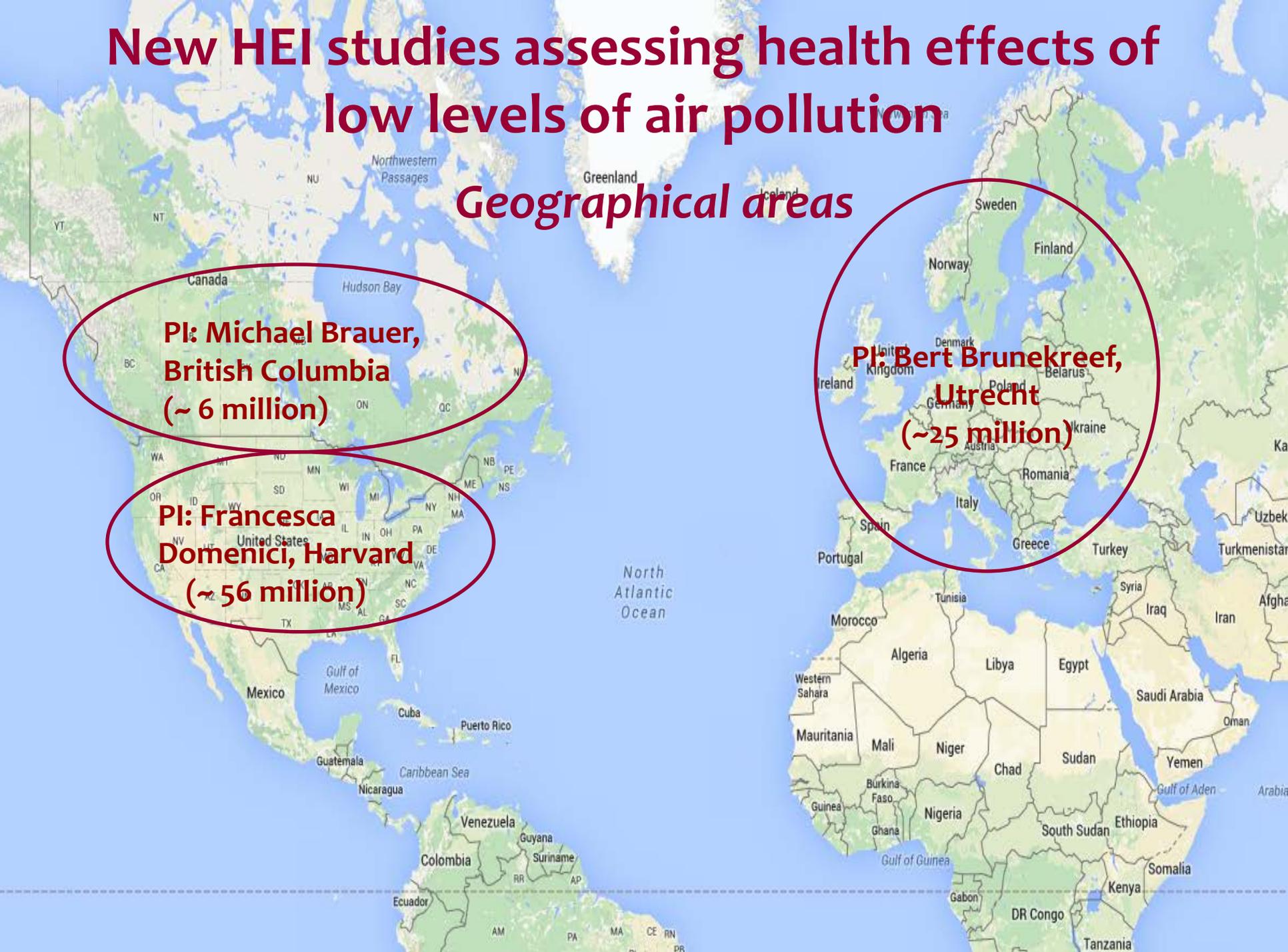
# New HEI studies assessing health effects of low levels of air pollution

## Geographical areas

**PI: Michael Brauer,  
British Columbia  
(~ 6 million)**

**PI: Francesca  
Domenici, Harvard  
(~ 56 million)**

**PI: Bert Brunekreef,  
Utrecht  
(~25 million)**



# Effect of Ozone on the Cardiovascular System: **The MOSES Study**

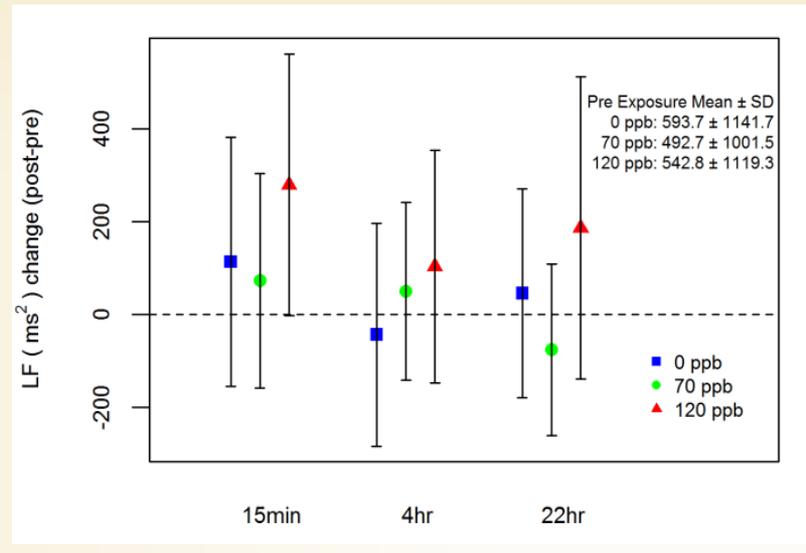
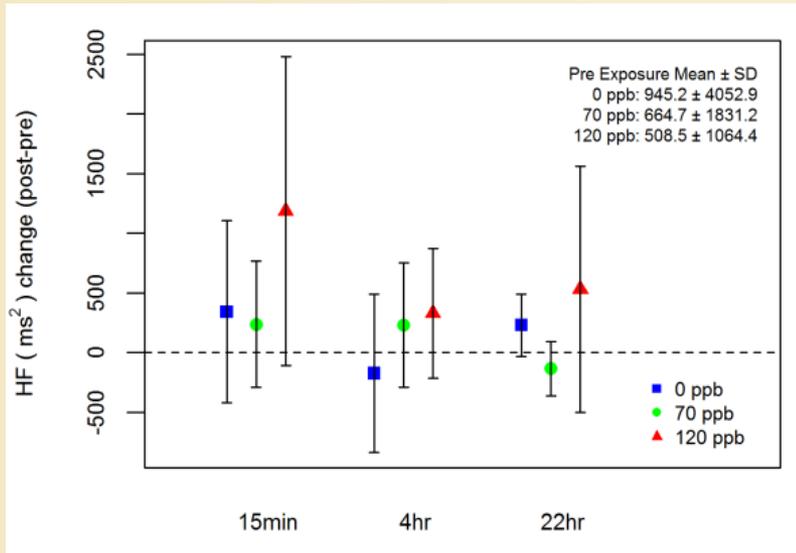
- Main Features of the Study:
  - Multicenter study; three locations
  - 87 healthy, older volunteers exposed to near ambient levels of ozone (0.07 and 0.12 ppm) or clean air while exercising
  - Highly standardized protocol and standard operating procedures (SOPs)
  - Endpoints studied:
    - Cardiac function (including autonomic balance)
    - Vascular effects (inflammation, endothelial function, prothrombotic changes)
    - Lung function and inflammation
- Status:
  - Late stages of review; publication in June, 2017
  - Phase 2 analyses underway. To be published in 2018 after review (see poster this afternoon)
  - Plans underway for providing access to data



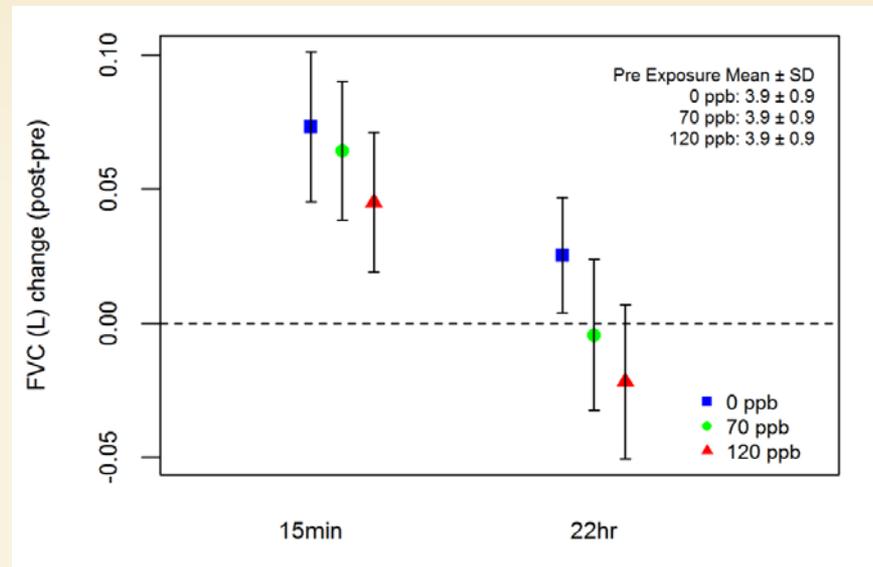
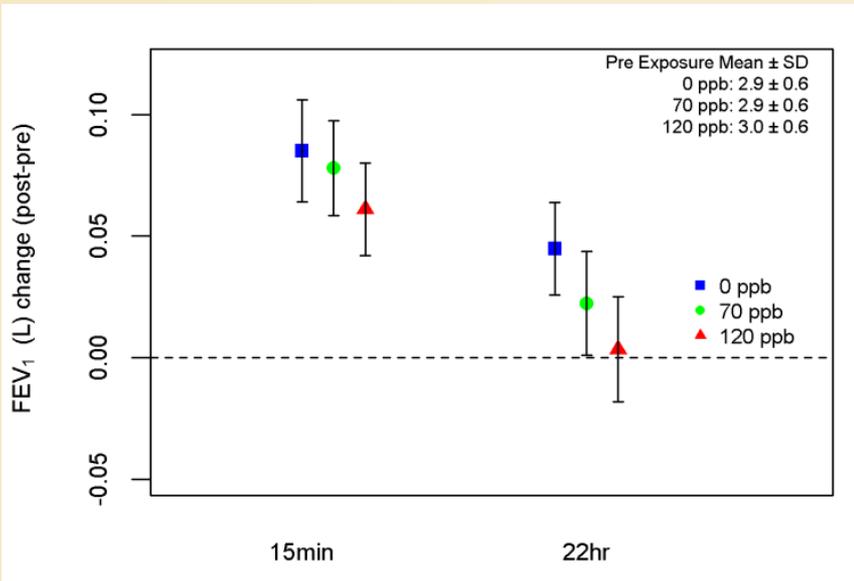
# Ozone Caused no Changes in Heart Rate Variability

## Rate Variability

(High Frequency and Low Frequency 5-min averages)



# *Ozone Attenuated the Exercise-Induced Increase in FEV<sub>1</sub> and FVC*



FEV<sub>1</sub> = forced expiratory volume in 1 second; FVC = forced vital capacity



# *Health Effects of Traffic-Relation Air Pollution*

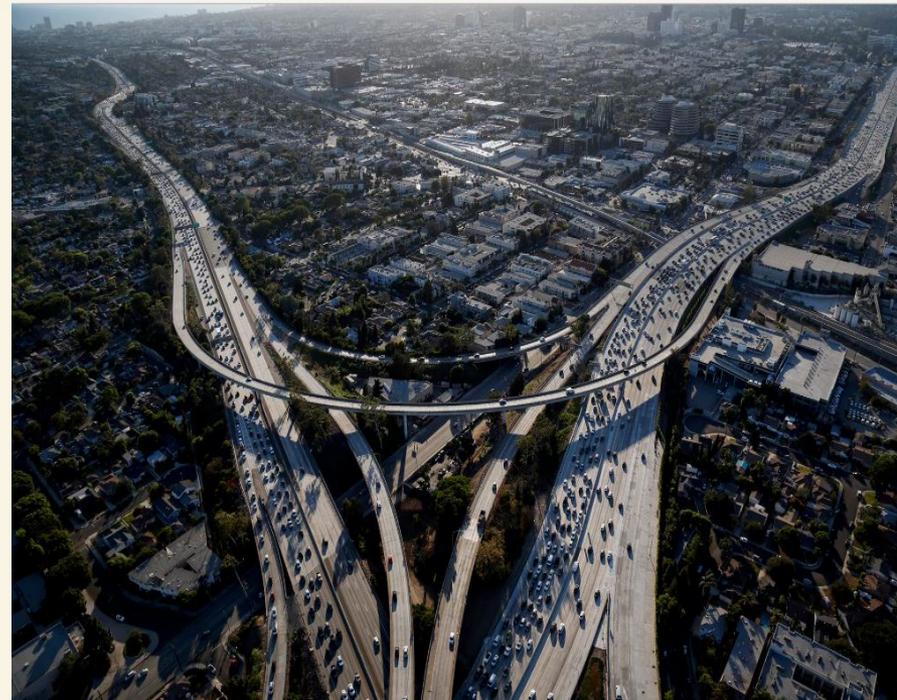
- Studies in progress:
  - Five targeted studies with the goal of enhanced exposure assessment: in Atlanta, Detroit, Hong Kong, North Carolina and Oakland
  - One study looking at tunnels in Hong Kong and Baltimore
  - One study looking at non-tail pipe emissions in Boston
- Status:
  - Studies in progress; to be completed during Year 3 & 4
  - Publications expected in Years 3 & 4

HEI Fort McHenry Tunnel Study  
....of a tunnel studied before



# *The Next Phase of Traffic Studies*

- A high-priority area; strong emphasis during strategic planning
- *New RFA: Assessing Adverse Health Effects of Exposure to Traffic-Related Air Pollution, Noise, and Their Interactions With Socio-Economic Status*
  - RFA issued in January, 2017
  - Studies to begin
    - Early 2018
- *New Review of the Traffic Literature*
  - To begin in late 2017
  - Update and extension of the 2010 review



# *Accountability Research & Transparency*

- Under a 2011 RFA, HEI funded four studies on large-scale, multi-year regulatory programs
  - Gilliland: Evaluating changes in children's health in Southern California (*published: January 2017*)
  - Zigler: Statistical methods for causal inference (*published: May 2016*)
  - Russell: Air quality regulations in Southeastern United States (in early stages of review; to be published in early 2018)
  - Meng: Goods movement regulations in California (phase 1 completed; phase 2 in progress)
- Future Plans:
  - This afternoon's session on accountability
  - Looking for approaches for the most impactful studies
  - *Your ideas most welcome*

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# *Transparency and Data Access*

- Transparency: Enhancing HEI's ability to build data access from inception into all our work
- Long-standing HEI policy
- A requirement for all studies we fund, explicitly stated in RFAs and contracts
- HEI policy is responsive to issues related to third-party data, confidentiality and privacy issues, intellectual interests of data producers, among others



# *Other HEI Research*

- Studies in areas that fall outside topics targeted in HEI's RFAs
- Studies funded under:
  - The Walter Rosenblith Awards
  - Preliminary applications process
    - RFA 17-2 is currently open
- Many important studies
- Please visit the posters



# *Emerging Fuels and Technologies: Workshop on Fuel Composition and PM*

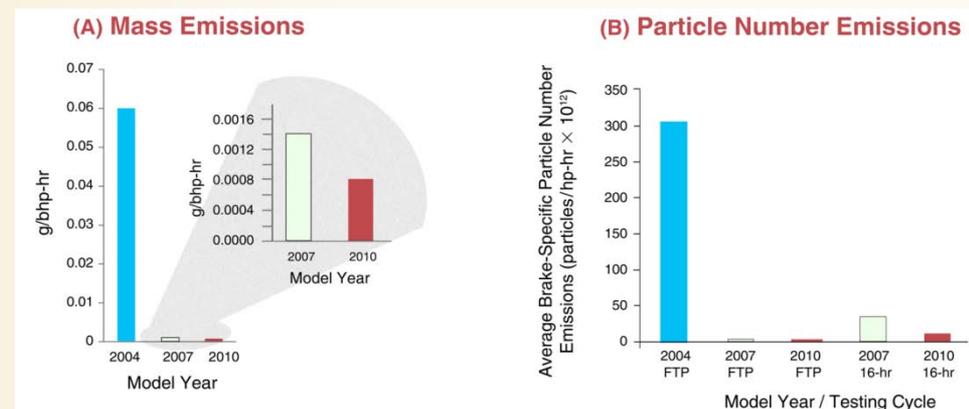
- December, 2016, workshop in Chicago
- Chaired by Allen Robinson (CMU) and Rob Harley (UC Berkeley)
- ~45 attendees:
  - From EPA, California Air Resources Board (CARB), auto companies, petroleum industry, ethanol producers, and research institutions
  - Open and useful dialogue
- Reviewed the latest research on:
  - Particulate matter (PM), both primary emissions and secondary formation
  - Gasoline aromatics and other unsaturated hydrocarbons
  - Ethanol blends
  - Automotive technology, particularly gasoline direct injection
    - *All have complex and interacting impact on PM*
- Outputs:
  - Presentations from the workshop on HEI website  
<https://www.healtheffects.org/meeting/workshop-effects-fuel-composition-pm>
  - Workshop summary to be available in mid-2017

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# *Emerging Fuels and Technologies: Traditional and Advanced Technology Diesel Engines*

- ACES findings summarized in a peer-reviewed publication (Costantini, Khalek, McDonald and van Erp. 2016. Emission Control Science and Technology 2:215–227)
- Diesel Emissions and Lung Cancer:
  - Expert Panel report published in November 2015
  - Continue to follow developments in Quantitative Risk Assessment and answer questions
- Executive Summary of the ACES Program – published in Dec 2015
- Both reports widely communicated to audiences in the US, Europe, China and India, e.g.
  - EPA Clean Air Act Advisory Committee (CAAAC)
  - International Society of Environmental Epidemiology (ISEE) 2016 meeting, Rome
  - ECT-2016, Delhi



# *Agenda for Monday Afternoon*

1:30 pm Poster Session 2 (blue tag)

Ballroom: real-world emissions, accountability, and epidemiology

Foyer: epidemiology, mechanisms (experimental studies in cells or rodents, and clinical studies), risk communication

3:00 pm Break

3:15 pm Session: *A New Vision for Accountability Research?*

5:00 pm Free evening



# *Moving Forward*

- Presentations to follow – on our global health and energy research programs
- HEI continues to be a success model for developing quality and impartial science
- The *HEI Strategic Plan* is moving at a brisk pace
  - With many projects coming to fruition this year
  - And a number of important new ones underway
- We look forward to hearing your ideas on where we can and should focus going forward!



# *And, Finally...*

- Term of Chair of the Research Committee:
  - Four 2-year appointments
- David Eaton – chair since 2010.  
Term ends in mid-2018
- The HEI Board requests your nominations and suggestions for a new chair. We will be writing to you shortly.
- Nominations also welcome for other experts to serve on :
  - The Research Committee
  - The Review Committee
  - Traffic Literature Review Panel



*Thank You!*

