

MONDAY, APRIL 27, 2026

# Particles in Motion: Tackling Brake, Tire, and Road Dust Emissions

SESSION CHAIRS



**Gregory Wellenius**  
Boston University &  
HEI Research Committee



**John Volckens**  
Colorado State University &  
HEI Review Committee

SPEAKERS &  
PANELISTS



**Chris Griffiths**  
University of  
Oxford



**James Scales**  
Queen Mary  
University of London



**Greg Evans**  
University of  
Toronto



**Seungju Yoon**  
California Air  
Resources Board



**Paolo Mazzatorta**  
WBCSD & TIP

# Introduction and Session Overview

Gregory A. Wellenius

Beverly A. Brown Professor for the Improvement of Urban Health  
Professor of Environmental Health  
Director, BU Center for Climate and Health

**Boston University** School of Public Health  
Center for Climate and Health



# Disclosures

## Current:

- Health Effects Institute
- Climate Resilience for All

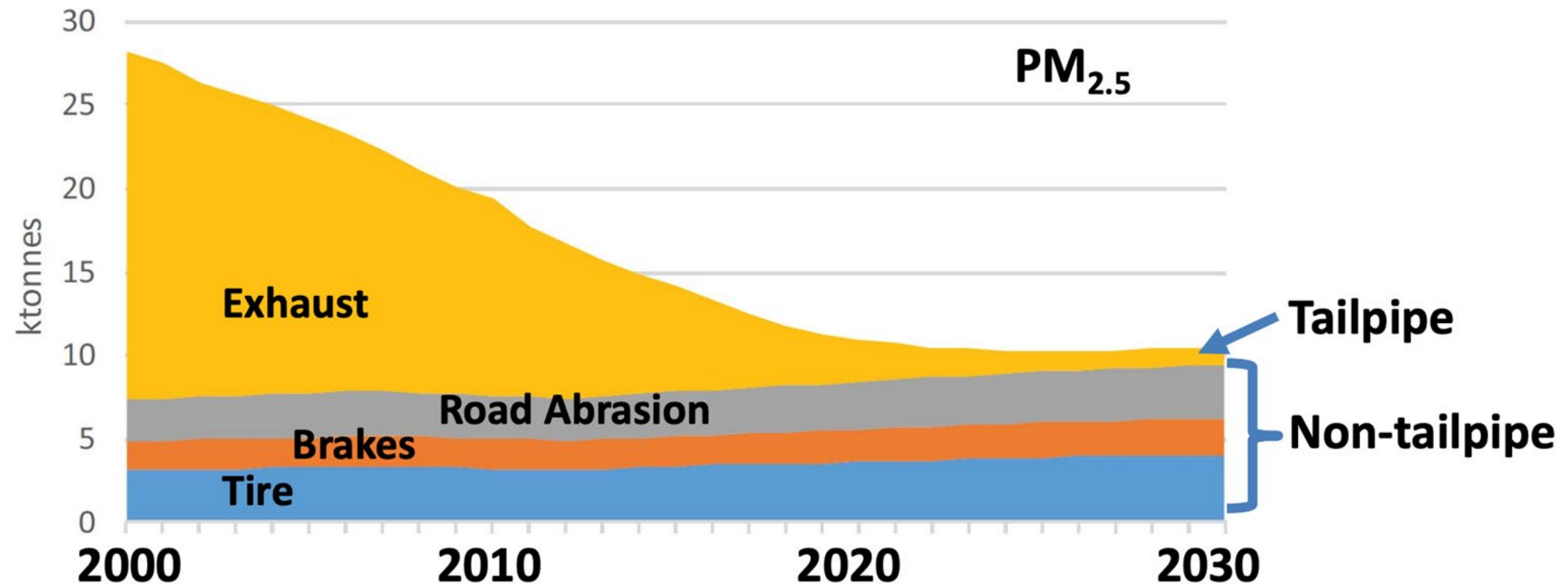
## Recent Past:

- Google
- Trust for Public Land

# Tailpipe vs Non-Tailpipe Emissions into Air

	<b>Tailpipe Emissions</b>	<b>Non-Tailpipe Emissions</b>
<b>Regulated</b>	Yes	Only indirectly
<b>Sources</b>	Combustion	Mechanical abrasion, heat, evaporation Brake/tire wear, road surface abrasion, resuspended road dust
<b>Size, Composition</b>	UFP to fine Sulfates, organics	Fine to coarse Metals, crustal minerals, polymers
<b>Trending</b>	Decreasing	Increasing proportion
<b>Human Health Impacts</b>	Established	Emerging concerns, Insufficient evidence

# Non-Tailpipe Emissions Exceed Tailpipe Emissions

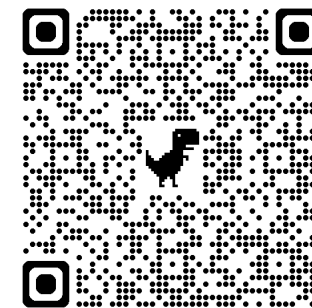


Adapted from: HEI Non-Tailpipe Workshop and [https://uk-air.defra.gov.uk/assets/documents/reports/cat09/1907101151\\_20190709\\_Non\\_Exhaust\\_Emissions\\_typeset\\_Final.pdf](https://uk-air.defra.gov.uk/assets/documents/reports/cat09/1907101151_20190709_Non_Exhaust_Emissions_typeset_Final.pdf)

# Key Evidence Gaps

2020 HEI workshop identified need for:

- Improved characterization of non-tailpipe emissions
- Consensus on which measurements best represent non-tailpipe emissions for use in exposure and health studies
- Better characterization of human exposures and health effects of non-tailpipe PM



# RFA 21-1 Objectives

- Validate exposure indicators to disentangle the contributions of non-tailpipe and tailpipe emissions
- Develop approaches to measure or model total and/or process-specific non-tailpipe PM in the near-road environment for human exposure assessment.
- Estimate potential impacts of non-tailpipe emissions on air quality, exposure, or health burden



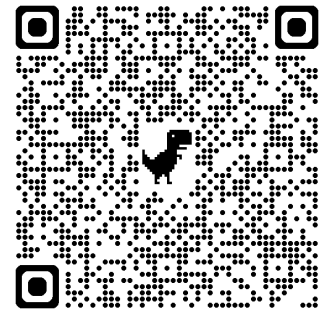
## SPECIAL REPORT

HEALTH  
EFFECTS  
INSTITUTE

Number 23  
June 2022

# **Systematic Review and Meta-analysis of Selected Health Effects of Long-Term Exposure to Traffic-Related Air Pollution**

HEI Panel on the Health Effects of Long-Term Exposure to  
Traffic-Related Air Pollution



## **Intersections as Hot Spots: Assessing the Contribution of Localized Nontailpipe Emissions and Noise on the Association Between Traffic and Children's Lung Function**

Meredith Franklin<sup>1</sup>, Scott Fruin<sup>1</sup>, Rob McConnell<sup>1</sup>, Xiaozhe Yin<sup>1</sup>, and Masoud Fallah-Shorshani<sup>1</sup>

<sup>1</sup>*University of Southern California*

Epidemiologically, coarse and fine nontailpipe metals, especially iron (Fe) and copper (Cu) as markers of road dust and brake wear, were consistently and significantly associated with reduced FEV<sub>1</sub> and FVC. These associations persisted after adjusting for PM mass, and were stronger than those of tailpipe markers like fine elemental carbon (EC<sub>2.5</sub>, diesel) and quasi-ultrafine organic carbon (OC<sub>0.2</sub>, gasoline).

# Agenda for Session

- **Chris Griffiths**, U of Oxford and Queen Mary U. of London  
**James Scales**, Queen Mary University of London
- **Greg Evans**, University of Toronto
- **John Volckens**, Colorado State U. and HEI Review Committee
- **Seungju Jiwoo Yoon**, California Air Resources Board
- **Paolo Mazzatorta**, Tire Industry Project
- **Q&A, Discussion**

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