HEI studies on non-exhaust emissions, exposures, and health effects

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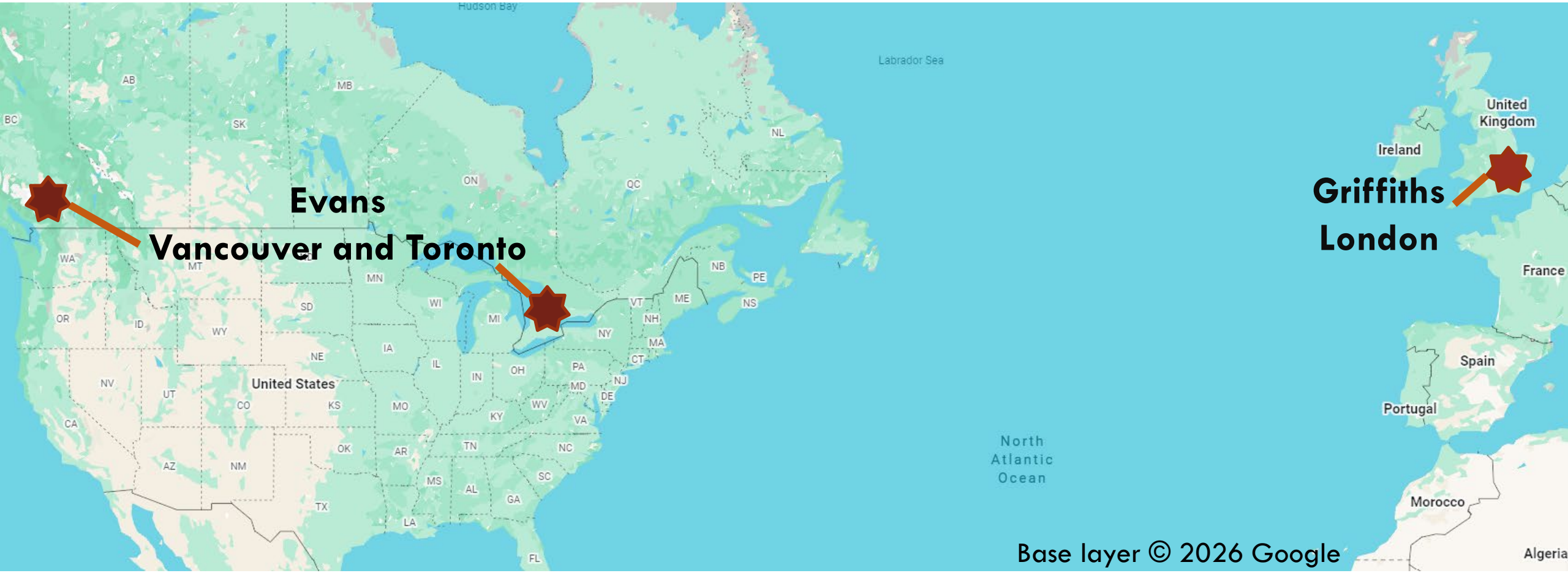
Disclosures

Current:

- Health Effects Institute (Review Committee)
- Access Sensor Technologies, LLC (Founder)

Focus on two HEI studies on non-exhaust emissions, exposures, and health effects



Overview of preliminary results

	Griffiths	Evans
Brake wear components	**Fe, Ba, Cu**, Zn (from PMF)	**Fe, Ba, Cu**, Ti, Sr, Mo, Sn, Sb (from PMF)
Tire and road wear components	**Si, Ca**, Fe, Cl (from PMF)	**Si, Ca** (from PMF)
Non-exhaust contributions to total $PM_{2.5}$	2-7% from brake and tire wear	3-6% from brake wear, 3-7% from road dust, and <2% from tire wear
Health effects associated with non-exhaust PM	Suggestive decreases in lung function and increased inflammation following acute exposure	N/A
Potential confounding environmental exposures	Other PM sources (e.g., train wear, cooking aerosols) that varied by site	Exhaust emissions

Strengths and limitations of the studies

Strengths

- ✓ High-quality study designs
- ✓ Complementary state-of-the-art exposure assessment methods in four urban areas
- ✓ Focus on real-world emissions
- ✓ Comprehensive analyses that applied novel methods
- ✓ Population and individual exposures

Limitations

- ✓ Could not completely disentangle the air quality and health effects of non-exhaust PM from those contributed by other PM sources
- ✓ Specific non-exhaust markers might not be immediately generalizable to other studies

Areas for future research

- ✓ Further characterize non-exhaust emissions and understand their relative importance to air air quality and health effects in the context of multiple sources.
- ✓ Continue to evaluate population level impacts under evolving energy transition themes.
- ✓ Synthesize the literature on health effects of non-exhaust emissions.