SPH45
Public Health. Now is the time.

Indoor air pollution: Exposures, sources, and challenges

Jon Levy

Professor and Chair, Department of Environmental Health, BU School of Public Health

MAPC Webinar Series – Particulate Policy: Addressing Indoor Air Quality

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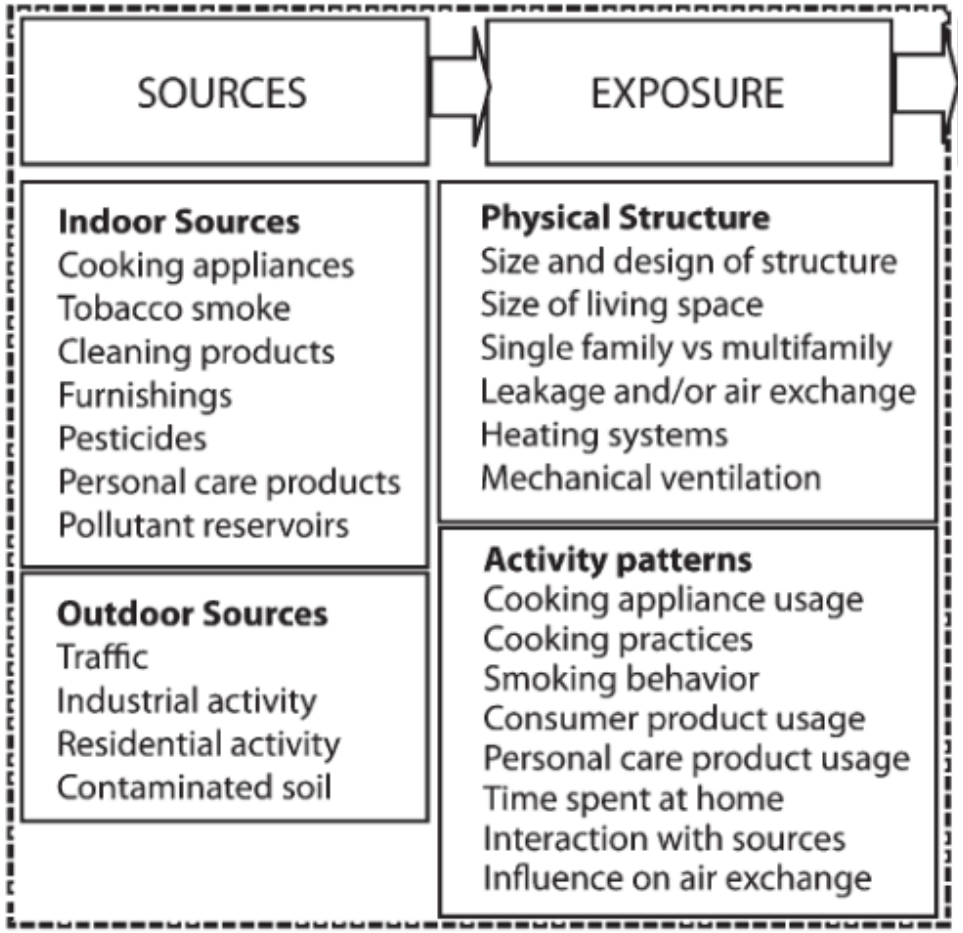
Email: jonlevy@bu.edu, TW: @jonlevyBU

Why worry?

- ~ 7 million deaths/year globally from ambient air pollution + household air pollution (smoke + cooking fires) (WHO, 2018)
- Most exposure to ambient air pollution occurs inside of homes and other buildings
- In the US, many indoor combustion sources contribute to air pollution exposures, with health effects above and beyond the effects of ambient air pollution infiltrating indoors

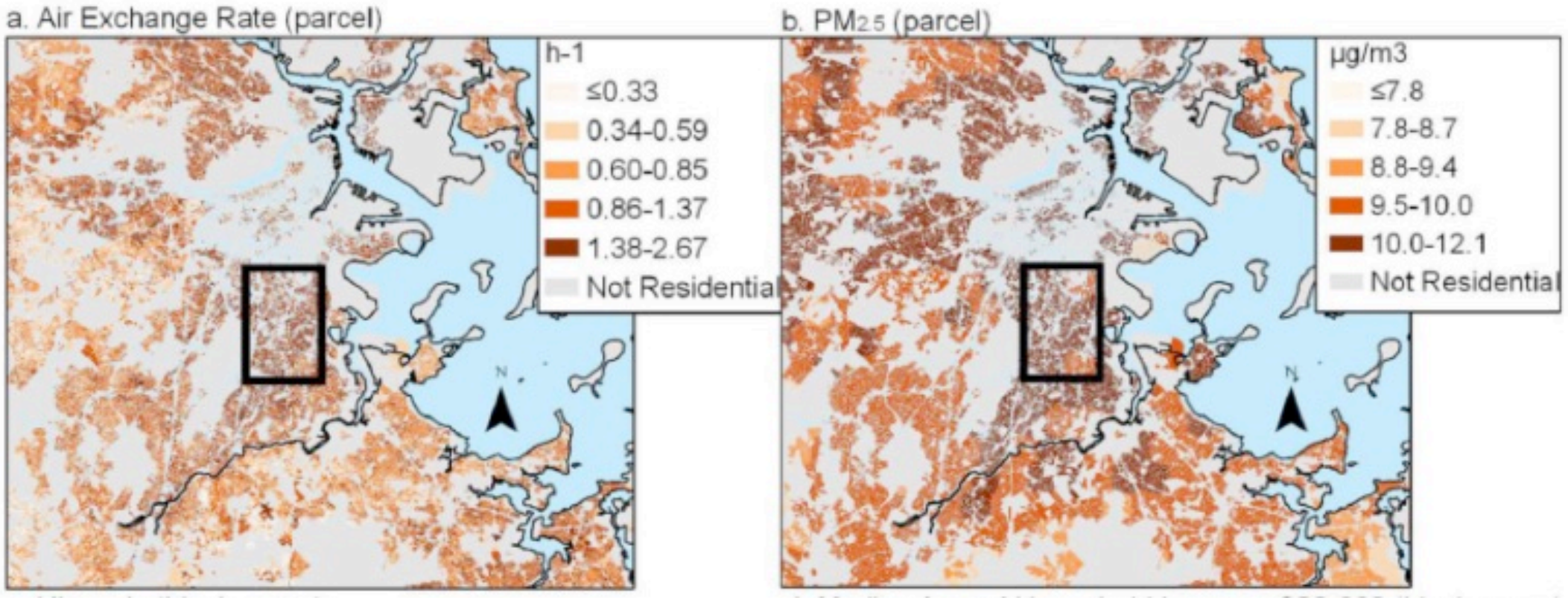
Framework



- Substantial contribution of indoor sources
- Important tradeoffs
- Potential disparities

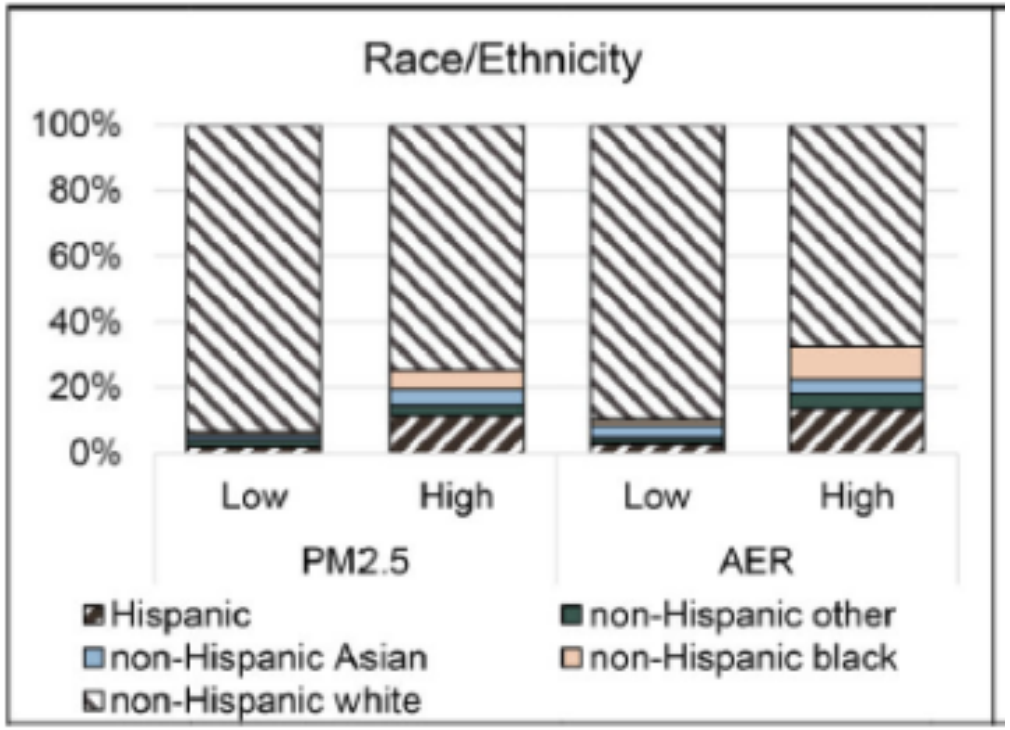
(Adamkiewicz et al. 2011)

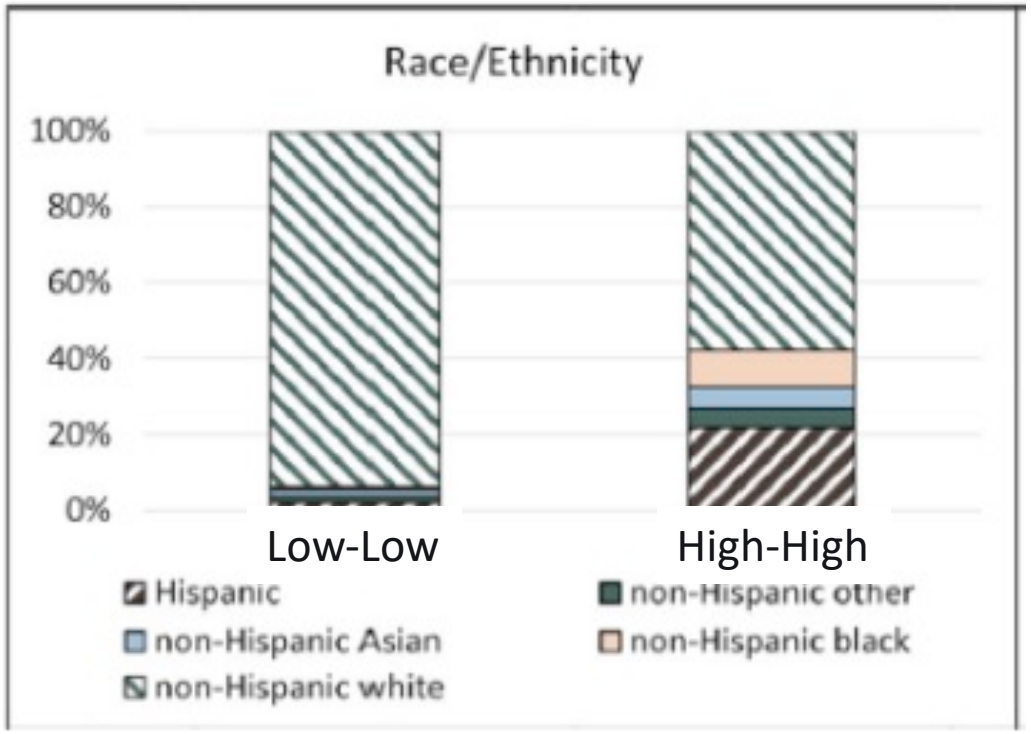
Example: Infiltration of ambient (outdoor sources + physical structure)



(Rosofsky et al. 2019)

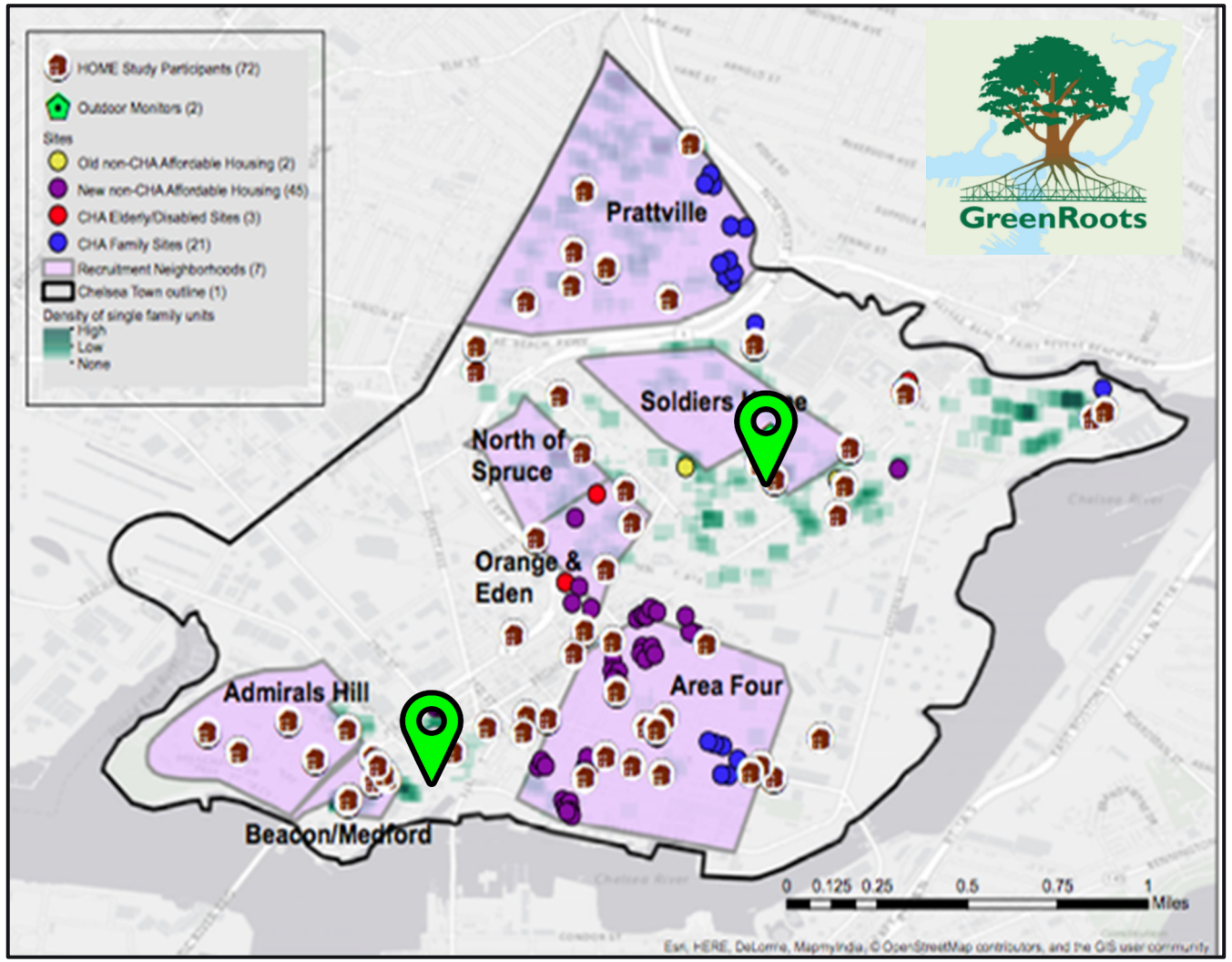
Implications for exposure disparities





(Rosofsky et al. 2019)

Example: Indoor sources

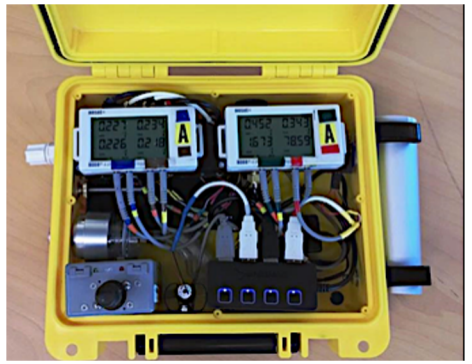


72 households recruited (131 total visits)

home visits

warm season | **cool season**

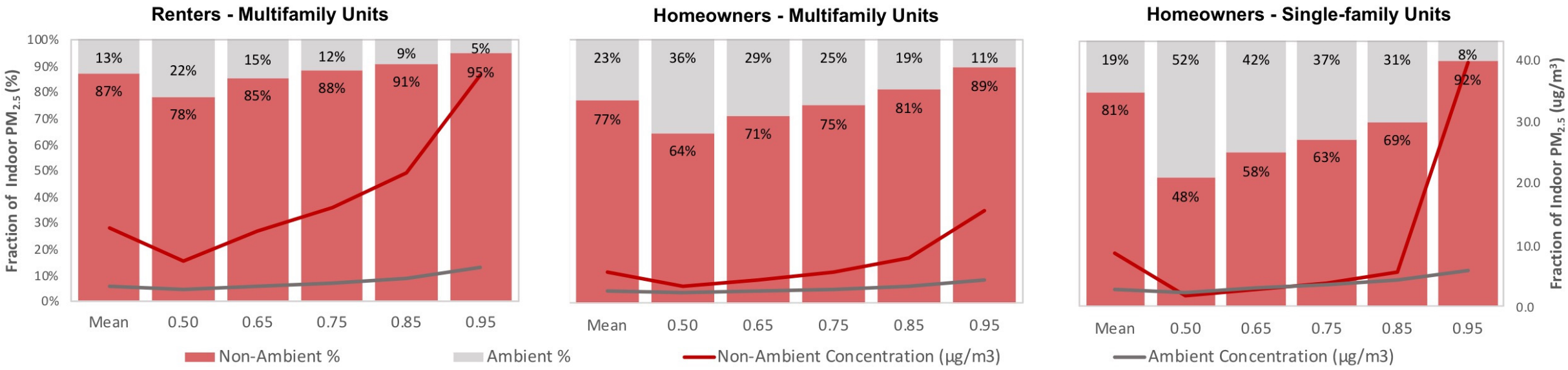
Survey	Visual assessment	Daily activity log	$PM_{2.}$ NOX, CO, Temp, RH



Portable measurement device EMMA

(Chu et al. 2020)

Ambient vs. indoor sources by home type



(Chu et al. 2020)

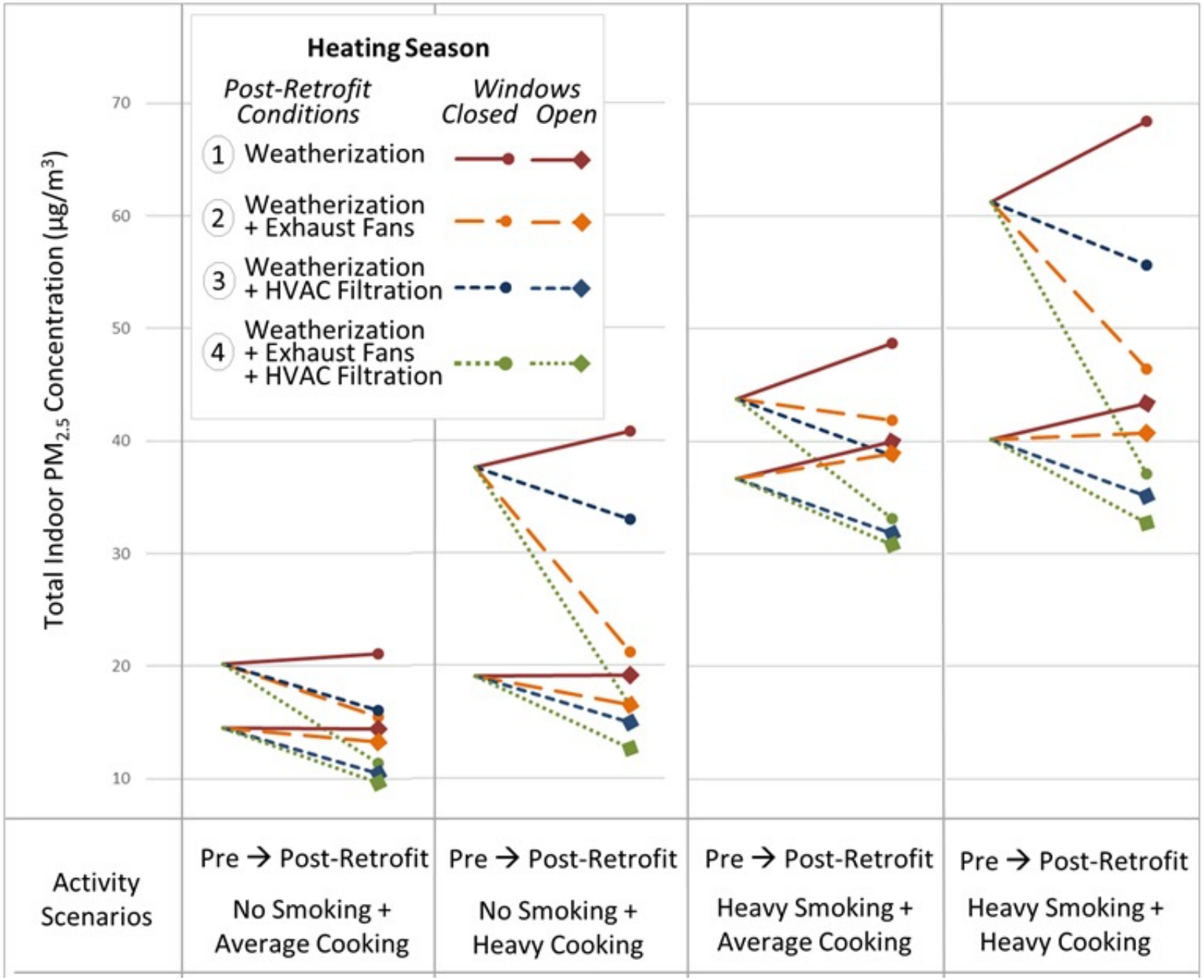
Predictors of exposure differences

- Elevated exposures among renters explained by behavioral and building-level contributors (some modifiable)
  - Cooking
  - Smoking
  - Range hood use
  - Building size

(Chu et al. 2020)

Putting the pieces together

- Some interventions would reduce indoor exposures for all populations, and others might have differential effects across homes
- Q: What are the characteristics of “high-performing” interventions?



(Underhill et al. 2017)

Conclusions

- Indoor air is a function of outdoor air pollution, building characteristics, and indoor sources
- In the presence of gas stoves, smoking, or other combustion sources, indoor sources can dominate infiltration from outdoors
- Healthy indoor environments have minimal indoor sources and use robust ventilation and filtration to avoid indoor/outdoor source tradeoffs