HAP exposure assessment in Nigeria

Amanda Northcross
Assistant Professor
Department Environmental and Occupational Health
Acknowledgments

Study Participants
Sola Olopade- UC (PI)
Oladosu Ojengbede UI-UCH (local-PI)
Donee Alexander – GACC, formerly UC
Matthew Shupler GW (SUMS analysis)
Nina Hwang GW (GPS analysis)
John Olajumilo & Tope Ibigbami HLF (Data collection)
Acknowledgments

Field Team
Study Overview

Randomized Control Trial
Ethanol Cookstove Intervention
<18 weeks gestation
Low birthweight
Study Location: Ibadan, Nigeria
Ambient Sources in Ibadan

Trash Burning

Generators

Traffic

North of Lagos/Cara Titilayo Harshman
Traditional Cooking sources

Firewood stove

Kerosene stove
Intervention Stove

Ethanol Stove
Exposure Assessment Plan

- 72 hour monitoring
  - 2\textsuperscript{nd} and 3\textsuperscript{rd} trimesters
  - PM\textsubscript{2.5}, CO
- 12-48 hour GPS
- Stove use monitoring
Exposure Assessment Goals

1. Do the study participants use the intervention stove?
2. Does the intervention group have lower exposures to PM and CO than the control group?
3. How do ambient exposures impact daily exposures?
Did the participants use the stove? 

Yes
Stove Use Analysis
Consistent Stove Usage

Matt Shupler
Does the intervention group have lower exposures to PM$_{2.5}$ and CO than the control group?
How do ambient exposures impact daily exposures?
Methods

PM$_{2.5}$ ($\mu$g/m$^3$)

- 72h monitoring

GPS (longitude, latitude)

- 12h monitoring
- + household coordinates
Sample Participant Exposure Map

PM$_{2.5}$ Concentration (μg/m$^3$)
- 0-15
- 16-25
- 26-35
- 36-50
- 50-200

PM$_{2.5}$ Concentration (μg/m$^3$)
- 0-15
- 16-25
- 26-35
- 36-50
- 50-200
Non-Household vs Household
Conclusions

• Cleancook stove is used continuously and preferentially
• Cleancook reduces exposures to PM$_{2.5}$ and CO
• Reducing household level exposures results in greater reductions of personal exposures
Next Steps

• PAH and Black Carbon exposures
• Expanding GPS analysis
• Combining exposure, GPS and SUMS
• Comparing exposures for primary and other adults in the home
• Developing ambient monitoring network in Ibadan
Thank You

northcross@gwu.edu