

QUANTIFYING THE HEALTH IMPACTS OF COOKING IN PERI-URBAN ACCRA, GHANA

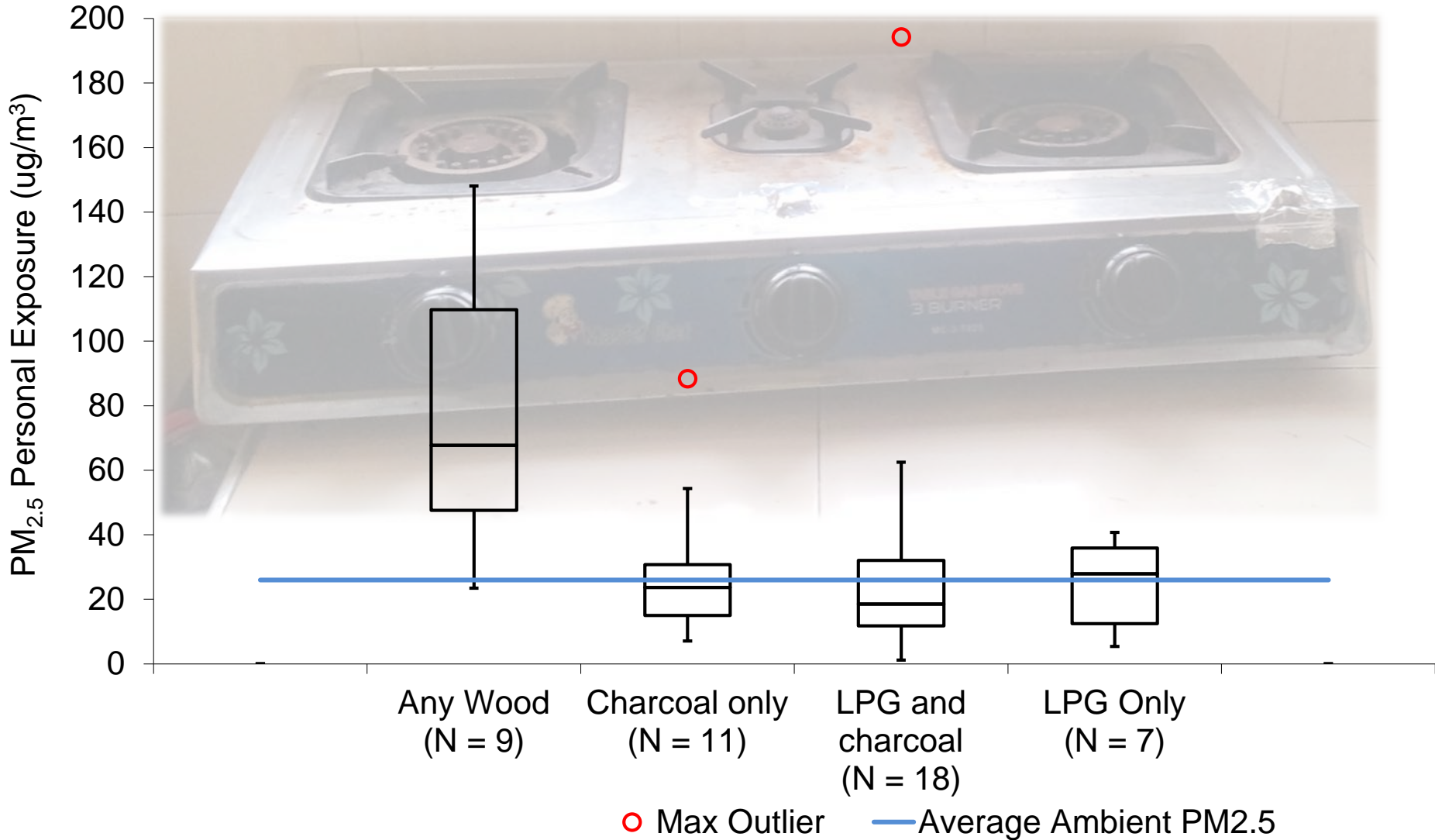
CHARITY GARLAND
BERKELEY AIR MONITORING GROUP
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BACKGROUND

- Climate and Clean Air Coalition, Global Alliance for Clean Cookstoves, and World Bank Funded
- Study implemented in peri-urban Accra, Ghana
- Capacity building training with the Ghana EPA
- PM_{2.5} personal exposure measurements in four distinct fuel use groups:
 1. Exclusive LPG
 2. LPG and charcoal mixed
 3. Exclusive charcoal
 4. Wood used in combination with other fuels
- Measurements made using Access Sensor's Ultrasonic Personal Air Sampler (UPAS) gravimetric monitor
- Usage measurements with iButtons
- Field measurements over four weeks
- Real time PM HAP measured using the PATS+
- Total sample size of 45



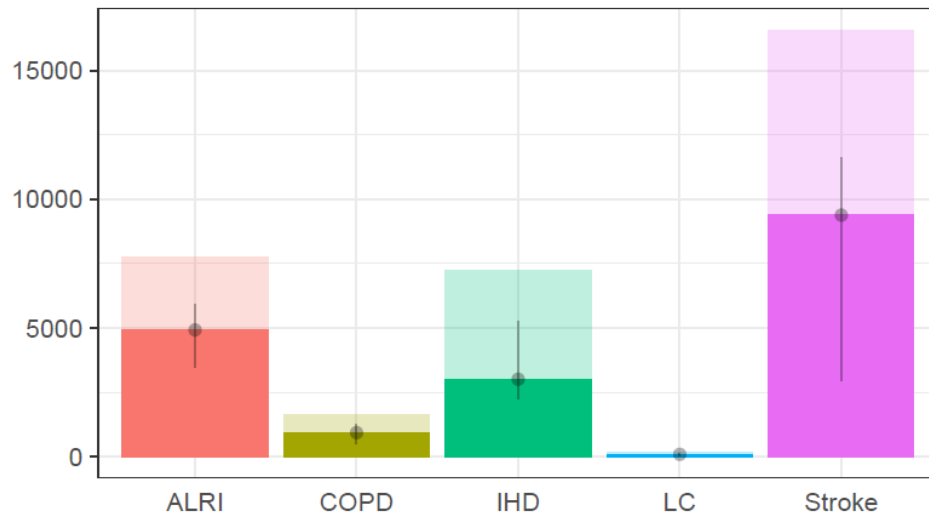
PERSONAL EXPOSURE - FOUR DISTINCT FUEL-USE GROUPS



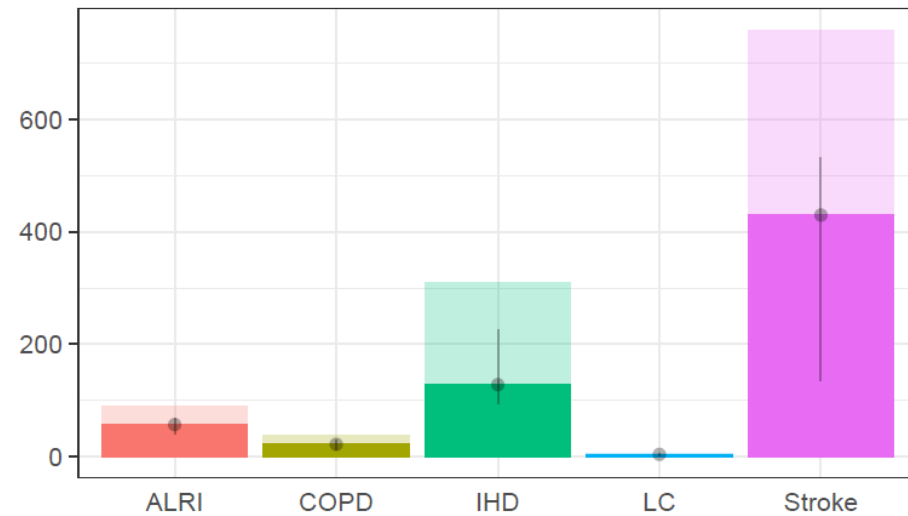
HOUSEHOLD AIR POLLUTION INTERVENTION TOOLKIT (HAPIT) MODEL

WOOD USERS TRANSITIONING TO EXCLUSIVE LPG USE

Averted DALYs (Disability Adjusted Life Years)



Averted Deaths

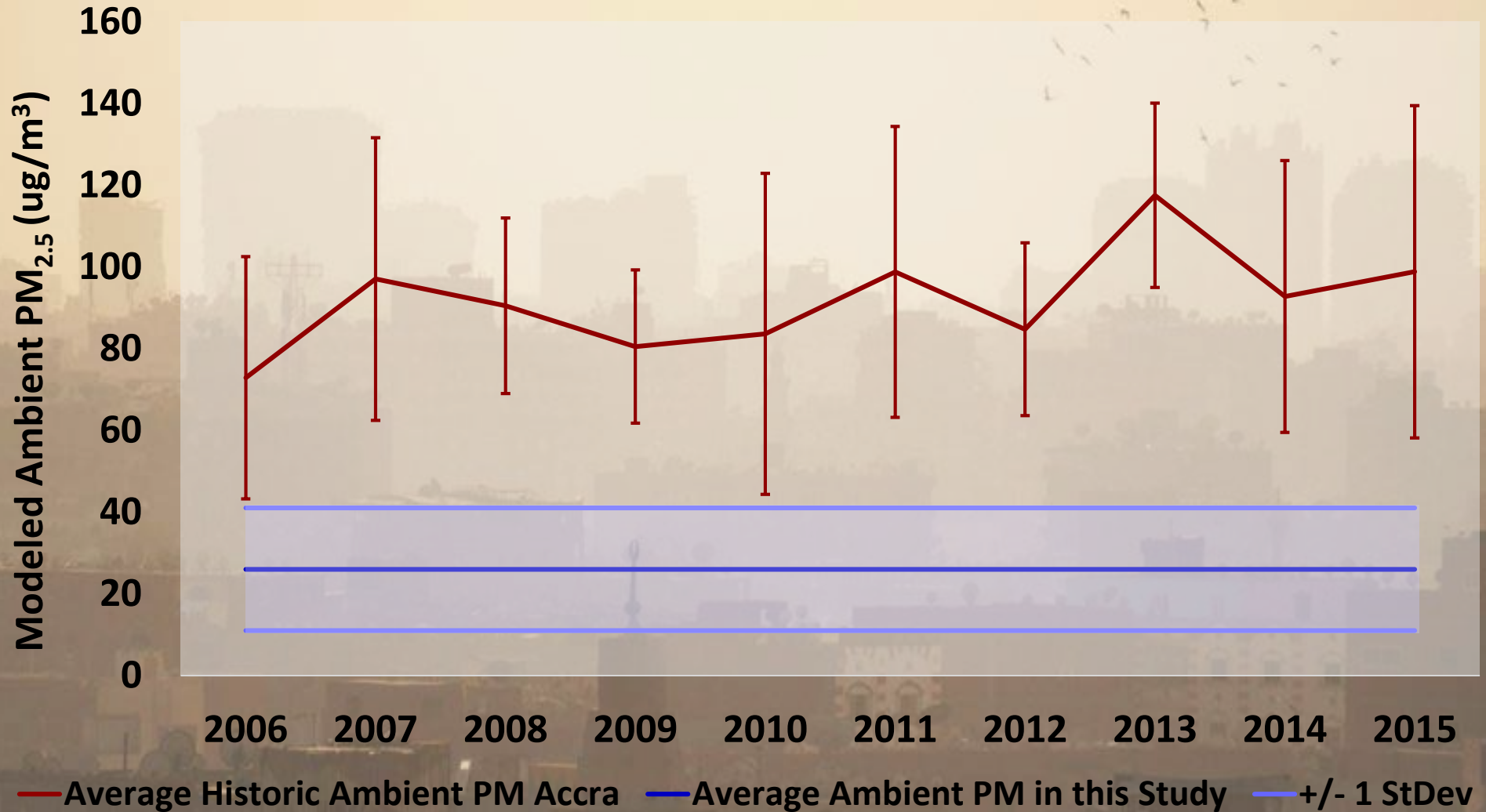


ALRI - Acute Lower Respiratory Infection
 COPD - Chronic Obstructive Pulmonary Disorder
 IHD - Ischemic Heart Disease
 LC - Lung Cancer

Avertable
 Averted

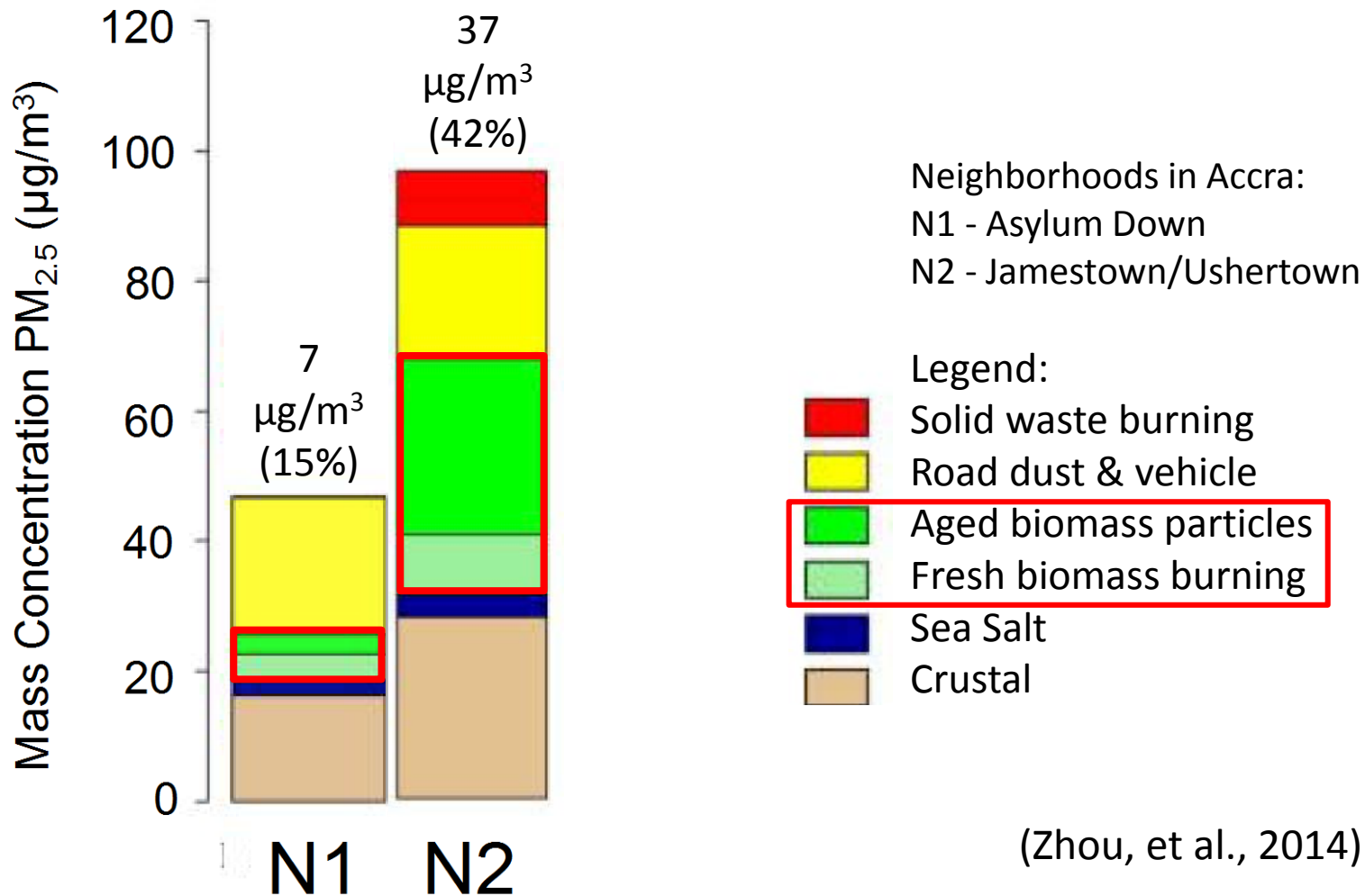
(HAPIT developed by Ajay Pillarisetti of University of California, Berkeley)

HISTORIC AMBIENT PM_{2.5} CONCENTRATIONS IN ACCRA, GHANA



(Historic ambient PM data provided by Ghana EPA)

SOURCE APPORTIONMENT OF AMBIENT AIR IN ACCRA, GHANA



REFERENCES

- Zhou, Z., Dionisio, K. L., Verissimo, T. G., Kerr, A. S., Coull, B., Howie, S., ... Ezzati, M. (2014). Chemical Characterization and Source Apportionment of Household Fine Particulate Matter in Rural, Peri-urban, and Urban West Africa. *Environmental Science & Technology*, 48(2), 1343–1351. <https://doi.org/10.1021/es404185m>

Acknowledgements

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USAGE RESULTS

LPG only:

Cooked for 61 minutes/day on average

LPG and charcoal:

LPG stoves 64 minutes per day

Charcoal stoves 74-104 minutes per day, depending on charcoal stove type

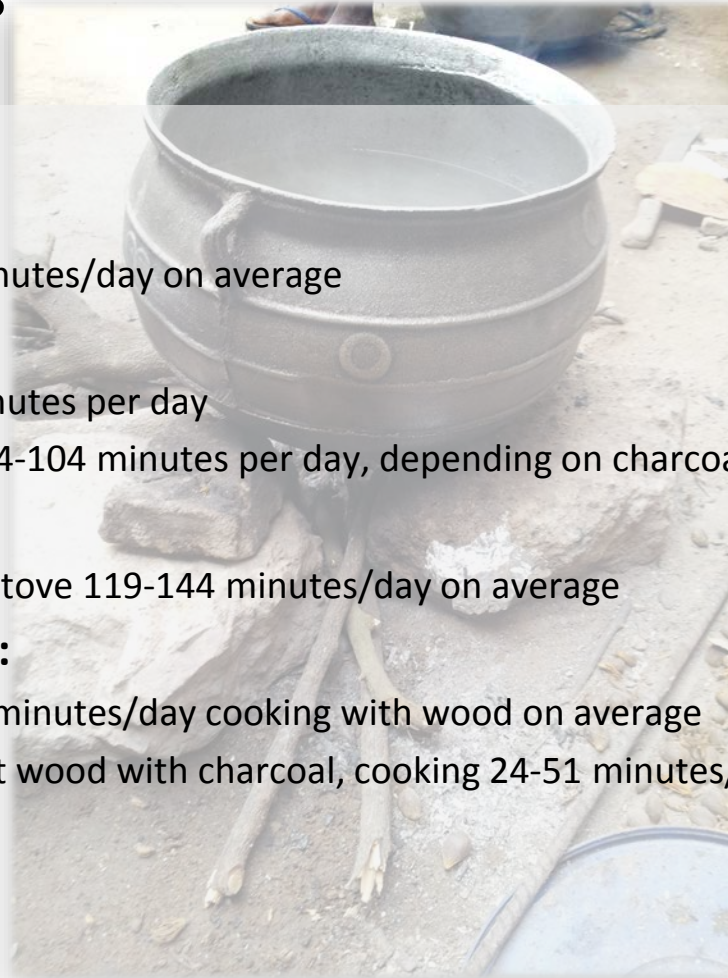
Charcoal only:

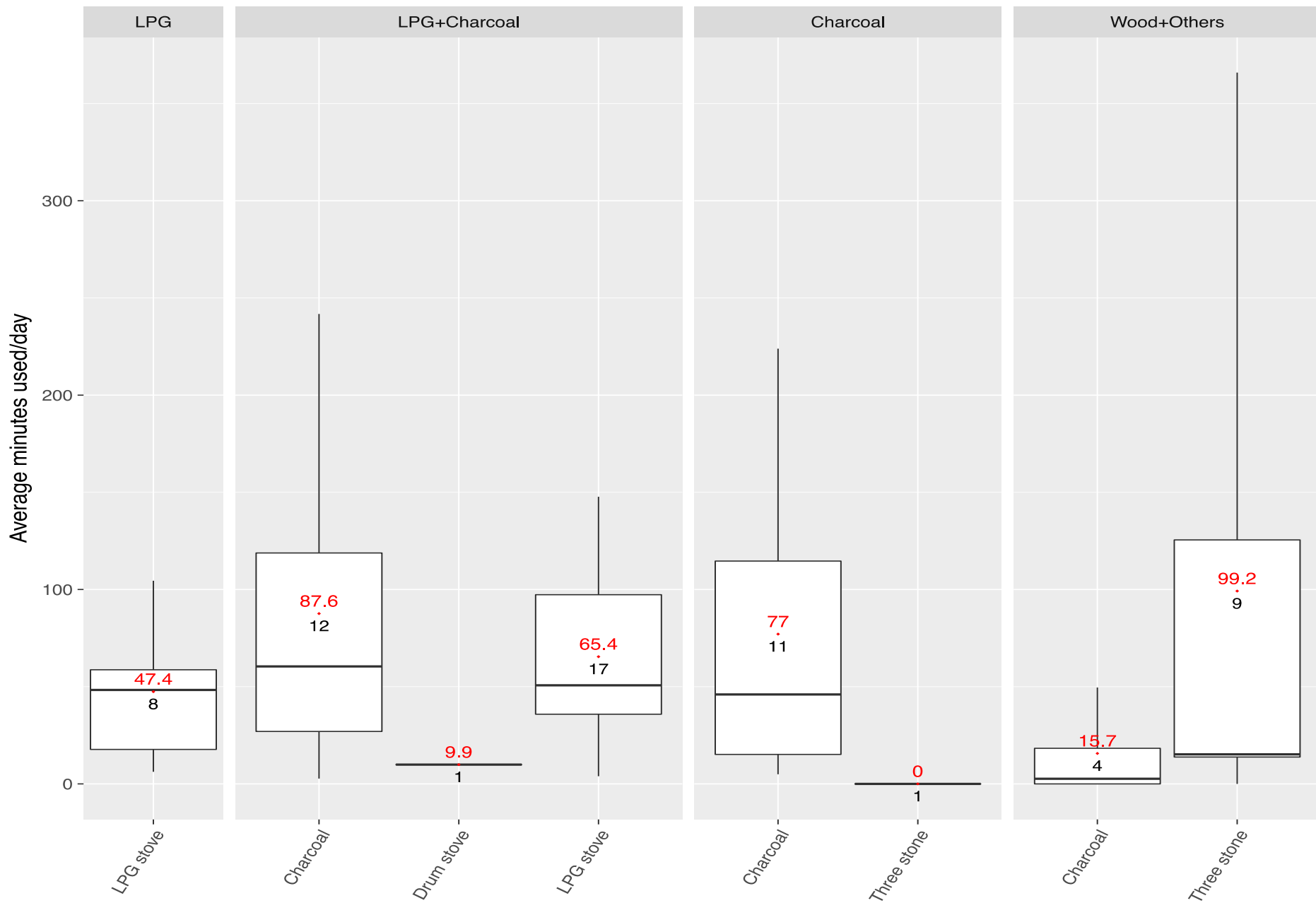
Homes use their stove 119-144 minutes/day on average

Wood + other fuels:

Homes spend 95 minutes/day cooking with wood on average

Often supplement wood with charcoal, cooking 24-51 minutes/day on average





PERSONAL EXPOSURE - FOUR DISTINCT FUEL-USE GROUPS

