

Further investigations of indoor air pollution and ventilation

Kelley Grabow

with Sam Bentson, Nordica
MacCarty, and Dean Still

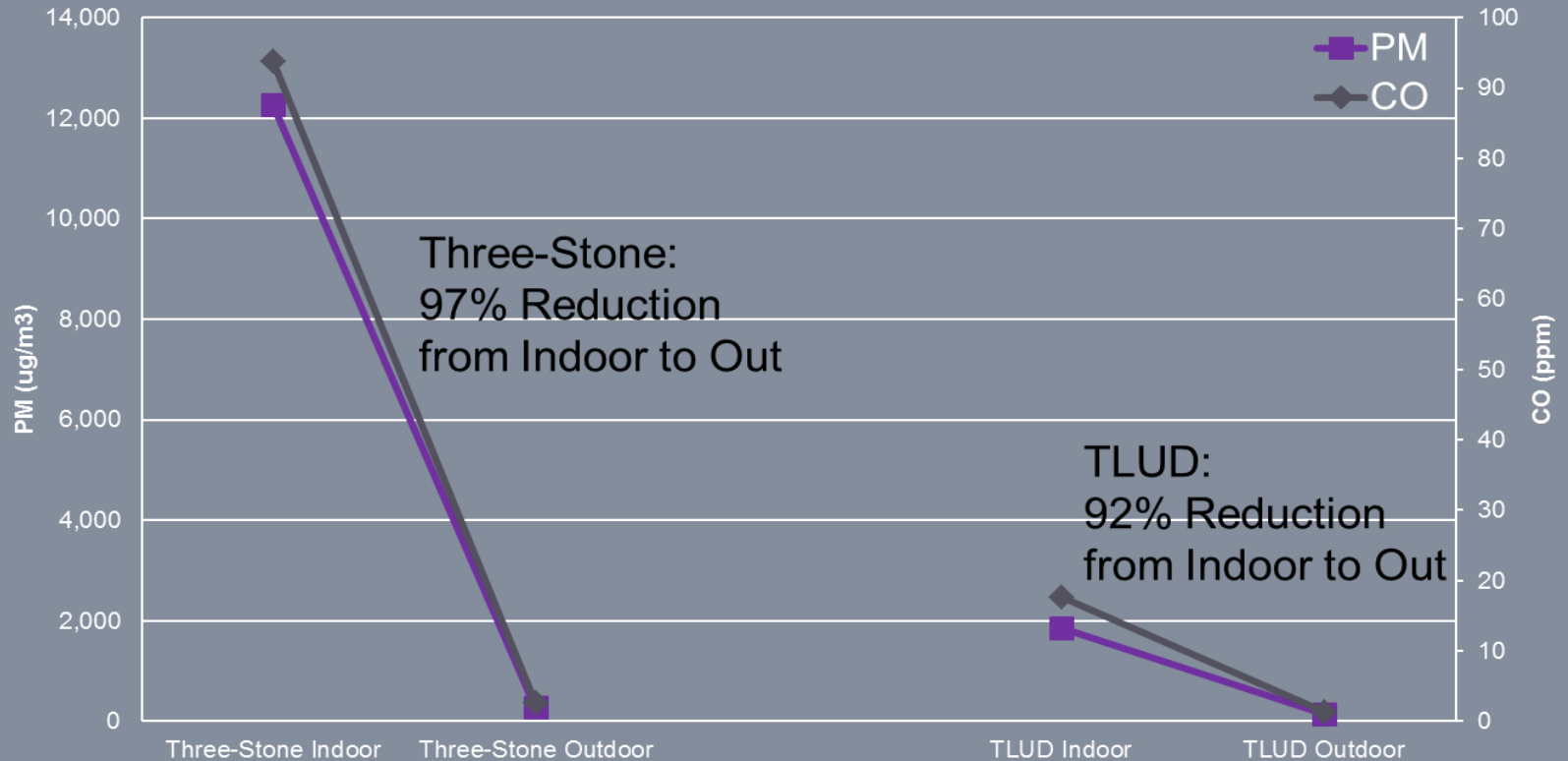
Background



- Why is indoor air pollution (IAP) a problem?
- WHO Standards
 - Updated in 2010

Last Year

Emissions Exposure as Measured by IAP Meter Backpack
Outdoors and Indoors for Three-Stone Fire and TLUD



Literature Review

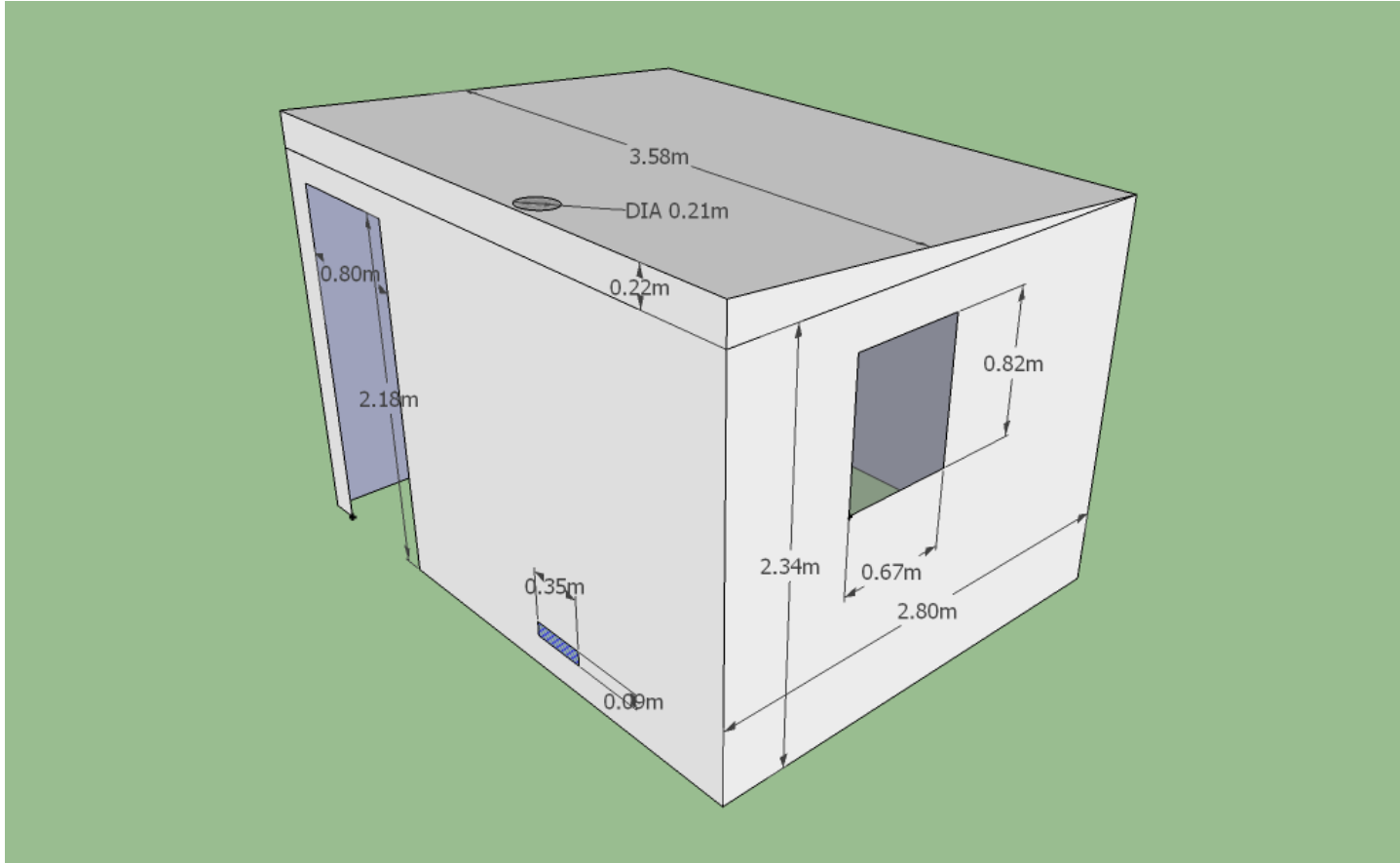
- IAP research in 2011
 - Michael Johnson
 - Mathematical model performance
 - Call for more data
 - Kirk Smith
 - RESPIRE study
 - Results of intervention
 - Field data

Goals



- Expand data set
- Bridge lab & field
- Maintain awareness
- Respond to global health organizations

Experimental



Experimental

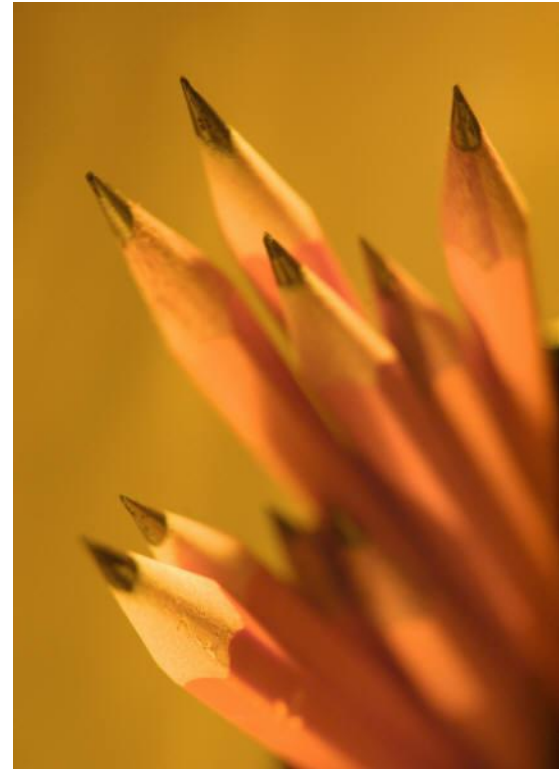


Experimental

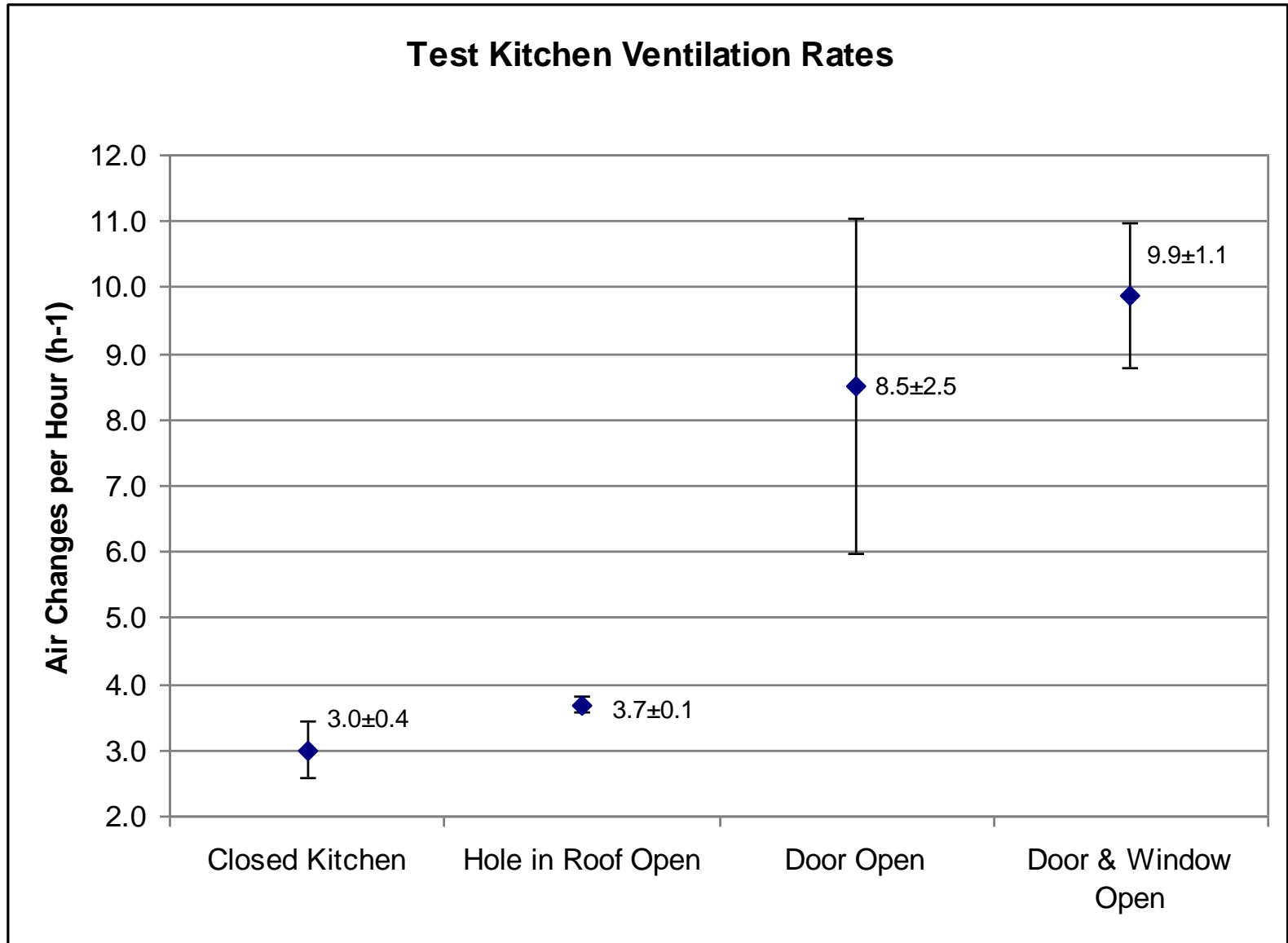


Results

- Submitted to ESD
- Continuing study

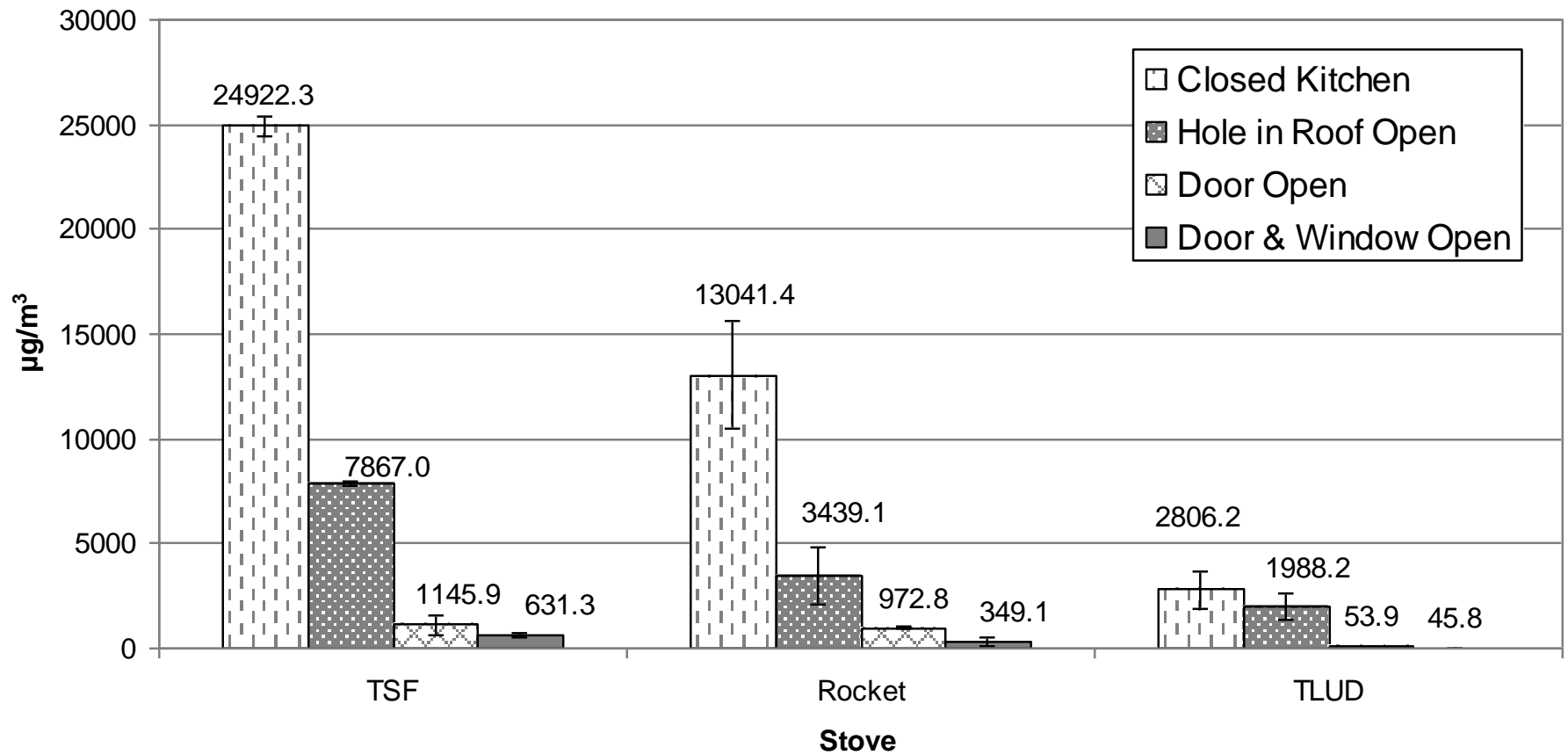


Results



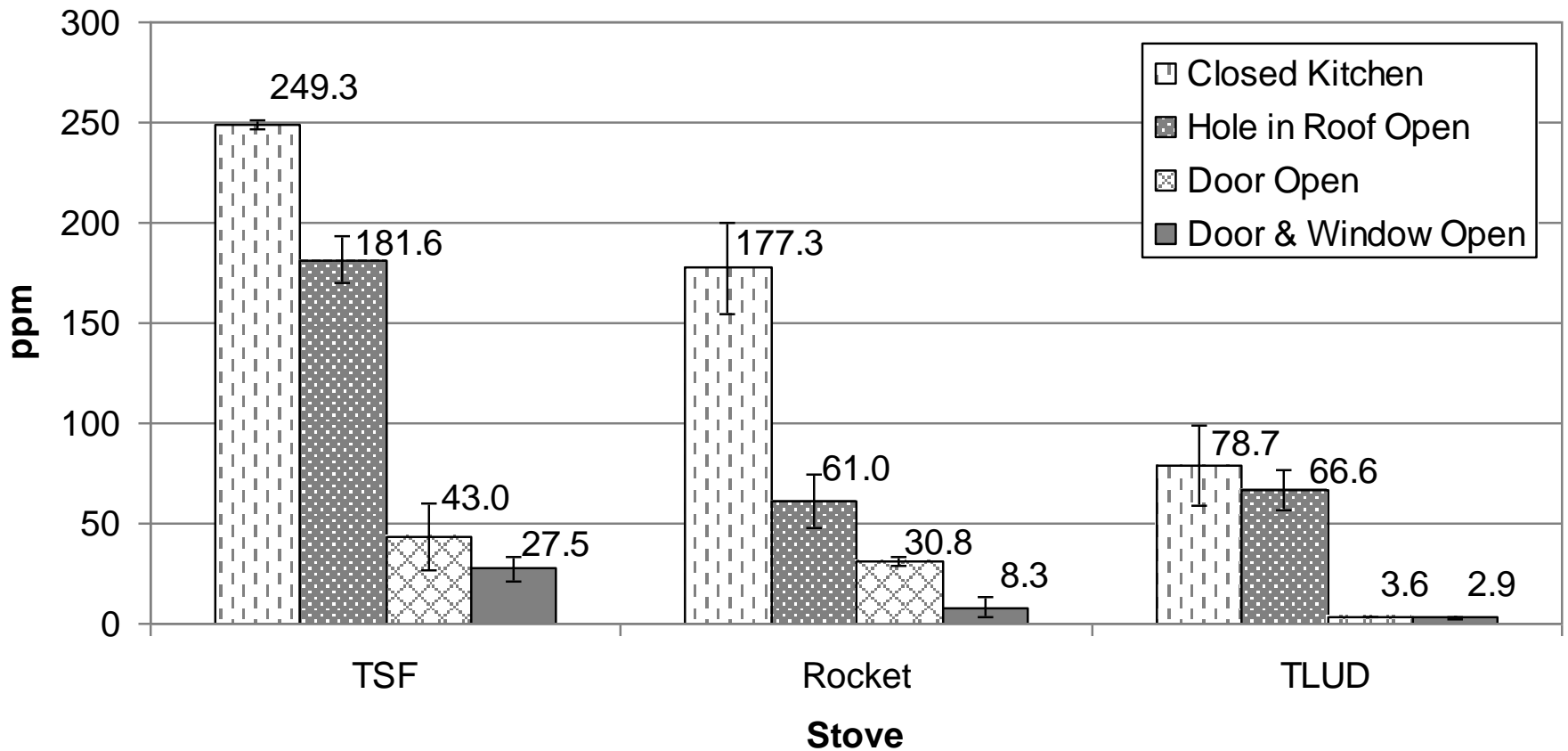
Results

Mean PM Concentrations by Stove in Test Kitchen



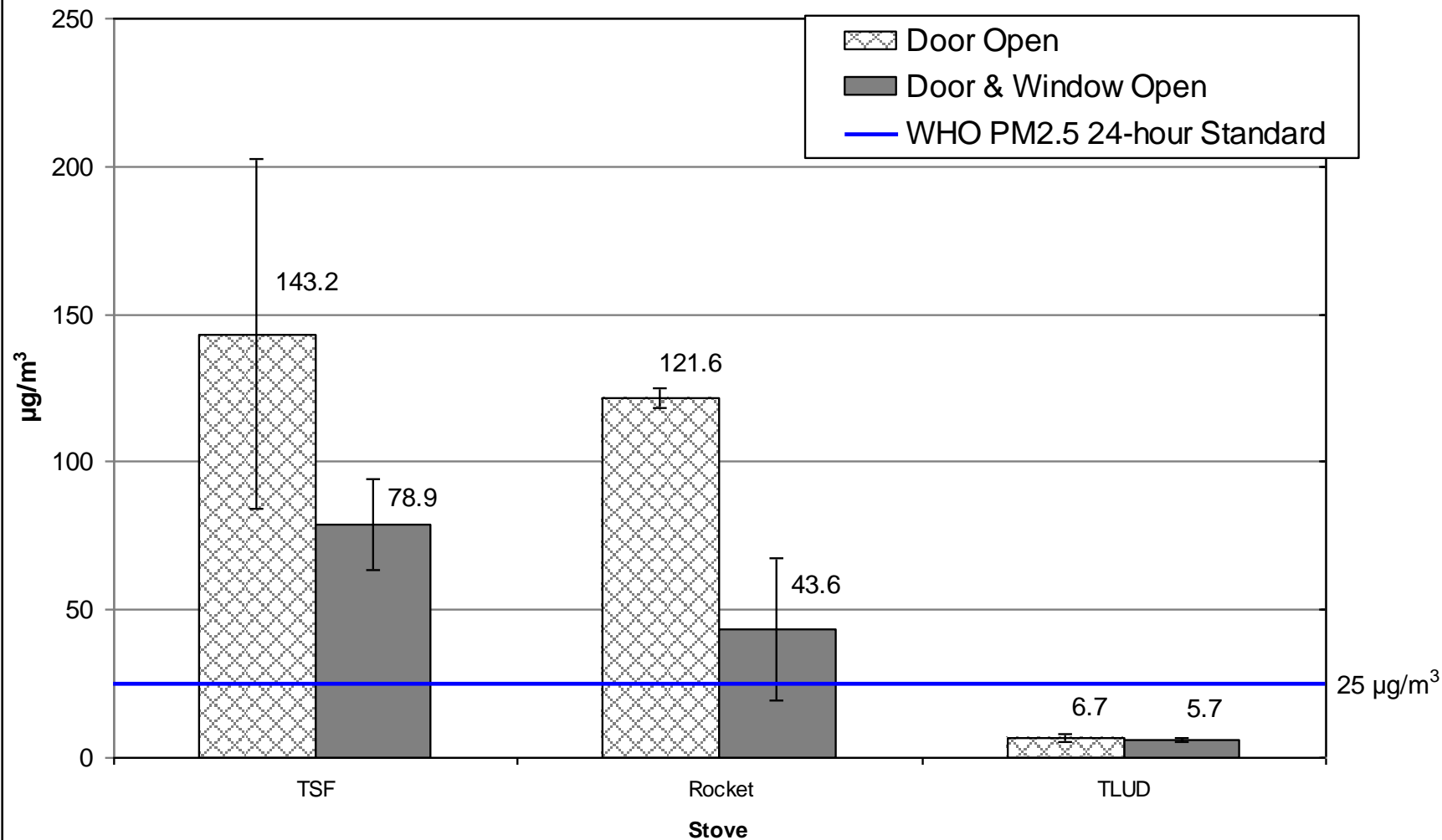
Results

Mean CO Concentrations by Stove in Test Kitchen



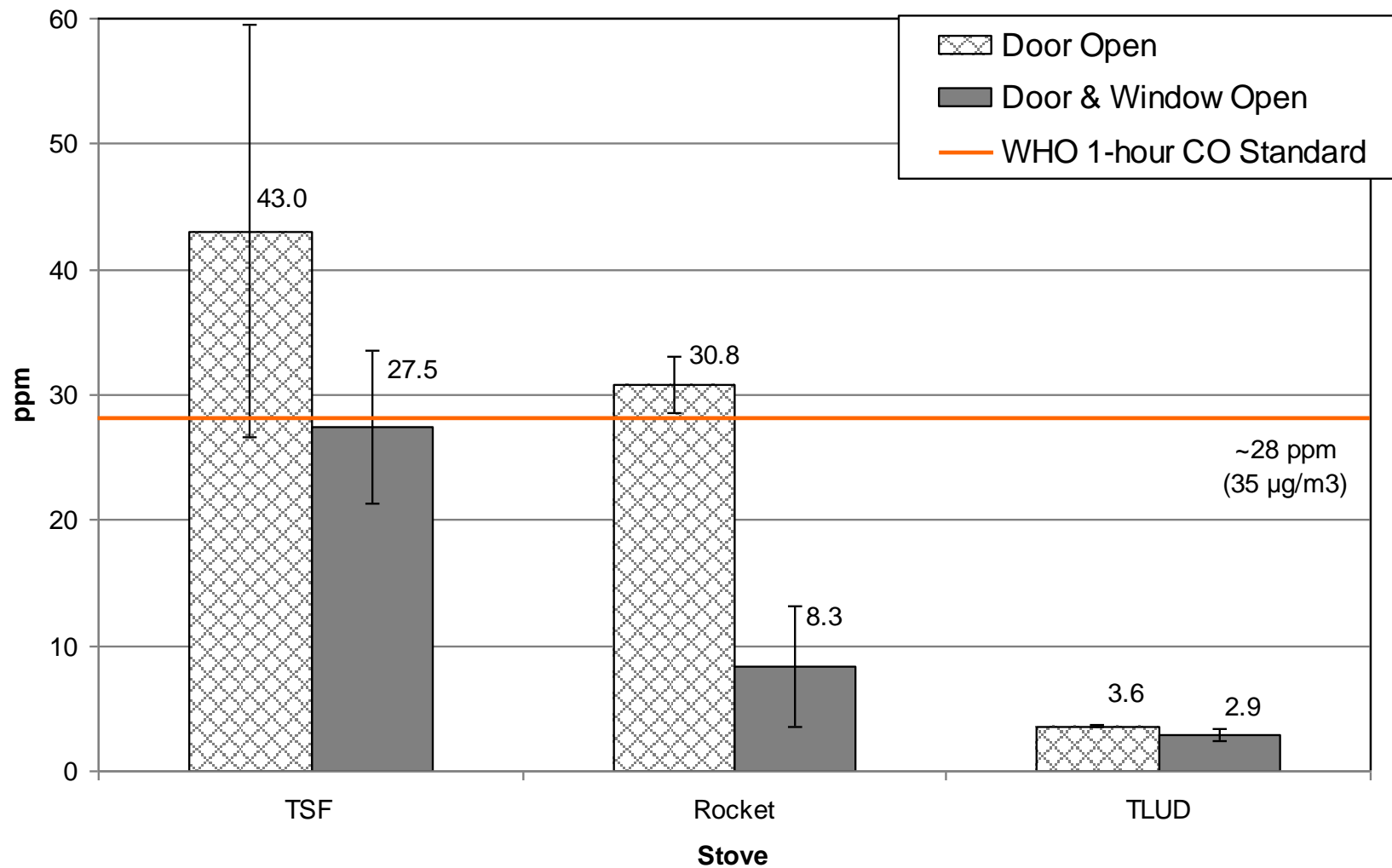
Results

**24-Hour Mean PM Concentrations in Test Kitchen
(Extrapolated From 1-Hour Concentrations)**



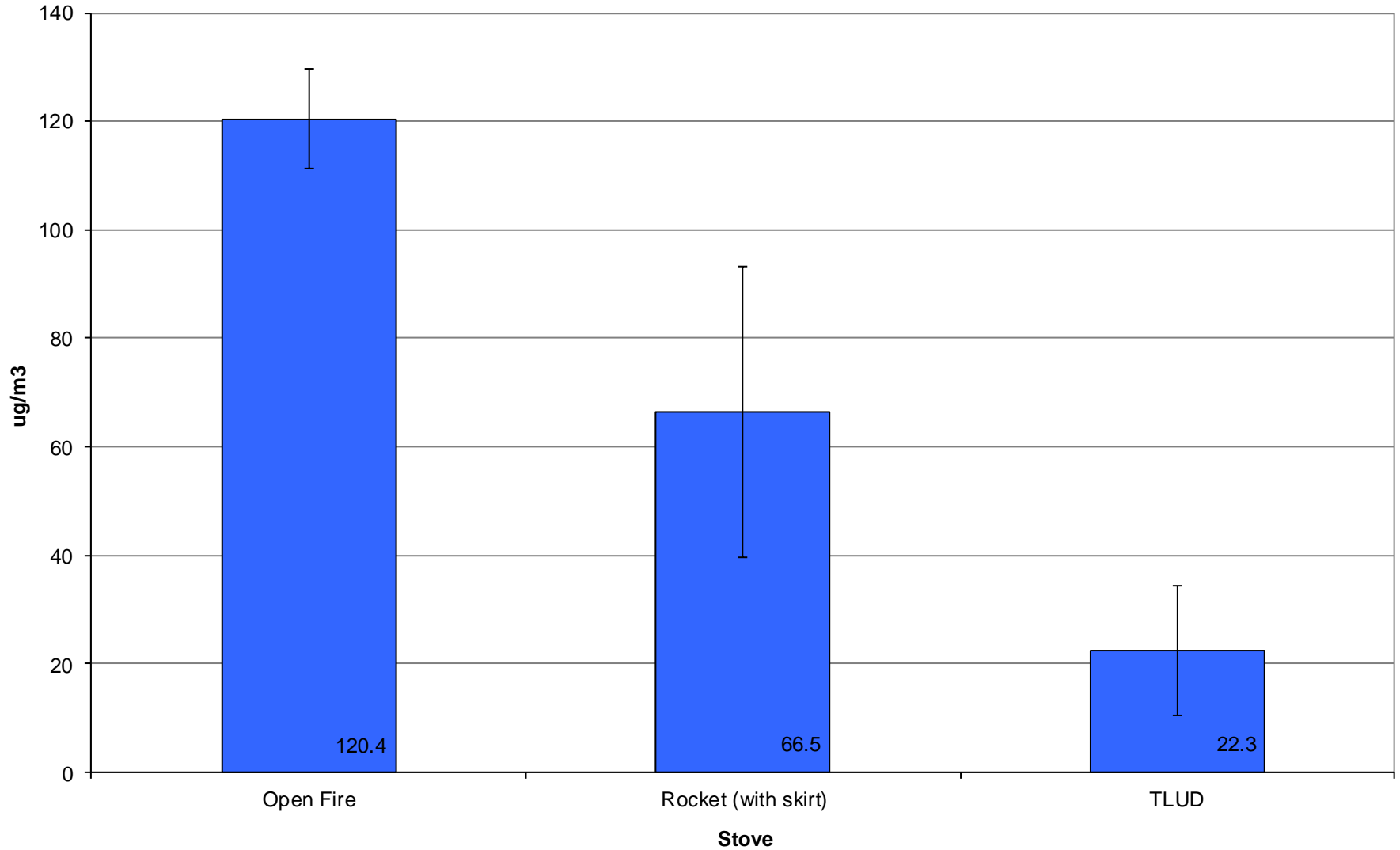
Results

1-Hour Mean CO Concentrations in Test Kitchen



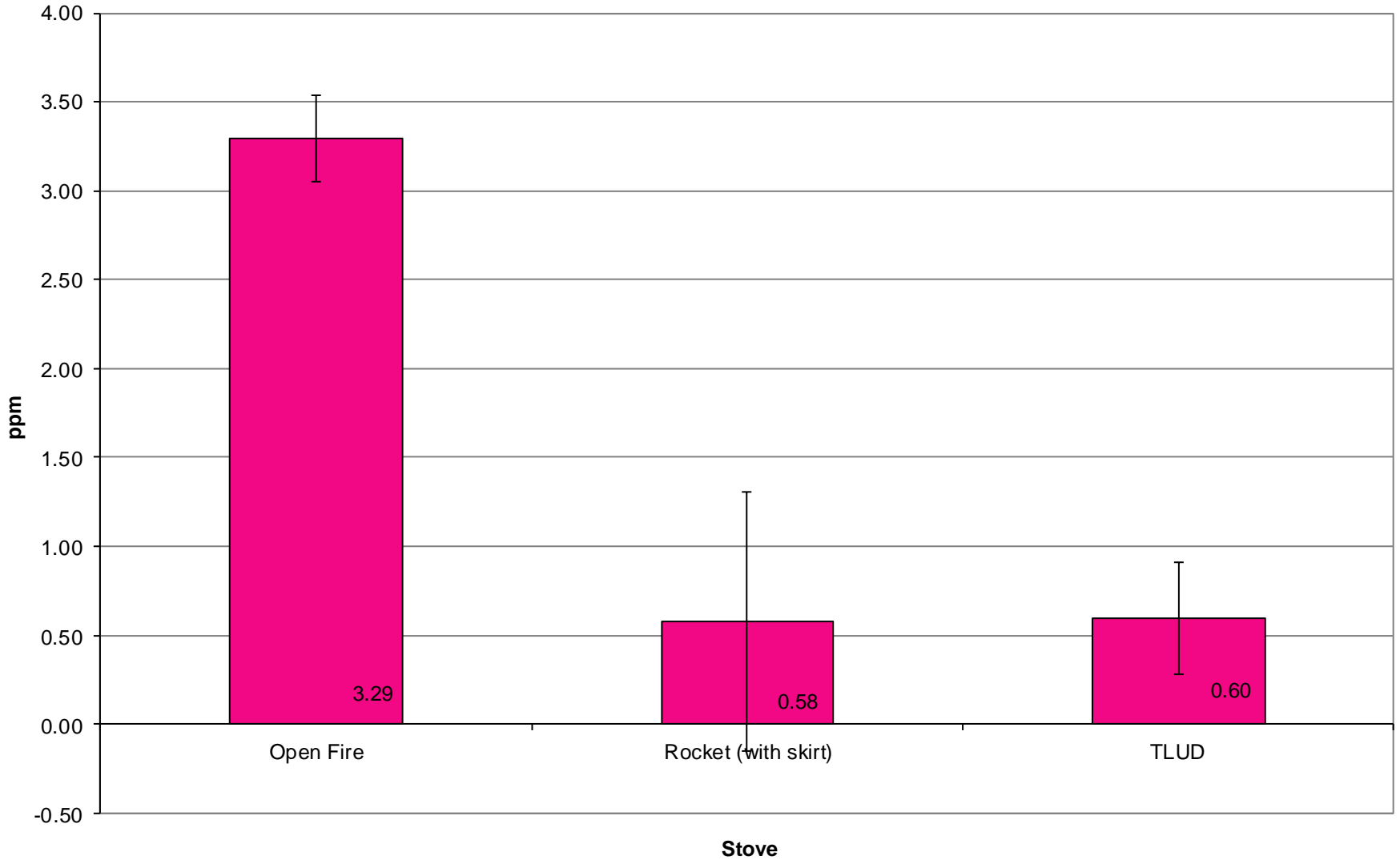
Results

Average PM on veranda



Results

Average CO on veranda



Discussion

- Methods for measuring ACHs
 - Is there a standard?
 - Basic Room Purge Equation
 - Mage & Ott IAP episode theory¹
 - Translatable?

1. Mage, D., Ott, W., 1996. Accounting for nonuniform mixing and human exposure in indoor environments, in: Characterizing Sources of Indoor Air Pollution and Related Sink Effects (ASTM STP 1287). American Society for Testing and Materials, West Conshohocken, PA.

Future Directions

- Laboratory and field
 - Bridging the gap crucial in IAP research²
- Collaboration
 - Methods in quantifying environmental tobacco smoke

2. Johnson, M., et al, 2009. New approaches to performance testing of improved cookstoves. Environ Sci Tech 44, 368-374.

Conclusions

- Quantifying variety of ventilation setups
- Thanks to Dean Still, Nordica MacCarty, Sam Bentson