

2014

Designing Healthier Houses in Guatemala

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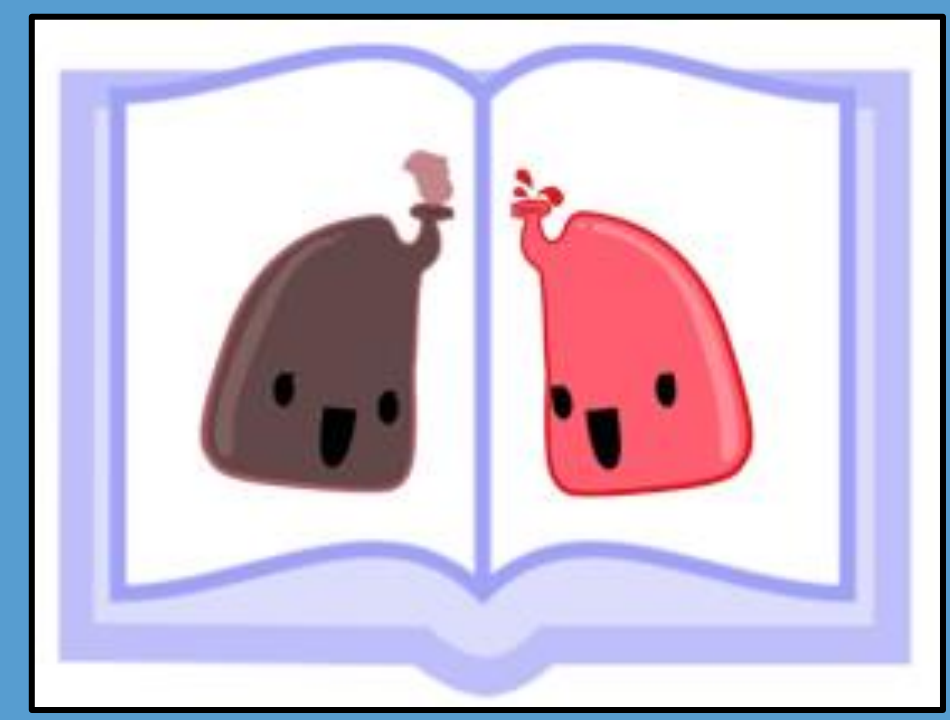
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Recommended Citation

Prescott, Mary; Ross, Jonathan; Torres, Alessandra; and Trahan, Meghan, "Designing Healthier Houses in Guatemala" (2014). *Great Problems Seminar Posters*. 165.

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Abstract

This project aims to address the problems of indoor air pollution (IAP) in Guatemala due to inefficient cooking methods. Currently, citizens use open fire as their main cooking method which can be hazardous to the households. We used background research on IAP and Guatemala to develop a stove design that decreases the levels of IAP yet is affordable and adaptable to the individual families we hope to help.

Background

Guatemala		
Growth Rate	Infant Mortality (per 1000 births)	Poverty Rate
1.86%	23.51	54%

Particulate matter levels in this region reach more than 100 times accepted levels (Von Ritter Figueres, 2010). The inhalation of these harmful emissions leads to high disease rates in rural areas.

Problem Statement

Each year, thousands of children and adults in Guatemala suffer or die from respiratory diseases due to the inhalation of indoor air pollution from biomass burning. Families in this area are unaware of the harmful impacts of open fire cook stoves, and are unable to afford a safer option.



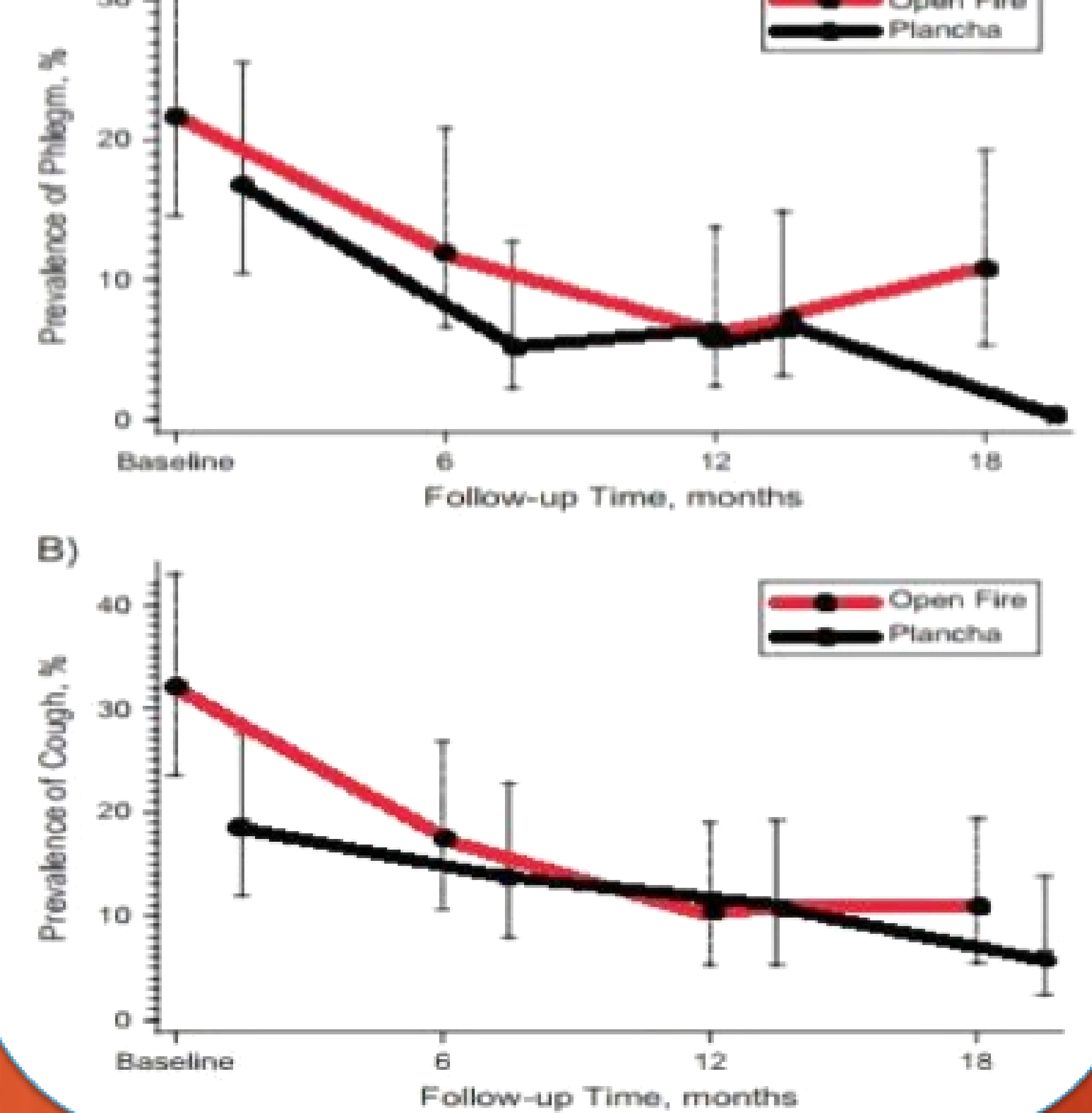
Process

We shaped our solution based on current stove designs in such a way that it is adaptable to a wide range of households. We then decided to build a prototype of the stove to find any flaws or difficulties in our design, which led to some modifications and improvements.

Studies

- We found many case studies that focused on the relation between indoor air pollution and:
 - Loss of life years
 - Rate of disease
 - Breathing problems
 - Infant birth weight
 - Death rates
- We also found pilot studies for modified stove implementation

RESPIRE Study on Respiratory Symptoms: Open Fire vs. Modified Stove

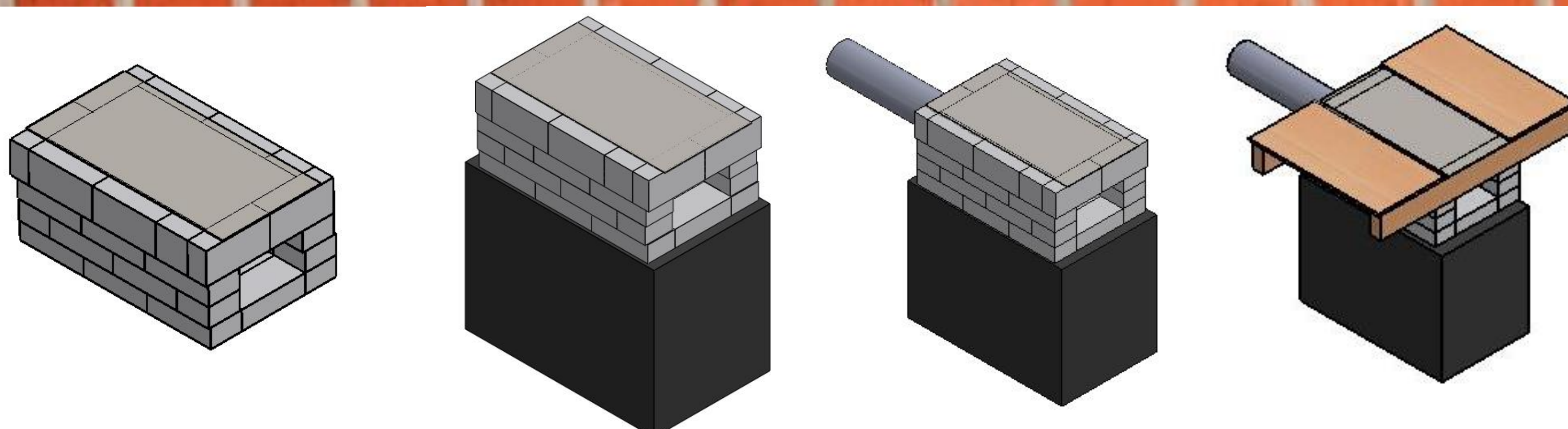


(Smith-Sivertsen, 2008)

The 4-Step Stove - La Estufa de Cuatro Pasos

- efficient wood-burning
- elevation
- ventilation
- table/workspace
- optional modifications
 - fire bricks for warmth
- easy to build/repair
- build-on/upgradable approach (levels)
 - price increases with level

Level	Provides	Total Price (Quetzals)	Total Price (USD)
1	Efficient Wood Burning	Q 177.80	\$22.99
2	Elevation	Q 188.51	\$24.37
3	Ventilation	Q 265.91	\$34.37
4	Table/Workspace	Q 381.62	\$49.33



References

Acknowledgments

Thank you professor Creighton R. Peet and Ashley Emerson Gilbert of Seven Hills Global Outreach for the fantastic interviews, from which we gleaned social knowledge on Guatemala. Thank you to our professors for all of the guidance and organization. Finally, thank you Thomas Mills Washburn for the help and resources provided.

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