Globally, around 3 billion people cook with biomass fuel (wood, crop waste, charcoal, and dung), which releases carbon monoxide, nitrogen dioxide, and other toxins into their homes. The resulting air pollution is linked to pneumonia, chronic obstructive pulmonary disease, lung cancer, and cardiovascular disease, and contributes to more than 4 million premature deaths annually. Burning these materials also contributes to deforestation, soil erosion, and climate change.

Girls and women are disproportionally affected by this type of air pollution because they are traditionally tasked with spending six or more hours per day cooking family meals in poorly ventilated homes. Additionally, gathering the biomass fuel puts girls and women at risk for sexual assault, animal attacks, and physical ailments.

Switching from biomass fuel to liquified petroleum gas (LPG), a mix of propane and butane, can reduce destructive pollution, but is financially out of reach for many.

Our team is working with residents of highland Puno, Peru to test whether a thermal cooker can make LPG affordable by dramatically reducing the quantity needed for cooking. A thermal cooker is a heavily insulated container that does not require fuel. Food is heated to a high temperature on an LPG stove, then enclosed in the thermal cooker, which continues the cooking by keeping the food at a high temperature for several hours without burning additional gas.

This could greatly reduce the amount of LPG required for cooking and make it an affordable option for people in low-
and middle-income countries.

Our team is studying the crucial question of how much fuel a thermal cooker can save under real-world conditions and whether this savings is significant enough to remove the economic barrier to LPG use for low-resource households. In addition to measuring LPG consumption to quantify potential savings, we will also test local materials and production modes to develop an affordable thermal cooker made from environmentally sustainable materials.

The Alliance believes that, if successful, this thermal cooker technology could transform cooking in Peru and many other countries, improving health equity for women and children, reducing the negative environmental consequences of cooking with biomass, and improving rural food security and nutrition.

**Collaboration Across Sectors**

Our Thermal Cooker team includes researchers and students from four schools at JHU: Public Health, Medicine, Engineering, and Business. We are proud to work in partnership with Asociación Benéfica PRISMA.

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**HEALTHY ENVIRONMENTS**

Transformative Technologies & Institutions

Testing a thermal cooker to reduce household air pollution and make cooking with LPG affordable and sustainable

Public Health, Medicine, Engineering, Business

PERU

**ABOUT JOHNS HOPKINS ALLIANCE FOR A HEALTHIER WORLD**

The Alliance is an initiative integrating diverse expertise and perspectives to unlock groundbreaking knowledge and resolve the most complex global health equity challenges of our time. Scholars, researchers, and leaders from all disciplines—medicine, nursing, public health, international relations, engineering, education, business, the social sciences, creative arts, and bioethics—work side-by-side with partners and disadvantaged communities around the world to create a healthier, more equitable, and more just world.