

Data Analysis of Exposure to Traditional Cookstoves and Health Endpoints

More than half of the world's population relies on biomass combustion to meet basic domestic energy needs. Indoor cook stoves can result in extremely high levels of indoor air pollution; typical PM₁₀ concentrations in homes using biofuels may range from 200 to 5,000 µg/m³. Improved stoves designs have the potential to substantially reduce pollutant emissions and indoor air pollution exposures; however, evaluations of improved stoves are limited. Biomass-derived indoor air pollution in developing countries has been associated with increased risks of respiratory diseases. Relatively few studies have examined the cardiovascular effects of biomass burning. Studies examining the relationship between stove use and adverse health effects have been inconsistent, relying mostly on proxies of exposure, such as type of stove or fuel. Studies quantitatively assessing both indoor air pollution levels and health effects, as well longitudinal studies assessing the impact of improved stoves on air pollution and health effects, are needed to fully evaluate the effectiveness of stove interventions. This proposed project is the baseline evaluation of a population using traditional cook stoves; we intend to study the same population longitudinally for several years after the implementation of improved cook stoves. For the baseline study, we have already quantitatively assessed indoor air pollution levels, as well as levels of exhaled carbon monoxide (CO), a biomarker of CO exposure. We also assessed several respiratory and cardiovascular health outcomes, including lung function, inflammatory marker from dried blood spots, oxygen saturation levels, blood pressure, and respiratory symptoms. In this proposal, we aim to create an electronic database and evaluate the association of the exposure measures with the various health endpoints. We hypothesize that increased concentrations of particulate matter and CO, and increased exhaled CO levels will be associated with markers of adverse respiratory and cardiovascular health effects.