

**GENDER-DIFFERENTIATED HEALTH AND RELATED IMPACTS OF IMPROVED
COOKING TECHNOLOGIES IN RURAL INDIA**

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ABSTRACT

The literature base examining the impact of household energy interventions on the health outcomes of populations exposed to indoor air pollution ignores gender dimensions. Understanding these gender-differentiated impacts is crucial to undertaking effective energy interventions because women suffer more from energy poverty compared to men. Using rare events logistic regression analysis, I estimate the differences by gender in the probability of health outcomes, depending on stove type and fuel type. These technologies include clean stoves (such as improved cookstoves and household biogas production plants) and clean fuels (liquid fuels such as LPG and kerosene) among rural households in India. I find that the likelihood of a negative health condition is higher in households using traditional stoves and dirty fuels; in unclean stove-using or unclean fuel-using households, for most health outcomes, women suffer more compared to men. In unclean stove-using and dirty fuel-using households, there is no additional effect of gender on children's writing and math cognitive skills or BMI measurements.

I. Introduction

Exposure to indoor air pollution (IAP) in developing countries, from the inefficient combustion of solid fuels in poorly ventilated kitchens, is a significant public health threat that has been well documented (Ezzati et al., 2002; Wallack and Ramanathan, 2009; Clark et al., 2009; Noonan et al., 2010; Smith et al., 2010). IAP leads to low birth weight and infant mortality, and causes respiratory illnesses such as asthma, pneumonia and other acute lower respiratory infections among children below five years of age. IAP also causes cataracts, blindness, ischemic heart disease (Smith and Mehta, 2003), and chronic obstructive pulmonary disease and lung cancer in adults, primarily women (Noonan et al., 2010). Given that women are often the primary (if not only) cooks, their exposure to polluted air should be higher than men's (Bruce et al., 2000). Unfortunately, the empirical literature analyzing the gender dimension of IAP impacts is narrow and scattered (Kohlin et al., 2011).

Energy interventions can deliver significant health benefits to women and their children provided interventions are carefully designed and targeted on the basis of context-specific understanding of scarce energy sources and intra-household decision-making. Millennium Development Goal 1 and gender and energy are linked in that women and girls suffer more from scarcity of energy services, and stand to gain more from improved energy services compared to men (ENERGIA, 2006). It is important that studies differentiate health impacts by gender, and based on research evidence, interventions be targeted to the populations most exposed to and affected by indoor air pollution.

I examine the differences by gender in health and related impacts of improved cooking technologies, including clean stoves and clean fuels, among rural households in India. By reducing indoor air pollution, clean stoves (improved cookstoves and household biogas production plants, for example) and clean fuels (such as LPG and kerosene) could positively impact women's and children's health (especially, early life health outcomes among children), cognitive skills of children, and activities of daily living among adults and children.

Among the empirical studies that examine health impacts, few differentiate the impacts by gender, and test for statistical difference between the two. My analysis advances beyond previous empirical work with broad coverage of outcomes affecting human health and activity. This allows exploring heterogeneous effects in the health impacts of indoor air pollution from traditional stoves and dirty fuels. Second, the use of a rare events logistic model allows explanation for differences in impact by gender, given the low number of positive cases of diagnosed health and related outcomes.

I find that the likelihood of a negative health condition is higher in households using traditional stoves and dirty fuels; in unclean stove-using or unclean fuel-using households, for most health outcomes, women suffer more compared to men. In unclean stove-using and dirty fuel-using households, there is no additional effect of gender on children's writing and math cognitive skills or BMI measurements.

The remaining sections of the paper are organized as follows: Section II provides background on the link between indoor air pollution and health, Section III describes the data and empirical strategy,

Section IV presents results, and Section V concludes the paper.

II. Background

A. Link Between Indoor Air Pollution and Health and Related Outcomes

Approximately 90% of rural households in developing countries are dependent on “unprocessed biomass fuels in the form of wood, dung and crop residues” (Bruce et al., 2000). India has the highest number of biomass fuel users (855 million) followed by Sub-Saharan Africa (585 million) (World Energy Outlook, 2010). According to the World Health Organization (WHO) estimates, 1.9 million people die prematurely every year from exposure to smoke from traditional cookstoves and open fires (WHO, 2010). Indoor air pollution has debilitating impacts on the local and global climate, as products of incomplete combustion from inefficient burning of fuels emit methane, a strong greenhouse gas that has higher global-warming potential than carbon dioxide. Biomass cookstoves emit black carbon, which also contributes to the present global warming (Ramanathan and Carmichael, 2008).

The evidence base for negative health impacts from biomass fuels in developing countries is well established. Acute respiratory infections, tuberculosis and chronic obstructive pulmonary disease are causally linked with exposure to pollutants from biomass fuels (Ezzati et al., 2002, Mishra et al., 1999). Dherani et al.’s (2008) meta-analysis best discusses the health impacts of household energy interventions, which shows that compared to cooking with clean fuels, cooking with biomass increases the risk of pneumonia by 80%.

Among the studies that have focused on health impacts by gender, there is no consensus on whether household energy interventions have a positive effect for women relative to men. In a case-control study conducted in Nanjing municipality, China, Xu et al. (2007) find that compared to non-smoking men, among non-smoking women there is a positively significant association between use of coal for heating fuel and COPD. Balakrishnan et al.’s (2002) study among 436 households in southern India shows that women cooks have significantly more exposure to respirable particulate matter compared to non-cook men. Ezzati et al. (2000) in their study among 345 individuals in 55 rural Kenyan households find that young and adult women have higher exposure to particulate matter relative to men in the same age group. In a case-control study among Saudi Arabian women, Dossing et al. (1994) find that indoor air exposure to open fire of wood or biomass is a risk factor of COPD among women. Pandey et al. (1984) show that among rural communities in the Nepal hill region, the prevalence of chronic bronchitis among non-smoking women increases significantly with duration of time spent near the fireplace, compared to non-smoking men.

Some studies show higher health benefits from cooking interventions for men compared to women. Mishra et al. (1999) conclude that despite higher exposures to cooking smoke, Indian women have lower prevalence of tuberculosis than men because of lower alcohol consumption and lesser likelihood of direct contact with people suffering from active TB. Chapman’s study (2005) in Xuanwei, China shows that using a stove with chimney has a significantly negative association with

incidence of COPD, and this reduction was more for men than women. In their study on the association between biomass fuel indoor air pollution and COPD in China, Liu et al. (2007) found that prevalence of COPD was significantly higher in men compared to women. Albalak et al.'s (1999) findings from a study in two Bolivian villages suggest that there is a positively significant association between chronic bronchitis and domestic fuel combustion, but there are no reported differences between men and women.

Some public health studies such as Chapman's study (2005) and Mishra et al.'s study (1999) use statistical rigor to establish causal connections, while some others do not eliminate all potential confounding variables between women's and men's health (Parikh, 2011 and Liu et al., 2007). Chapman et al. compare the relative risks of COPD among users and non-users of stoves with chimneys by gender, using the Cox-modeled risk ratio, and the modeled risk ratios were robust to different Cox model specifications. Mishra et al. adjust effects of cooking fuel type and key covariates on prevalence of tuberculosis, differentiating for age, gender and residence.

Parikh (2011) in her study of 4296 individuals in two districts of Himachal Pradesh, India reports that girls below 5 years of age, and women in the age groups of 30-60 years (commonly the primary cooks in a family) are at higher health risks than males in the same age groups, from the burning of fuelwood. The study, however, lacks rigorous statistical analysis to support the author's claim on the association between fuelwood burning and health risks such as neck ache, backache and coughing. While Liu et al. (2007) establish that biomass fuel use is an important risk factor for COPD, they do not report statistical differences between health outcomes for men and women.

B. Importance of Gender Dimension in Public Health and Stove Adoption Studies

Jayachandran (2008) argues that mortality effects of pollution vary by gender. In her analysis of the effects of the 1997 Indonesian forest fires on early-life mortality, she finds that male fetuses are more negatively affected by smoke compared to female fetuses. But smoke has a higher negative effect for girls compared to boys, in the month of birth and month after birth. She argues that this reflects both physiological differences and gender discrimination. These gender differences, however, are not statistically significant.

Maccini and Yang (2009), in their analysis of the relationship between early-life rainfall shocks and later-life health and socio-economic outcomes in Indonesia, find that only in the first year of life are the rainfall shocks associated with long-run outcomes, as against shocks felt in utero (prior to knowing the child's gender). These negative impacts are significant for women compared to men, which is in accordance with literature on gender bias in the allocation of nutrition and other resources in difficult times (Behrman, 1988; Behrman and Deolalikar, 1990; Cameron and Worswick, 2001).

Fuelwood collection and cooking are time-intensive activities; hence the most likely impacts of improved cooking technologies are on women and girls' time savings, in addition to improvement in their health. It is assumed that the time saved from these new technologies will help women engage in income-generation activities and education, and in turn empower them within the household. While

literature exists on the health impacts of household energy interventions, there is no empirical evidence on the time savings for women compared to men (Kohlin et al., 2011).

III. Data Description and Empirical Strategy

A. Data Description

For my analysis, I use the data from the Indian Human Development Survey (IHDS), 2005 conducted by University of Maryland, College Park and National Council of Applied Economic Research (NCAER), India. This data were downloaded from the Data Sharing for Demographic Research website:

<http://www.icpsr.umich.edu/icpsrweb/DSDR/studies/22626/version/8>

IHDS is a nationally representative, multi-topic survey of 41,554 households including 215,754 individuals. The sample is spread across 33 states and union territories, 384 districts, 1,503 villages and 971 urban blocks in India.

The IHDS survey was organized in two separate questionnaires: household, and education and health. The household questionnaires were administered to the individual with maximum knowledge about income and expenditure, frequently the male head of the household. The questionnaire for health and education was administered to a woman in the household, most often the wife of the household head. The household survey captured information on education, employment, income, consumption, and ownership of consumer goods, household assets, social networks, and social safety nets. The education and health questionnaire collected information on demographics, education of children, water, sanitation and hygiene, fuel and energy use, tobacco use, health outcomes (cough, asthma, TB, diarrhea, heart disease, cataract, HIV/AIDS) and health-related costs, marriage and fertility history, gender relations, and observations about housing quality. Both the questionnaires collected anthropometric measurements and cognitive skills of children.

B. Empirical Design

The goal of empirical analysis is to show significant difference in health and related outcomes among males and females in households that use unclean stoves and solid fuels, compared to males and females in households that use clean stoves and liquid fuels. I estimate the difference in probabilities of health and related outcomes using rare events logistic regression (King and Zeng, 2000)¹ for the binary outcome variables and OLS regression for continuous outcome variables.

In addition to type of cooking fuel and stove, low health outcomes could be the result of number of hours spent cooking, using the stove or burning the fuel, and exposure to tobacco smoke. Households use solid fuels because they are cheap and readily available; their upward movement on the energy ladder depends on various factors. Empirical studies establish a positively significant relationship between adoption of clean stoves and clean fuels, and socio-economic factors such as household

¹ King, Gary, Langche Zeng. 2000. ReLogit: Rare Events Logistic Regression
http://gking.harvard.edu/scholar_software/relogit-rare-events-logistic-regression/1-1-stata

income (Heltberg, 2005; Ouedraogo, 2006; Farsi, 2007; Gebreegziabher, 2010; Damte, 2011), age of household head (Khandkar, 2010; Edwards, 2005; Farsi, 2010; Suliman, 2010), years of education of household head (El Tayeb Muneer, 2003; Heltberg, 2004, 2005; Gupta, 2006), and number of household members (Heltberg, 2005; Edwards, 2005; Farsi, 2007; Gupta, 2006; Suliman, 2010). Clean fuel adoption could depend on households' access to markets, which depends on location of households in rural or urban areas. I include all household and individual characteristics that are associated with choice of unclean stoves and unclean fuels, as control variables to test the relative impact of the stove or fuel type.

Miller and Mobarak (2011) consider gender differences in preference for improved cookstoves within rural households in Bangladesh. Using gender-price interactions (choice of stove type at different price points), their results show that in addition to constraints faced by women, intra-household externality discourages them from adopting a technology that is scientifically claimed to be efficient for the household. Women are differentially more liquidity restrained; they express a higher preference for healthier stoves when the stoves are offered for free, but they are not able to act on their preference when small positive prices are charged.

For my analysis, I create similar power differential variables by generating interaction terms between gender and the age gap between household head and household member, and a similar interaction term for education gap. Since health outcomes among individuals are likely to be correlated, I adjust the standard errors for repeat observations per household, for example, by using the 'cluster' command in Stata 11.

My preferred model for estimating differences in binary outcome variables between the two groups is:

$$\Pr(Y=1|X_1, X_2, X_3, X_4, X_5, X_6, X_7) = \beta_0 + \beta_1 \text{Female} + \beta_2 \text{Uncleanstove} + \beta_{12} \text{Female} * \text{Uncleanstove} + \beta_3 \text{Uncleanfuel} + \beta_{13} \text{Female} * \text{Uncleanfuel} + \alpha_j + \gamma_j, \text{cluster (HH)}$$

Where α_j = Independent variables and γ_j = Gender-interacted variables.

Estimation results using regression models with (a) only unclean stove or unclean fuel with household and individual characteristics and (b) unclean stove and unclean fuel along with individual and household characteristics are presented in Appendix II on page 24.

C. Outcome Variables

The main health outcomes I analyze are cough (whether respondent had cough in the last month), tuberculosis (whether respondent was ever diagnosed by a doctor of having tuberculosis) and low birth weight (whether the size of the last and next to last child was small or very small); these are coded as binary variables. Diarrhea (whether respondent had diarrhea in the last month) is used as a falsification test. These variables come from the questions asked in the education and health questionnaire (variables SM4, MB3, LB16, NL16 and SM6 in the individual dataset).

I calculate four body mass index (BMI) measurements of children upto 5 years of age from height and weight measurements asked in the education and health questionnaire (variables AP2 and AP5 in the individual dataset). These measurements are height-for-age z-score (HAZ), weight-for-age z-score (WAZ), weight-for-height z-score (WHZ), and body mass index-for-age z-score (BMI). I use the `zscore06` package in Stata² to compute these measurements.

In addition to negatively affecting human health, traditional stoves and solid fuels use could affect cognitive skills of children, their ability to perform household chores such as collection of water and fuel, and activities of daily living such as walking, dressing, speaking, hearing among adults and children. Cognitive skills of children in the age group of 8-11 years, measured by their reading, writing and math scores, are binary variables (TA7LVL, TA8LVL and TA9LVL in the individual dataset). Household chores of water and fuel collection performed by children less than 15 years of age are binary variables, from the education and health questionnaire (variables WA9C, WA9D, FU11D and FU11E).

Indoor air pollution could also have debilitating impacts on individuals' ability to perform daily activities. Hence, the last category of binary outcome variables I analyze includes, individuals' ability to perform activities of daily living without difficulty, including, walking 1 kilometer, going to the toilet, dressing, speaking, hearing, far sight and short sight (variables AD2, AD3, AD4, AD5, AD6, AD7 and AD8 in the individual dataset). The descriptive statistics for all the outcome variables are given on Page 21.

D. Independent Variables

- The dummy variable *female*, where 1 is if the respondent is female (coded 2 in variable *RO3* in the household dataset) and 0 if male (coded 1 in variable *RO3*)
- The dummy variable *uncleanstove*, where 1 is if the household uses open fire (coded 1 in variable *FU4*) or traditional stove (coded 2 in variable *FU4*) as the primary stove type; 0 if the household uses non-biomass stove (coded 0 in variable *FU4* in the household dataset) or improved cookstoves (coded 3 in variable *FU4*)
- The dummy variable *uncleanfuel*, where 1 is if the household uses firewood (coded 1 in variable *FU5* in the household dataset) or dung cakes (coded 1 in variable *FU6*) or crop residue (coded 3 in variable *FU7*) or charcoal/coal as the main fuel for cooking (coded 1 in variable *FU10*). 0 will be coded if the household uses kerosene (coded 1 in variable *FU8*) or LPG (coded 1 in variable *FU9*) as the primary source of cooking fuel
- The dummy variable *female* interacted with dummy variables *uncleanstove* and *uncleanfuel*
- The dummy variable *tob_exp*, where 1 is if the individual is exposed to tobacco smoke (coded 1=sometimes or coded 2=daily, in the variable *TO2* in the individual dataset) and 0 if never exposed to tobacco smoke.

² Leroy, Jef L (2011). `zscore06`: Stata command for the calculation of anthropometric z-scores using the 2006 WHO child growth standards <http://www.ifpri.org/staffprofile/jef-leroy>

- The dummy variable *rural*, where 1 is if the household is in a rural area and 0 if in an urban area, from variable *urban* in the household dataset.
- The binary variable *poor* for whether household is a BPL household from the household dataset.
- The continuous variable *COPC* for monthly household expenditure from the household dataset.
- From the individual dataset, the continuous variable *HH_education* for number of years of education completed by the household head
- From the individual dataset, the continuous variable *HH_agegap* for age of the household head
- The continuous variable *Edu_gap* measuring the gap in years of education between the household head and the household member
- The continuous variable *Age_gap* measuring the age gap between the household head and the household member
- Interaction term *female*Edu_gap* between the *female* and *Edu_gap* variables
- Interaction term *female*Age_gap* between the *female* and *Age_gap* variables

IV. Results

A. Health Outcomes: Cough, TB and BMI Measurements for Children upto 5 Years of Age

In Table 1 (page 14), I present the relationship between four health outcomes, and stove and fuel type. There is a positively significant association between unclean stove-using and unclean fuel-using households and the likelihood of cough. In unclean stove-using and in unclean fuel-using households, females are significantly more likely to cough, compared to males. In accordance with empirical literature, I find that the likelihood of TB is significantly higher among men than women, in unclean stove-using and in unclean fuel-using households.

Exposure to smoke from traditional stoves and solid fuels contributes to low birth weight; I find a positively significant association between unclean fuel-using households and low birth weight, but no significant association with unclean stove-using households. There is no significant difference in birth weight of female and male infants, though empirical findings argue for male fetuses being physiologically less robust than female fetuses (Jakobvits, 1991 in Jayachandran, 2008).

I find that unclean stoves have a significantly negative association with height-for-age, weight-for-age and weight-for-height z-scores and no significant association with body mass index of children in the age group of 0-5 years (Table 2, page 16). Unclean fuel has no association with HAZ, WAZ and WHZ, but has a negatively significant association with BMI. In unclean fuel-using households, there is no significant difference between girls and boys, on these four BMI measurements. In unclean stove-using households, girls have significantly lower WAZ scores compared to boys. As the age gap between the household head and the child increases, the scores for HAZ, WAZ and WHZ decrease significantly, whereas the BMI significantly increases. As the education gap between the household head and the child increases, the scores for HAZ, WAZ, WHZ and BMI significantly increase. But there is no significant difference by gender in the age and education gap between household head and the child.

My findings for these three health outcomes are not robust; I get similar associations between unclean stove-using and unclean fuel-using households and likelihood of diarrhea, as those with cough. Dirty stove-using and dirty fuel-using households have a positively significant association with diarrhea, and females are significantly more likely to suffer compared to males, in dirty stove-using households.

B. Cognitive Skills of Children in the Ages 8-11 Years

The next estimates I test are whether unclean stoves and unclean fuels in households affect children's cognitive skills (Table 3, page 17). Children's ill-health due to acute respiratory infections caused by exposure to smoke from solid fuels and unclean stoves, could negatively affect cognitive skills of children in the ages 0-5 years. In a randomized longitudinal study in Guatemala, Dix-Cooper et al. (2011) found an association between higher personal carbon monoxide concentrations, an indicator

for chronic wood smoke exposure, examined among mothers in their third trimester of pregnancy and low neurodevelopmental and behavioral scores on four tests on their children seven years later.

Unclean stoves have a positively significant association with high reading score only; there is no significant association between unclean fuel-using households and any cognitive skill. Girls have higher reading and writing scores compared to boys, however these estimates are not significant. In dirty stove-using households, boys have significantly higher reading skills compared to girls.

C. Household Chores Performed by Adults (Aged 15 Years and Above) and Children (Aged Less Than 15 Years)

In developing countries, children primarily perform household chores. I find that the likelihood of collecting water is significantly higher for adult males compared to adult females, but there is no significant association between gender and the remaining three household chores (Table 4, page 18). Water and fuel collection are significantly higher in unclean stove-using and unclean fuel-using households. In dirty stove-using households, girls are more likely to collect water, compared to boys. In dirty stove-using and dirty fuel-using households, relative to women, men are more likely to collect fuel. With increasing education gap between household head and household member, the likelihood of fuel collection is significantly higher.

D. Activities of Daily Living Performed by All Respondents Above 7 Years of Age

The last sets of outcomes I analyze are presented in Table 5 on page 19. Difficulty with far sight and short sight is significantly higher for females compared to males. There is a positively significant association between dirty stove-using households and the likelihood of inability to perform any of these seven daily activities; unclean fuel has no significant association. In unclean stove-using households, females have significantly more difficulty with short sight compared to men, but in unclean fuel-using households, the reverse holds true, that is, men suffer more. In unclean fuel-using households, men have significantly more difficulty walking 1 kilometer, going to the toilet without help, dressing, speaking and with far sight.

V. Discussion

My results confirm the hypothesis that females suffer more compared to males in dirty stove-using and dirty fuel-using households, on most health outcomes. The likelihood of suffering from TB is higher for males relative to females. It is likely that TB among males could be driven by risky behavior, such as chewing and smoking tobacco, exposure to outdoor air pollutants and occupational exposure. Low birth weight is associated with dirty fuel use, but has no significant association with dirty stove use, and there is no significant difference by gender. While lower HAZ, WAZ and WHZ are associated with dirty stove use, lower BMI is associated with dirty fuel use. The only significant difference by gender in dirty stove-using households is in the WAZ scores, where girls have lower WAZ compared to boys.

Reading score is the only significant cognitive skill measure that differs by gender. In unclean stove-using households, boys have significantly higher reading scores compared to girls. Just as cognitive skills of children are affected by indoor smoke exposure, so is their ability to perform household chores such as collecting water and fuel. In dirty stove-using households, girls are more likely to collect water; no significant differences exist in unclean fuel-using households; and fuel collection by children shows no significant differences by gender in these households. On the seven motor skills I analyze, in unclean fuel-using households, males suffer more relative to women.

While literature identifies women and children as being more vulnerable to negative health impacts, there is a lack of sufficient empirical evidence supporting this argument. My findings fail to reject the hypothesis that women and children suffer more from exposure to IAP compared to men since they spend more time near the stove cooking or heating. It is hypothesized that men are likely to suffer as much as women, or even more, because in these biomass using households, men spend most of the peak cooking hours (in the early morning and evenings) at home in the same unventilated one- or two-room houses as their wives and children (Kohlin et al., 2011). While poor nutrition, poor sanitation, over-crowding and low-quality medical care are significant determinants of health impacts associated with indoor air pollution, perhaps what could make men more vulnerable is their additional exposure to outdoor air pollution. However, based on my findings, no such inference or associations can be made.

Table 1: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Main Health Outcomes

VARIABLES	Cough	TB	Diarrhea	Low Birth Weight (Last Child)	Low Birth Weight (Next to Last Child)
Female	0.60*** (0.04)	-0.00 (0.21)	0.33*** (0.09)		
Unclean Stove	0.35*** (0.04)	0.60*** (0.16)	0.32*** (0.06)	0.02 (0.08)	-0.16 (0.15)
Female* Unclean Stove	0.22*** (0.04)	-0.39* (0.21)	-0.13* (0.07)		
Unclean Fuel	0.05* (0.03)	0.45*** (0.12)	0.29*** (0.05)	0.30*** (0.06)	0.54*** (0.12)
Female* Unclean Fuel	-0.04 (0.03)	-0.12 (0.18)	-0.03 (0.06)		
Hours of Stove Burning/Day	0.03*** (0.01)	-0.01 (0.02)	0.02* (0.01)	-0.06*** (0.02)	-0.10*** (0.03)
Exposure to Tobacco	0.21*** (0.04)	0.20* (0.11)	0.43*** (0.07)	0.29** (0.14)	0.39* (0.21)
Monthly Household Expenditure	0.00*** (0.00)	0.00*** (0.00)	0.00 (0.00)	-0.00* (0.00)	-0.00 (0.00)
BPL Household	0.30*** (0.02)	-0.24** (0.11)	0.26*** (0.04)	-0.29*** (0.07)	-0.16 (0.11)
Years of Education Completed by Household Head	0.08*** (0.00)	0.08*** (0.01)	0.11*** (0.01)	-0.04*** (0.01)	-0.04*** (0.01)
Age of Household Head	0.03*** (0.00)	0.05** (0.02)	0.03*** (0.01)	-0.01 (0.01)	0.04 (0.02)
Age Squared	0.00*** (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00** (0.00)
Rural	0.03 (0.03)	-0.10 (0.11)	0.14*** (0.04)	-0.08 (0.07)	-0.04 (0.12)
Number of Persons in Household	0.09*** (0.00)	-0.03* (0.01)	0.06*** (0.01)	0.05*** (0.01)	0.04* (0.02)
Education Gap b/w HH member and HH head (For Low Birth Weight: Education Gap b/w Mother and HH head)	0.12*** (0.00)	0.04*** (0.02)	0.15*** (0.01)	0.02*** (0.01)	0.01 (0.01)
Female*Education Gap b/w HH member and HH head	0.04***	-0.04*	0.02***		

	(0.00)	(0.02)	(0.01)		
Age Gap b/w HH member and HH head (For Low Birth Weight: Age Gap b/w Mother and HH head)	0.02*** (0.00)	- 0.04*** (0.00)	0.03*** (0.00)	-0.00 (0.01)	0.01 (0.01)
Female*Age Gap b/w HH member and HH head	- 0.01*** (0.00)	- 0.01*** (0.00)	- 0.01*** (0.00)		
Constant	1.78*** (0.11)	7.11*** (0.52)	3.26*** (0.20)	-1.12*** (0.32)	-2.03*** (0.56)
Observations	215,754	215,754	215,754	36,826	13,825

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2: OLS Regression: Effect of Stove and Fuel Type on BMI Measurements of Children upto 5 Years of Age

VARIABLES	Height-for-Age Z-score	Weight-for-Age Z-score	Weight-for-Height Z-score	BMI Z-Score
Female	-0.45 (2.00)	-0.73 (2.11)	-0.76 (2.41)	0.43 (0.56)
Unclean Stove	-1.93* (1.00)	-2.13** (1.04)	-2.01* (1.17)	-0.10 (0.36)
Female* Unclean Stove	1.72 (1.23)	2.16* (1.29)	1.89 (1.45)	-0.13 (0.42)
Unclean Fuel	-0.63 (0.81)	-0.75 (0.85)	-1.50 (0.95)	-0.63** (0.29)
Female* Unclean Fuel	-0.61 (1.05)	-0.98 (1.11)	-0.69 (1.26)	0.04 (0.36)
Hours of Stove Burning/Day	-0.04 (0.19)	-0.10 (0.20)	-0.44** (0.22)	-0.15*** (0.06)
Exposure to Tobacco	-9.60 (7.04)	-10.28 (7.50)	-15.62* (7.98)	-0.26 (0.71)
Monthly Household Expenditure	0.00* (0.00)	0.00** (0.00)	0.00*** (0.00)	0.00** (0.00)
BPL Household	0.50 (0.68)	0.51 (0.72)	0.52 (0.79)	-0.19 (0.17)
Years of Education Completed by Household Head	4.12*** (0.74)	4.67*** (0.81)	8.34*** (1.00)	0.61*** (0.19)
Age of Household Head	4.63*** (0.19)	3.34*** (0.20)	3.35*** (0.23)	-1.22*** (0.06)
Age Squared	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00 (0.00)
Rural	-0.52 (0.70)	-0.53 (0.75)	-0.90 (0.83)	0.23 (0.19)
Number of Persons in Household	1.07*** (0.14)	1.14*** (0.14)	1.15*** (0.15)	0.02 (0.03)
Education Gap b/w HH member and HH head	4.09*** (0.74)	4.65*** (0.81)	8.32*** (1.00)	0.59*** (0.20)
Female*Education Gap b/w HH member and HH head	-0.13 (0.11)	-0.12 (0.11)	-0.09 (0.13)	0.04 (0.04)
Age Gap b/w HH member and HH head	-4.14*** (0.15)	-2.82*** (0.16)	-2.74*** (0.18)	1.27*** (0.05)
Female*Age Gap b/w HH member and HH head	-0.03 (0.03)	-0.03 (0.03)	-0.03 (0.04)	-0.00 (0.01)
Constant	-1.71 (3.14)	-2.43 (3.29)	-3.78 (3.67)	3.64*** (1.09)
Observations	24,314	24,313	24,313	19,019
R-Squared	0.06	0.04	0.04	0.04

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Children's (Age Group 8-11 Years) Cognitive Skills

VARIABLES	Reading Score	Writing Score	Math Score
Female	0.02 (0.13)	0.00 (0.13)	-0.09 (0.13)
Unclean Stove	0.12* (0.07)	-0.02 (0.06)	0.06 (0.07)
Female* Unclean Stove	-0.25*** (0.09)	-0.19** (0.08)	-0.25*** (0.09)
Unclean Fuel	-0.02 (0.06)	0.02 (0.05)	-0.06 (0.05)
Female* Unclean Fuel	-0.05 (0.08)	-0.04 (0.07)	-0.08 (0.07)
Hours of Stove Burning/Day	0.03*** (0.01)	-0.01 (0.01)	0.01 (0.01)
Exposure to Tobacco	0.56 (0.78)	0.15 (0.69)	0.83 (0.76)
Monthly Household Expenditure	-0.00** (0.00)	-0.00 (0.00)	-0.00 (0.00)
BPL Household	-0.22*** (0.04)	-0.35*** (0.04)	-0.35*** (0.04)
Years of Education Completed by Household Head	0.26*** (0.01)	0.31*** (0.01)	0.27*** (0.01)
Age of Household Head	-0.02 (0.02)	0.01 (0.02)	-0.01 (0.02)
Age Squared	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)
Rural	-0.12** (0.05)	-0.18*** (0.05)	-0.15*** (0.05)
Number of Persons in Household	-0.05*** (0.01)	-0.04*** (0.01)	-0.05*** (0.01)
Education Gap b/w HH member and HH head	0.22*** (0.01)	0.26*** (0.01)	0.22*** (0.01)
Female*Education Gap b/w HH member and HH head	0.00 (0.01)	-0.01 (0.01)	-0.00 (0.01)
Age Gap b/w HH member and HH head	0.03** (0.01)	-0.01 (0.01)	0.02 (0.01)
Female*Age Gap b/w HH member and HH head	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Constant	0.19 (0.29)	-0.90***	-0.07 (0.28)
Observations	17,137	17,137	17,138

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Household Chores

VARIABLES	Water Collection by Adults	Water Collection by Children	Fuel Collection by Adults	Fuel Collection by Children
Female	-0.13*** (0.02)	0.03 (0.06)	-0.02 (0.02)	-0.03 (0.06)
Unclean Stove	0.23*** (0.03)	0.12*** (0.04)	0.46*** (0.03)	0.22*** (0.04)
Female* Unclean Stove	-0.00 (0.02)	0.06* (0.04)	0.05*** (0.02)	0.06 (0.04)
Unclean Fuel	0.36*** (0.03)	0.19*** (0.03)	0.41*** (0.03)	0.40*** (0.04)
Female* Unclean Fuel	-0.01 (0.01)	0.02 (0.03)	-0.04*** (0.01)	0.00 (0.04)
Hours of Stove Burning/Day	-0.01 (0.01)	0.03*** (0.01)	-0.04*** (0.01)	0.00 (0.01)
Exposure to Tobacco	-0.14*** (0.02)	-0.01 (0.32)	0.07*** (0.02)	-0.25 (0.30)
Monthly Household Expenditure	-0.00*** (0.00)	-0.00*** (0.00)	-0.00 (0.00)	-0.00** (0.00)
BPL Household	0.38*** (0.03)	0.23*** (0.04)	0.17*** (0.04)	0.09** (0.04)
Years of Education Completed by Household Head	-0.07*** (0.00)	-0.03*** (0.01)	-0.05*** (0.00)	-0.03*** (0.01)
Age of Household Head	-0.01 (0.01)	0.01* (0.01)	-0.01*** (0.00)	0.00 (0.01)
Age Squared	-0.00 (0.00)	-0.00** (0.00)	0.00 (0.00)	0.00 (0.00)
Rural	0.55*** (0.03)	0.42*** (0.04)	1.43*** (0.03)	0.94*** (0.04)
Number of Persons in Household	-0.05*** (0.01)	-0.04*** (0.01)	0.01** (0.01)	-0.01 (0.01)
Education Gap b/w HH member and HH head	-0.02*** (0.00)	0.00 (0.01)	0.04*** (0.00)	0.02*** (0.00)
Female*Education Gap b/w HH member and HH head	-0.01*** (0.00)	0.00 (0.00)	-0.01*** (0.00)	-0.00 (0.00)
Age Gap b/w HH member and HH head	0.00** (0.00)	-0.01 (0.00)	-0.00*** (0.00)	-0.00* (0.00)
Female*Age Gap b/w HH member and HH head	0.00*** (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Constant	1.00*** (0.14)	-0.10 (0.17)	-0.56*** (0.08)	-1.05*** (0.09)
Observations	147,292	68,462	147,292	68,462

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Activities of Daily Living

VARIABLES	Difficulty Walking 1km	Difficulty Going to the Toilet Without Help	Difficulty Dressing	Difficulty Hearing	Difficulty Speaking	Difficulty with Far Sight	Difficulty with Short Sight
Female	0.13 (0.09)	-0.04 (0.12)	-0.14 (0.12)	-0.14 (0.12)	-0.17 (0.13)	0.35*** (0.08)	0.16* (0.09)
Unclean Stove	0.39*** (0.08)	0.26*** (0.10)	0.24** (0.11)	0.24** (0.10)	0.19* (0.11)	0.54*** (0.08)	0.46*** (0.09)
Female* Unclean Stove	0.07 (0.10)	-0.02 (0.12)	-0.03 (0.13)	0.10 (0.12)	0.05 (0.14)	-0.05 (0.09)	0.17* (0.10)
Unclean Fuel	0.04 (0.07)	0.10 (0.08)	0.08 (0.08)	0.02 (0.08)	0.18** (0.09)	-0.22*** (0.06)	-0.02 (0.07)
Female* Unclean Fuel	-0.33*** (0.08)	-0.26** (0.10)	-0.21* (0.11)	-0.08 (0.10)	-0.27** (0.12)	-0.21*** (0.07)	-0.25*** (0.08)
Hours of Stove Burning/Day	0.03* (0.01)	0.02 (0.02)	-0.00 (0.02)	0.04*** (0.02)	0.01 (0.02)	-0.02 (0.01)	-0.03* (0.02)
Exposure to Tobacco	-0.15** (0.06)	-0.20*** (0.08)	-0.19** (0.08)	-0.20*** (0.08)	-0.27*** (0.09)	-0.08 (0.06)	0.02 (0.07)
Monthly Household Expenditure	0.00*** (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00*** (0.00)	0.00*** (0.00)
BPL Household	0.16*** (0.06)	0.20*** (0.07)	0.18** (0.07)	0.20*** (0.07)	0.25*** (0.08)	0.13** (0.06)	0.07 (0.06)
Years of Education Completed by Household Head	-0.02*** (0.01)	-0.05*** (0.01)	-0.05*** (0.01)	-0.07*** (0.01)	-0.07*** (0.01)	0.00 (0.01)	-0.00 (0.01)
Age of Household Head	0.04*** (0.01)	0.02** (0.01)	0.02* (0.01)	0.03*** (0.01)	0.02 (0.01)	0.09*** (0.01)	0.07*** (0.01)
Age Squared	0.00 (0.00)	0.00** (0.00)	0.00** (0.00)	0.00* (0.00)	0.00** (0.00)	-0.00** (0.00)	-0.00 (0.00)
Rural	0.02 (0.06)	-0.01 (0.07)	-0.03 (0.08)	0.03 (0.07)	-0.07 (0.08)	0.13** (0.06)	-0.07 (0.07)
Number of Persons in Household	-0.05***	-0.02**	-0.02*	-0.05***	-0.03***	-0.08***	-0.06***

	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Education Gap b/w HH member and HH head	-0.06*** (0.01)	-0.08*** (0.01)	-0.09*** (0.01)	-0.10*** (0.01)	-0.12*** (0.01)	-0.05*** (0.01)	-0.06*** (0.01)
Female*Education Gap b/w HH member and HH head	0.05*** (0.01)	0.04*** (0.01)	0.03** (0.01)	0.05*** (0.01)	0.05*** (0.01)	0.07*** (0.01)	0.06*** (0.01)
Age Gap b/w HH member and HH head	-0.05*** (0.00)	-0.04*** (0.00)	-0.04*** (0.00)	-0.04*** (0.00)	-0.03*** (0.00)	-0.06*** (0.00)	-0.05*** (0.00)
Female*Age Gap b/w HH member and HH head	-0.01*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)
Constant	-6.43*** (0.27)	-6.05*** (0.32)	-5.96*** (0.34)	-6.30*** (0.32)	-5.92*** (0.35)	-7.61*** (0.29)	-7.37*** (0.31)
Observations	215,754	215,754	215,754	215,754	215,754	215,754	215,754

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

APPENDIX I

Table 1: Descriptive Statistics for Health Outcomes

Health Outcome		Fuel Type		Stove Type		Total
		Dirty	Clean	Dirty	Clean	
Cough	Yes	10,891	6,795	13,424	4,262	17,686
	No	114,820	83,248	139,244	58,824	198,068
	Total	125,711	90,043	63,086	152,668	215,754
TB	Yes	461	186	530	117	647
	No	125,250	89,857	152,138	62,969	215,107
	Total	125,711	90,043	152,668	63,086	215,754
Diarrhea	Yes	3,592	1,570	4,178	984	5,162
	No	122,119	88,473	148,490	62,102	210,592
	Total	125,711	90,043	152,668	63,086	215,754
Low Birth Weight (Next to Last Child)	Yes	3,984	1,268	4,334	918	5,252
	No	14,996	7,871	18,458	4,409	22,867
	Total	18,980	9,139	22,792	5,327	28,119
Low Birth Weight (Last Child)	Yes	9,763	4,296	11,110	2,949	14,059
	No	36,699	23,433	45,034	15,098	60,132
	Total	46,462	27,729	56,144	18,047	74,191

Table 2: Descriptive Statistics for BMI Measurements of Children upto 5 Years of Age

Health Outcome		Fuel Type		Stove Type		Total
		Dirty	Clean	Dirty	Clean	
Height-for-age	Mean	29.221	31.241	29.567	31.263	29.975
	Median	13.280	13.990	13.310	14.460	13.500
	Total N	15239	9075	18472	5842	24314
Weight-for-age	Mean	25.737	28.077	26.182	27.965	26.610
	Median	6.600	7.380	6.640	7.580	6.860
	Total N	15239	9074	18471	5842	24313
Weight-for-height	Mean	25.224	28.691	25.845	28.647	26.518
	Median	0.510	1.090	0.570	1.160	0.700
	Total N	15239	9074	18471	5842	24313
BMI-for-age	Mean	1.156	1.990	1.311	1.950	1.462
	Median	-0.440	-0.140	-0.390	-0.110	-0.340
	Total N	12036	6983	14505	4514	19019

Table 3: Descriptive Statistics for Cognitive Skills of Children aged 7-11 Years

Cognitive Skills		Fuel Type		Stove Type		Total
		Dirty	Clean	Dirty	Clean	
Reading Score	Yes	6,754	4,542	8,237	3,059	11,296
	No	3,908	1,933	4,647	1,194	5,841
	Total	10,662	6,475	12,884	4,253	17,137
Math Score	Yes	5,996	4,286	7,353	2,929	10,282
	No	4,667	2,189	5,532	1,324	6,856
	Total	10,663	6,475	12,885	4,253	17,138
Writing Score	Yes	4,910	3,628	5,955	2,583	8,538
	No	5,752	2,847	6,929	1,670	8,599
	Total	10,662	6,475	12,884	4,253	17,137

Table 4: Descriptive Statistics for Household Chores by Adults and Children

Water and Fuel Collection		Fuel Type		Stove Type		Total
		Dirty	Clean	Dirty	Clean	
Water Collection (Adults)	Yes	56,566	31,198	67,473	20,291	87,764
	No	26,688	32,840	33,802	25,726	59,528
	Total	83,254	64,038	101,275	46,017	147,292
Water Collection (Children)	Yes	24,148	11,359	28,742	6,765	35,507
	No	18,309	14,646	22,651	10,304	32,955
	Total	42,457	26,005	51,393	17,069	68,462
Fuel Collection (Adults)	Yes	56,842	28,361	69,618	15,585	85,203
	No	26,412	35,677	31,657	30,432	62,089
	Total	83,254	64,038	101,275	46,017	147,292
Fuel Collection (Children)	Yes	22,437	8,780	26,395	4,822	31,217
	No	20,020	17,225	24,998	12,247	37,245
	Total	42,457	26,005	51,393	17,069	68,462

Table 5: Descriptive Statistics for Activities of Daily Living

Activities of Daily Living		Fuel Type		Stove Type		Total
		Dirty	Clean	Dirty	Clean	
Difficulty Walking 1km	Yes	1,424	1,052	1,912	564	2,476
	No	124,287	88,991	150,756	62,522	213,278
	Total	125,711	90,043	152,668	63,086	215,754
Difficulty Going to Toilet without Help	Yes	975	632	1,235	372	1,607
	No	124,736	89,411	151,433	62,714	214,147
	Total	125,711	90,043	152,668	63,086	215,754
Difficulty Dressing	Yes	846	549	1,068	327	1,395
	No	124,865	89,494	151,600	62,759	214,359
	Total	125,711	90,043	152,668	63,086	215,754
Difficulty Hearing	Yes	1,039	89,397	1,324	361	1,685
	No	124,672	646	151,344	62,725	214,069
	Total	125,711	90,043	152,668	63,086	215,754
Difficulty Speaking	Yes	796	478	980	294	1,274
	No	124,915	89,565	151,688	62,792	214,480
	Total	125,711	90,043	152,668	63,086	215,754
Difficulty Farsight	Yes	1,473	1,369	2,162	680	2,842
	No	124,238	88,674	150,506	62,406	212,912
	Total	125,711	90,043	152,668	63,086	215,754
Difficulty Shortsight	Yes	1,191	956	1,645	502	2,147
	No	124,520	89,087	151,023	62,584	213,607
	Total	125,711	90,043	152,668	63,086	215,754

APPENDIX II

Table 1: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Cough

VARIABLES	Model 1	Model 2	Model 3
Female	0.28*** (0.03)	0.18*** (0.03)	0.28*** (0.03)
Unclean Stove	0.38*** (0.03)		0.36*** (0.04)
Female* Unclean Stove	-0.17*** (0.04)		-0.17*** (0.04)
Unclean Fuel		0.13*** (0.03)	0.06** (0.03)
Female* Unclean Fuel		-0.05 (0.03)	0.01 (0.03)
Hours of Stove Burning/Day	0.03*** (0.01)	0.04*** (0.01)	0.03*** (0.01)
Exposure to Tobacco	-0.29*** (0.03)	-0.28*** (0.03)	-0.29*** (0.03)
Monthly Household Expenditure	0.00*** (0.00)	0.00** (0.00)	0.00*** (0.00)
BPL Household	-0.23*** (0.02)	-0.21*** (0.02)	-0.23*** (0.02)
Years of Education Completed by Household Head	-0.01*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)
Age of Household Head	-0.05*** (0.00)	-0.05*** (0.00)	-0.05*** (0.00)
Age Squared	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Rural	0.08*** (0.02)	0.17*** (0.02)	0.07*** (0.02)
Number of Persons in Household	-0.05*** (0.00)	-0.05*** (0.00)	-0.05*** (0.00)
Constant	-1.27*** (0.10)	-1.12*** (0.10)	-1.31*** (0.10)
Observations	215,754	215,754	215,754

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Tuberculosis

VARIABLES	Model 1	Model 2	Model 3
Female	0.37** (0.18)	0.20 (0.15)	0.43** (0.20)
Unclean Stove	0.76*** (0.16)		0.63*** (0.16)
Female* Unclean Stove	-0.44** (0.20)		-0.39* (0.21)
Unclean Fuel		0.60*** (0.13)	0.49*** (0.12)
Female* Unclean Fuel		-0.25 (0.17)	-0.15 (0.18)
Hours of Stove Burning/Day	-0.02 (0.02)	-0.01 (0.02)	-0.02 (0.02)
Exposure to Tobacco	0.89*** (0.11)	0.91*** (0.11)	0.89*** (0.11)
Monthly Household Expenditure	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
BPL Household	-0.20* (0.11)	-0.20* (0.11)	-0.23** (0.11)
Years of Education Completed by Household Head	-0.04*** (0.01)	-0.04*** (0.01)	-0.04*** (0.01)
Age of Household Head	0.02 (0.02)	0.02 (0.02)	0.02 (0.02)
Age Squared	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Rural	0.03 (0.11)	0.12 (0.10)	-0.03 (0.11)
Number of Persons in Household	-0.07*** (0.02)	-0.06*** (0.02)	-0.06*** (0.02)
Constant	-6.45*** (0.52)	-6.37*** (0.50)	-6.72*** (0.52)
Observations	215,754	215,754	215,754

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Diarrhea

VARIABLES	Model 1	Model 2	Model 3
Female	0.11* (0.06)	0.05 (0.05)	0.11 (0.07)
Unclean Stove	0.43*** (0.06)		0.36*** (0.06)
Female* Unclean Stove	-0.10 (0.07)		-0.10 (0.07)
Unclean Fuel		0.37*** (0.05)	0.31*** (0.05)
Female* Unclean Fuel		-0.02 (0.06)	0.01 (0.06)
Hours of Stove Burning/Day	0.03** (0.01)	0.03*** (0.01)	0.02** (0.01)
Exposure to Tobacco	-0.18*** (0.05)	-0.17*** (0.05)	-0.18*** (0.05)
Monthly Household Expenditure	-0.00** (0.00)	-0.00** (0.00)	-0.00* (0.00)
BPL Household	-0.18*** (0.04)	-0.17*** (0.04)	-0.19*** (0.04)
Years of Education Completed by Household Head	-0.02*** (0.00)	-0.02*** (0.00)	-0.01*** (0.00)
Age of Household Head	-0.05*** (0.01)	-0.05*** (0.01)	-0.05*** (0.01)
Age Squared	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Rural	0.22*** (0.04)	0.28*** (0.04)	0.17*** (0.04)
Number of Persons in Household	-0.02** (0.01)	-0.02** (0.01)	-0.02** (0.01)
Constant	-2.58*** (0.19)	-2.57*** (0.19)	-2.76*** (0.19)
Observations	215,754	215,754	215,754

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Low Birth Weight (Last Child)

VARIABLES	Model 1	Model 2	Model 3
Female			0.02 (0.03)
Unclean Stove	0.10 (0.08)		0.02 (0.08)
Female* Unclean Stove			0.02 (0.04)
Unclean Fuel		0.31*** (0.06)	0.30*** (0.06)
Female* Unclean Fuel			-0.00 (0.03)
Hours of Stove Burning/Day	0.09*** (0.03)	0.09*** (0.03)	0.11*** (0.04)
Exposure to Tobacco	-0.06*** (0.02)	-0.06*** (0.02)	-0.06*** (0.02)
Monthly Household Expenditure	-0.00* (0.00)	-0.00 (0.00)	-0.00 (0.00)
BPL Household	-0.25*** (0.06)	-0.26*** (0.06)	-0.26*** (0.06)
Years of Education Completed by Household Head	-0.03*** (0.01)	-0.03*** (0.01)	-0.03*** (0.01)
Age of Household Head	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Age Squared	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Rural	0.00 (0.07)	-0.04 (0.06)	-0.05 (0.07)
Number of Persons in Household	0.05*** (0.01)	0.05*** (0.01)	0.05*** (0.01)
Constant	-0.91*** (0.31)	-1.08*** (0.31)	-1.11*** (0.31)
Observations	74,191	74,191	74,191

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Low Birth Weight (Next to Last Child)

VARIABLES	Model 1	Model 2	Model 3
Female			-0.03 (0.06)
Unclean Stove	-0.02 (0.13)		-0.19 (0.15)
Female* Unclean Stove			0.07 (0.07)
Unclean Fuel		0.47*** (0.11)	0.49*** (0.12)
Female* Unclean Fuel			0.00 (0.06)
Hours of Stove Burning/Day	0.11** (0.05)	0.11** (0.05)	0.12** (0.06)
Exposure to Tobacco	-0.09*** (0.03)	-0.09*** (0.03)	-0.09*** (0.03)
Monthly Household Expenditure	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
BPL Household	-0.09 (0.11)	-0.11 (0.10)	-0.10 (0.10)
Years of Education Completed by Household Head	-0.03*** (0.01)	-0.02** (0.01)	-0.03** (0.01)
Age of Household Head	0.03 (0.02)	0.04* (0.02)	0.04* (0.02)
Age Squared	-0.00* (0.00)	-0.00* (0.00)	-0.00* (0.00)
Rural	0.08 (0.11)	-0.03 (0.11)	0.01 (0.11)
Number of Persons in Household	0.04* (0.02)	0.04* (0.02)	0.04* (0.02)
Constant	-1.89*** (0.48)	-2.26*** (0.48)	-2.17*** (0.49)
Observations	28,119	28,119	28,119

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: OLS Regression: Effect of Stove and Fuel Type on Height-for-Age Z-score (Children upto 5 Years of Age)

VARIABLES	Model 1	Model 2	Model 3
Female	-1.19 (0.98)	-0.19 (0.79)	-0.91 (1.03)
Unclean Stove	-1.81* (0.96)		-1.72* (1.00)
Female* Unclean Stove	0.92 (1.11)		1.29 (1.20)
Unclean Fuel		-1.00 (0.78)	-0.62 (0.82)
Female* Unclean Fuel		-0.46 (0.98)	-0.87 (1.06)
Hours of Stove Burning/Day	-0.09 (0.19)	-0.10 (0.19)	-0.08 (0.19)
Exposure to Tobacco	-8.04 (6.99)	-8.13 (7.01)	-8.02 (7.03)
Monthly Household Expenditure	0.00* (0.00)	0.00* (0.00)	0.00* (0.00)
BPL Household	0.47 (0.68)	0.46 (0.68)	0.52 (0.68)
Years of Education Completed by Household Head	0.12* (0.07)	0.12* (0.07)	0.11 (0.07)
Age of Household Head	0.58*** (0.13)	0.57*** (0.13)	0.57*** (0.13)
Age Squared	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Rural	-0.81 (0.71)	-1.05 (0.66)	-0.66 (0.71)
Number of Persons in Household	1.09*** (0.14)	1.09*** (0.14)	1.09*** (0.14)
Constant	7.82*** (3.03)	7.32** (3.01)	8.30*** (3.06)
Observations	24,314	24,314	24,314
R-squared	0.02	0.02	0.02

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: OLS Regression: Effect of Stove and Fuel Type on Weight-for-Age Z-score (Children upto 5 Years of Age)

VARIABLES	Model 1	Model 2	Model 3
Female	-1.45 (1.01)	-0.11 (0.82)	-1.07 (1.07)
Unclean Stove	-2.02** (1.00)		-1.91* (1.04)
Female* Unclean Stove	1.22 (1.16)		1.72 (1.25)
Unclean Fuel		-1.19 (0.82)	-0.75 (0.85)
Female* Unclean Fuel		-0.64 (1.02)	-1.20 (1.10)
Hours of Stove Burning/Day	-0.14 (0.20)	-0.15 (0.20)	-0.13 (0.20)
Exposure to Tobacco	-9.36 (7.37)	-9.44 (7.41)	-9.33 (7.43)
Monthly Household Expenditure	0.00** (0.00)	0.00** (0.00)	0.00** (0.00)
BPL Household	0.42 (0.72)	0.43 (0.72)	0.50 (0.72)
Years of Education Completed by Household Head	0.10 (0.07)	0.10 (0.07)	0.09 (0.07)
Age of Household Head	0.58*** (0.14)	0.58*** (0.14)	0.57*** (0.14)
Age Squared	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Rural	-0.84 (0.74)	-1.04 (0.69)	-0.66 (0.75)
Number of Persons in Household	1.16*** (0.14)	1.16*** (0.14)	1.16*** (0.14)
Constant	3.85 (3.17)	3.34 (3.13)	4.44 (3.19)
Observations	24,313	24,313	24,313
R-squared	0.02	0.02	0.02

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: OLS Regression: Effect of Stove and Fuel Type on Weight-for-Height Z-score (Children upto 5 Years of Age)

VARIABLES	Model 1	Model 2	Model 3
Female	-1.52 (1.15)	-0.37 (0.93)	-1.22 (1.21)
Unclean Stove	-2.15* (1.12)		-1.83 (1.17)
Female* Unclean Stove	1.16 (1.31)		1.53 (1.42)
Unclean Fuel		-1.96** (0.92)	-1.55 (0.96)
Female* Unclean Fuel		-0.40 (1.16)	-0.90 (1.25)
Hours of Stove Burning/Day	-0.48** (0.22)	-0.49** (0.22)	-0.47** (0.22)
Exposure to Tobacco	-15.01* (7.86)	-15.04* (7.92)	-14.93* (7.94)
Monthly Household Expenditure	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
BPL Household	0.35 (0.79)	0.38 (0.79)	0.45 (0.79)
Years of Education Completed by Household Head	0.11 (0.08)	0.10 (0.08)	0.09 (0.08)
Age of Household Head	0.68*** (0.15)	0.68*** (0.15)	0.67*** (0.15)
Age Squared	-0.01*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)
Rural	-1.34 (0.83)	-1.45* (0.77)	-1.07 (0.83)
Number of Persons in Household	1.18*** (0.15)	1.18*** (0.15)	1.18*** (0.15)
Constant	1.96 (3.50)	1.95 (3.47)	2.99 (3.53)
Observations	24,313	24,313	24,313
R-squared	0.02	0.02	0.02

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9: OLS Regression: Effect of Stove and Fuel Type on Body Mass Index Z-score (Children upto 5 Years of Age)

VARIABLES	Model 1	Model 2	Model 3
Female	0.09 (0.28)	0.09 (0.28)	0.08 (0.30)
Unclean Stove	-0.32 (0.30)		-0.16 (0.35)
Female* Unclean Stove	0.04 (0.33)		0.02 (0.40)
Unclean Fuel		-0.64** (0.27)	-0.61** (0.31)
Female* Unclean Fuel		0.05 (0.33)	0.05 (0.39)
Hours of Stove Burning/Day	-0.12** (0.06)	-0.12** (0.06)	-0.12** (0.06)
Exposure to Tobacco	-0.93 (0.86)	-0.93 (0.88)	-0.92 (0.88)
Monthly Household Expenditure	0.00** (0.00)	0.00** (0.00)	0.00** (0.00)
BPL Household	-0.23 (0.18)	-0.22 (0.18)	-0.20 (0.18)
Years of Education Completed by Household Head	0.01 (0.02)	0.00 (0.02)	0.00 (0.02)
Age of Household Head	0.01 (0.04)	0.01 (0.04)	0.01 (0.04)
Age Squared	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Rural	0.12 (0.18)	0.15 (0.21)	0.20 (0.19)
Number of Persons in Household	-0.00 (0.03)	-0.00 (0.03)	-0.00 (0.03)
Constant	0.96 (1.03)	1.22 (0.91)	1.31 (0.98)
Observations	19,019	19,019	19,019
R-squared	0.00	0.00	0.00

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Children's (age group 8-11 years) Reading Score

VARIABLES	Model 1	Model 2	Model 3
Female	0.11 (0.07)	-0.02 (0.06)	0.13* (0.07)
Unclean Stove	0.10 (0.06)		0.10 (0.07)
Female* Unclean Stove	-0.31*** (0.08)		-0.27*** (0.08)
Unclean Fuel		-0.01 (0.05)	-0.05 (0.05)
Female* Unclean Fuel		-0.17** (0.07)	-0.08 (0.07)
Hours of Stove Burning/Day	0.02* (0.01)	0.02* (0.01)	0.02* (0.01)
Exposure to Tobacco	0.21 (0.66)	0.20 (0.66)	0.20 (0.66)
Monthly Household Expenditure	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
BPL Household	-0.28*** (0.04)	-0.28*** (0.04)	-0.28*** (0.04)
Years of Education Completed by Household Head	0.06*** (0.00)	0.06*** (0.00)	0.06*** (0.00)
Age of Household Head	0.02* (0.01)	0.02* (0.01)	0.02* (0.01)
Age Squared	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Rural	-0.11** (0.05)	-0.10** (0.04)	-0.09** (0.05)
Number of Persons in Household	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)
Constant	0.20 (0.26)	0.30 (0.26)	0.23 (0.26)
Observations	17,137	17,137	17,137

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Children's (age group 8-11 years) Writing Score

VARIABLES	Model 1	Model 2	Model 3
Female	0.10 (0.06)	0.00 (0.05)	0.13* (0.07)
Unclean Stove	-0.03 (0.06)		-0.03 (0.06)
Female* Unclean Stove	-0.26*** (0.07)		-0.23*** (0.08)
Unclean Fuel		0.00 (0.05)	-0.01 (0.05)
Female* Unclean Fuel		-0.16** (0.07)	-0.09 (0.07)
Hours of Stove Burning/Day	-0.02** (0.01)	-0.02** (0.01)	-0.02** (0.01)
Exposure to Tobacco	0.05 (0.64)	0.04 (0.64)	0.05 (0.64)
Monthly Household Expenditure	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
BPL Household	-0.41*** (0.04)	-0.42*** (0.04)	-0.41*** (0.04)
Years of Education Completed by Household Head	0.07*** (0.00)	0.07*** (0.00)	0.07*** (0.00)
Age of Household Head	0.02** (0.01)	0.02** (0.01)	0.02** (0.01)
Age Squared	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Rural	-0.15*** (0.04)	-0.18*** (0.04)	-0.14*** (0.04)
Number of Persons in Household	-0.05*** (0.01)	-0.05*** (0.01)	-0.05*** (0.01)
Constant	-0.47* (0.01)	-0.45* (0.01)	-0.46* (0.01)
Observations	17,137	17,137	17,137

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 12: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Children's (age group 8-11 years) Math Score

VARIABLES	Model 1	Model 2	Model 3
Female	0.06 (0.07)	-0.07 (0.05)	0.09 (0.07)
Unclean Stove	0.04 (0.06)		0.05 (0.06)
Female* Unclean Stove	-0.33*** (0.08)		-0.28*** (0.08)
Unclean Fuel		-0.05 (0.05)	-0.08 (0.05)
Female* Unclean Fuel		-0.21*** (0.07)	-0.12* (0.07)
Hours of Stove Burning/Day	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)
Exposure to Tobacco	0.53 (0.67)	0.52 (0.67)	0.52 (0.68)
Monthly Household Expenditure	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
BPL Household	-0.41*** (0.04)	-0.41*** (0.04)	-0.40*** (0.04)
Years of Education Completed by Household Head	0.06*** (0.00)	0.06*** (0.00)	0.06*** (0.00)
Age of Household Head	0.02** (0.01)	0.02** (0.01)	0.02** (0.01)
Age Squared	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Rural	-0.14*** (0.05)	-0.15*** (0.04)	-0.12*** (0.05)
Number of Persons in Household	-0.05*** (0.01)	-0.05*** (0.01)	-0.05*** (0.01)
Constant	-0.03 (0.26)	0.07 (0.25)	0.02 (0.26)
Observations	17,138	17,138	17,138

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 13: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Water Collection by Adults (15 Years and above)

VARIABLES	Model 1	Model 2	Model 3
Female	-0.04*** (0.01)	-0.04*** (0.01)	-0.04*** (0.01)
Unclean Stove	0.33*** (0.03)		0.25*** (0.03)
Female* Unclean Stove	0.00 (0.01)		0.01 (0.02)
Unclean Fuel		0.41*** (0.03)	0.37*** (0.03)
Female* Unclean Fuel		-0.01 (0.01)	-0.01 (0.01)
Hours of Stove Burning/Day	-0.01 (0.01)	-0.00 (0.01)	-0.01 (0.01)
Exposure to Tobacco	-0.11*** (0.02)	-0.10*** (0.02)	-0.11*** (0.02)
Monthly Household Expenditure	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
BPL Household	0.42*** (0.03)	0.42*** (0.03)	0.40*** (0.03)
Years of Education Completed by Household Head	-0.06*** (0.00)	-0.06*** (0.00)	-0.06*** (0.00)
Age of Household Head	-0.01* (0.01)	-0.01* (0.01)	-0.01* (0.01)
Age Squared	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Rural	0.61*** (0.03)	0.66*** (0.03)	0.57*** (0.03)
Number of Persons in Household	-0.05*** (0.01)	-0.05*** (0.01)	-0.05*** (0.01)
Constant	1.07*** (0.14)	0.98*** (0.14)	0.87*** (0.14)
Observations	147,292	147,292	147,292

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 14: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Water Collection by Children (Less than 15 Years of Age)

VARIABLES	Model 1	Model 2	Model 3
Female	-0.00 (0.03)	0.03 (0.02)	-0.01 (0.03)
Unclean Stove	0.17*** (0.04)		0.12*** (0.04)
Female* Unclean Stove	0.08** (0.04)		0.07* (0.04)
Unclean Fuel		0.21*** (0.03)	0.19*** (0.03)
Female* Unclean Fuel		0.05 (0.03)	0.03 (0.03)
Hours of Stove Burning/Day	0.03*** (0.01)	0.03*** (0.01)	0.03*** (0.01)
Exposure to Tobacco	-0.01 (0.32)	0.00 (0.32)	0.00 (0.32)
Monthly Household Expenditure	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
BPL Household	0.24*** (0.04)	0.24*** (0.04)	0.23*** (0.04)
Years of Education Completed by Household Head	-0.04*** (0.00)	-0.04*** (0.00)	-0.03*** (0.00)
Age of Household Head	0.01* (0.01)	0.01* (0.01)	0.01* (0.01)
Age Squared	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Rural	0.45*** (0.03)	0.47*** (0.03)	0.42*** (0.04)
Number of Persons in Household	-0.05*** (0.01)	-0.05*** (0.01)	-0.05*** (0.01)
Constant	-0.02 (0.16)	-0.07 (0.16)	-0.12 (0.16)
Observations	68,462	68,462	68,462

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 15: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Fuel Collection by Adults (15 Years and above)

VARIABLES	Model 1	Model 2	Model 3
Female	-0.08*** (0.01)	-0.04*** (0.01)	-0.06*** (0.02)
Unclean Stove	0.58*** (0.03)		0.48*** (0.03)
Female* Unclean Stove	0.03* (0.02)		0.04*** (0.02)
Unclean Fuel		0.50*** (0.03)	0.43*** (0.03)
Female* Unclean Fuel		-0.03** (0.01)	-0.04*** (0.01)
Hours of Stove Burning/Day	-0.04*** (0.01)	-0.03*** (0.01)	-0.04*** (0.01)
Exposure to Tobacco	0.09*** (0.02)	0.10*** (0.02)	0.09*** (0.02)
Monthly Household Expenditure	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
BPL Household	0.21*** (0.03)	0.24*** (0.03)	0.19*** (0.03)
Years of Education Completed by Household Head	-0.04*** (0.00)	-0.04*** (0.00)	-0.03*** (0.00)
Age of Household Head	-0.01*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)
Age Squared	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Rural	1.49*** (0.03)	1.62*** (0.03)	1.45*** (0.03)
Number of Persons in Household	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Constant	-0.47*** (0.06)	-0.45*** (0.06)	-0.72*** (0.07)
Observations	147,292	147,292	147,292

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 16: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Fuel Collection by Children (Less than 15 Years of Age)

VARIABLES	Model 1	Model 2	Model 3
Female	-0.02 (0.03)	0.02 (0.03)	-0.01 (0.04)
Unclean Stove	0.38*** (0.04)		0.26*** (0.04)
Female* Unclean Stove	0.06 (0.04)		0.06 (0.04)
Unclean Fuel		0.47*** (0.03)	0.43*** (0.04)
Female* Unclean Fuel		0.01 (0.03)	-0.00 (0.03)
Hours of Stove Burning/Day	0.01 (0.01)	0.01 (0.01)	0.00 (0.01)
Exposure to Tobacco	-0.22 (0.29)	-0.21 (0.29)	-0.21 (0.29)
Monthly Household Expenditure	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
BPL Household	0.14*** (0.04)	0.14*** (0.04)	0.12*** (0.04)
Years of Education Completed by Household Head	-0.02*** (0.01)	-0.02** (0.01)	-0.01* (0.01)
Age of Household Head	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)
Age Squared	0.00* (0.00)	0.00 (0.00)	0.00 (0.00)
Rural	1.01*** (0.04)	1.06*** (0.03)	0.96*** (0.04)
Number of Persons in Household	-0.01** (0.01)	-0.01* (0.01)	-0.01* (0.01)
Constant	-1.13*** (0.07)	-1.20*** (0.07)	-1.31*** (0.07)
Observations	68,462	68,462	68,462

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 17: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Difficulty Walking 1 km

VARIABLES	Model 1	Model 2	Model 3
Female	0.15* (0.08)	0.31*** (0.06)	0.23*** (0.09)
Unclean Stove	0.41*** (0.08)		0.37*** (0.08)
Female* Unclean Stove	0.02 (0.09)		0.13 (0.10)
Unclean Fuel		0.10 (0.06)	0.05 (0.06)
Female* Unclean Fuel		-0.27*** (0.08)	-0.30*** (0.08)
Hours of Stove Burning/Day	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Exposure to Tobacco	0.55*** (0.06)	0.56*** (0.06)	0.55*** (0.06)
Monthly Household Expenditure	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
BPL Household	0.14** (0.06)	0.19*** (0.06)	0.15*** (0.06)
Years of Education Completed by Household Head	0.01* (0.01)	0.00 (0.01)	0.01 (0.01)
Age of Household Head	-0.00 (0.01)	-0.00 (0.01)	-0.00 (0.01)
Age Squared	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Rural	0.09 (0.06)	0.27*** (0.06)	0.11* (0.06)
Number of Persons in Household	-0.12*** (0.01)	-0.12*** (0.01)	-0.12*** (0.01)
Constant	-5.21*** (0.25)	-5.02*** (0.25)	-5.20*** (0.25)
Observations	215,754	215,754	215,754

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 18: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Difficulty Going to the Toilet

VARIABLES	Model 1	Model 2	Model 3
Female	0.04 (0.10)	0.13* (0.08)	0.12 (0.11)
Unclean Stove	0.31*** (0.10)		0.26*** (0.10)
Female* Unclean Stove	-0.07 (0.12)		0.03 (0.12)
Unclean Fuel		0.16** (0.08)	0.12 (0.08)
Female* Unclean Fuel		-0.25** (0.10)	-0.26** (0.10)
Hours of Stove Burning/Day	0.00 (0.02)	0.01 (0.02)	0.00 (0.02)
Exposure to Tobacco	0.48*** (0.08)	0.49*** (0.08)	0.48*** (0.08)
Monthly Household Expenditure	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
BPL Household	0.20*** (0.07)	0.23*** (0.07)	0.20*** (0.07)
Years of Education Completed by Household Head	-0.01 (0.01)	-0.01* (0.01)	-0.01 (0.01)
Age of Household Head	-0.02* (0.01)	-0.02* (0.01)	-0.02* (0.01)
Age Squared	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Rural	0.07 (0.07)	0.17** (0.07)	0.07 (0.07)
Number of Persons in Household	-0.07*** (0.01)	-0.08*** (0.01)	-0.07*** (0.01)
Constant	-5.02*** (0.30)	-4.94*** (0.30)	-5.06*** (0.31)
Observations	215,754	215,754	215,754

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 19: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Difficulty Dressing

VARIABLES	Model 1	Model 2	Model 3
Female	-0.01 (0.11)	0.06 (0.08)	0.05 (0.11)
Unclean Stove	0.30*** (0.10)		0.26** (0.11)
Female* Unclean Stove	-0.07 (0.12)		0.01 (0.13)
Unclean Fuel		0.14* (0.08)	0.11 (0.08)
Female* Unclean Fuel		-0.21** (0.11)	-0.21* (0.11)
Hours of Stove Burning/Day	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Exposure to Tobacco	0.48*** (0.08)	0.49*** (0.08)	0.48*** (0.08)
Monthly Household Expenditure	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
BPL Household	0.19** (0.07)	0.21*** (0.07)	0.19** (0.07)
Years of Education Completed by Household Head	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Age of Household Head	-0.02 (0.01)	-0.02 (0.01)	-0.02 (0.01)
Age Squared	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Rural	0.06 (0.08)	0.15** (0.08)	0.06 (0.08)
Number of Persons in Household	-0.07*** (0.01)	-0.07*** (0.01)	-0.07*** (0.01)
Constant	-5.07*** (0.32)	-4.98*** (0.32)	-5.11*** (0.33)
Observations	215,754	215,754	215,754

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 20: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Difficulty Hearing

VARIABLES	Model 1	Model 2	Model 3
Female	0.02 (0.10)	0.13* (0.08)	0.05 (0.11)
Unclean Stove	0.27*** (0.10)		0.25** (0.10)
Female* Unclean Stove	0.10 (0.11)		0.13 (0.12)
Unclean Fuel		0.08 (0.08)	0.05 (0.08)
Female* Unclean Fuel		-0.04 (0.10)	-0.08 (0.10)
Hours of Stove Burning/Day	0.03* (0.02)	0.03* (0.02)	0.03* (0.02)
Exposure to Tobacco	0.50*** (0.08)	0.50*** (0.08)	0.50*** (0.08)
Monthly Household Expenditure	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
BPL Household	0.21*** (0.07)	0.23*** (0.07)	0.20*** (0.07)
Years of Education Completed by Household Head	-0.01** (0.01)	-0.02*** (0.01)	-0.01** (0.01)
Age of Household Head	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Age Squared	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Rural	0.13* (0.07)	0.24*** (0.07)	0.13* (0.07)
Number of Persons in Household	-0.12*** (0.01)	-0.12*** (0.01)	-0.12*** (0.01)
Constant	-5.21*** (0.30)	-5.11*** (0.30)	-5.23*** (0.30)
Observations	215,754	215,754	215,754

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 21: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Difficulty Speaking

VARIABLES	Model 1	Model 2	Model 3
Female	-0.10 (0.11)	0.04 (0.09)	-0.01 (0.12)
Unclean Stove	0.28** (0.11)		0.21* (0.11)
Female* Unclean Stove	-0.02 (0.13)		0.09 (0.14)
Unclean Fuel		0.24*** (0.09)	0.22** (0.09)
Female* Unclean Fuel		-0.24** (0.11)	-0.27** (0.12)
Hours of Stove Burning/Day	-0.00 (0.02)	-0.00 (0.02)	-0.00 (0.02)
Exposure to Tobacco	0.35*** (0.09)	0.36*** (0.09)	0.35*** (0.09)
Monthly Household Expenditure	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
BPL Household	0.27*** (0.08)	0.29*** (0.08)	0.27*** (0.08)
Years of Education Completed by Household Head	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Age of Household Head	-0.02* (0.01)	-0.02* (0.01)	-0.02* (0.01)
Age Squared	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Rural	0.03 (0.08)	0.10 (0.08)	0.02 (0.09)
Number of Persons in Household	-0.08*** (0.01)	-0.08*** (0.01)	-0.08*** (0.01)
Constant	-5.02*** (0.34)	-5.01*** (0.34)	-5.11*** (0.34)
Observations	215,754	215,754	215,754

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 22: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Difficulty with Far Sight

VARIABLES	Model 1	Model 2	Model 3
Female	0.33*** (0.07)	0.39*** (0.05)	0.37*** (0.07)
Unclean Stove	0.45*** (0.08)		0.48*** (0.08)
Female* Unclean Stove	-0.02 (0.08)		0.04 (0.09)
Unclean Fuel		-0.15** (0.06)	-0.22*** (0.06)
Female* Unclean Fuel		-0.16** (0.07)	-0.17** (0.07)
Hours of Stove Burning/Day	-0.04** (0.01)	-0.03** (0.01)	-0.04** (0.01)
Exposure to Tobacco	0.65*** (0.06)	0.66*** (0.06)	0.65*** (0.06)
Monthly Household Expenditure	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
BPL Household	0.10* (0.06)	0.17*** (0.06)	0.13** (0.06)
Years of Education Completed by Household Head	0.03*** (0.01)	0.01** (0.01)	0.02*** (0.01)
Age of Household Head	0.04*** (0.01)	0.03*** (0.01)	0.03*** (0.01)
Age Squared	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Rural	0.16*** (0.06)	0.38*** (0.06)	0.20*** (0.06)
Number of Persons in Household	-0.16*** (0.01)	-0.16*** (0.01)	-0.16*** (0.01)
Constant	-6.17*** (0.27)	-5.80*** (0.26)	-6.02*** (0.27)
Observations	215,754	215,754	215,754

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 23: Rare Events Logistic Regression: Effect of Stove and Fuel Type on Difficulty with Short-Sight

VARIABLES	Model 1	Model 2	Model 3
Female	0.17** (0.08)	0.38*** (0.06)	0.23*** (0.08)
Unclean Stove	0.44*** (0.09)		0.43*** (0.09)
Female* Unclean Stove	0.16* (0.09)		0.24** (0.10)
Unclean Fuel		0.04 (0.07)	-0.01 (0.07)
Female* Unclean Fuel		-0.16** (0.08)	-0.23*** (0.08)
Hours of Stove Burning/Day	-0.05*** (0.02)	-0.04*** (0.02)	-0.05*** (0.02)
Exposure to Tobacco	0.73*** (0.07)	0.73*** (0.07)	0.72*** (0.07)
Monthly Household Expenditure	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
BPL Household	0.06 (0.06)	0.12** (0.06)	0.07 (0.06)
Years of Education Completed by Household Head	0.02*** (0.01)	0.01** (0.01)	0.02*** (0.01)
Age of Household Head	0.02** (0.01)	0.02** (0.01)	0.02** (0.01)
Age Squared	0.00** (0.00)	0.00* (0.00)	0.00** (0.00)
Rural	-0.00 (0.07)	0.22*** (0.06)	0.01 (0.07)
Number of Persons in Household	-0.13*** (0.01)	-0.14*** (0.01)	-0.14*** (0.01)
Constant	-6.01*** (0.29)	-5.78*** (0.29)	-5.97*** (0.29)
Observations	215,754	215,754	215,754

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

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