

EFFECTS OF PARENTAL MORBIDITY ON CHILD SCHOOL PARTICIPATION IN MALAWI

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## **ABSTRACT**

Educating children in developing countries has the potential to profoundly and positively affect socio-economic development outcomes by allowing these individuals to attain improved health outcomes, increased wage-earning potential, and to potentially break the cycle of inter-generational poverty. One of the key development concerns impacting educational participation for children is health, with a developing strand of research focused on the effects of parental morbidity and mortality on child educational participation. This study seeks to add to this body of literature by investigating the relationship between adult health status and child educational participation in Sub-Saharan Africa, a region that is faced with particularly low educational attainment and high disease burden. Using data from the Government of Malawi's 2004-2005 Second Integrated Household Survey, this study finds a modest and statistically significant negative relationship between head of household morbidity and child school attendance, and confirms parental education as a primary driver of child school attendance. These findings suggest mutually positively reinforcing benefits to human development investments in health and

education. Further investigation of this research question is encouraged, particularly addressing the efficacy of interventions to increase ailing parents' access to health care or palliative care in improving school attendance rates of children.

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## **I. Introduction**

Educating children in developing countries has the potential to profoundly and positively affect socio-economic development outcomes by allowing these individuals to attain improved health outcomes, increased wage-earning potential, and to potentially break the cycle of inter-generational poverty (Center for Global Development, 2006). In recognition of the development benefits associated with educating children, and in light of the challenges inherent in providing quality education to children across the world, education holds a solid position as a priority on the global stage. One of the United Nations Millennium Development Goals, for example, is to attain universal primary education in all countries by 2015 (United Nations, 2008).

Substantial progress has been made in increasing school enrollment in developing regions, with most regions attaining roughly 90 percent net enrollment<sup>1</sup> at the primary and secondary levels, on average. Despite impressive gains in Sub-Saharan Africa in the past several decades, this region still lags behind, with only 71 percent of eligible children enrolled in school as of 2006 (Millennium Development Goal Report, 2008). Furthermore, many children that are nominally enrolled in school have low

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<sup>1</sup> Net enrollment refers to the number of students enrolled in a level of education within that level's relevant age group, as a percentage of the population in that age group (The World Bank, 2004). The Enrollment rate is useful as a comparative development indicator, but is not meant to be a perfect indicator for educational participation levels, and does not impart information about educational quality.

rates of attendance. The current study is motivated by the search to identify the obstacles to school attendance and enrollment, and consequent policy options for tackling the educational deficit in Sub-Saharan Africa. While the quality of schooling available to children is also an important aspect of this education deficit, getting children into schools represents a first step towards progress.

Malawi is one country in Sub-Saharan Africa which has promoted education as part of a poverty reduction policy in its national development strategy (Government of Malawi, 2008). Poor and landlocked, Malawi is characterized by the Economic and Social Council of the United Nations as a least developed country, and with 52 percent of the population living below the poverty line<sup>2</sup> in 2004, it ranks low on many development indicators (United Nations, 2005; World Bank, 2007). The Malawian government's 1994 abolition of primary school fees was associated with a large increase in net primary enrollment rates, moving from 58 percent in 1992 to 82 percent in 2004 (Al-Samarrai and Zaman, 2006). This rate has dropped in the past several years, with 2006 net primary enrollment recorded at 73 percent, although the government of Malawi attributes this decline to a change in the methodology used to calculate net enrollment (Government of Malawi, 2008).

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<sup>2</sup> According to the World Bank, Malawi's poverty line is 44.3 Malawi Kwacha per person per day, which was approximately \$0.50 USD in 2004 at the time the IHS-2 survey was conducted (World Bank, 2007).

Although one of the key development concerns impacting educational participation for children is health, the effect of morbidity on school participation in developing countries has received only modest attention in recent research. The current study investigates the effects of adult morbidity on child school participation, as parental morbidity and mortality (household-level health shocks) have been shown to have “substantial effects on school participation rates” (Miguel, 2005). Households in developing countries may pull children out of school when the head of household falls ill (Sharma, 2005). This may occur if the household is no longer able to finance the child’s educational costs, or if the child’s labor becomes necessary to supplement the household’s income, or if the child assumes a role as a caregiver in the household. By having to drop out of school or by falling behind in school, children must forego an opportunity for human capital development, and are theoretically more likely to face resource constraints such as depressed incomes as adults (Ibid). Sub-Saharan Africa and Malawi in particular carry an unfortunately high disease burden. Malawi’s HIV/AIDS prevalence rate is almost twice that of the Sub-Saharan African average (Kaiser Family Foundation, 2005). Along with common ailments such as diarrhea, malaria, and tuberculosis, Malawi’s HIV prevalence rate is very high at roughly 14 percent in 2005 among adults 15 years of age or older, with HIV/AIDS as the leading cause of death (World Health Organization, 2008).

This study investigates the relationship between adult health and child educational participation, and aims to answer the following questions:

- (1) Among households with a temporarily ill or injured head of household, does seeking treatment have an effect on children's school participation outcomes, holding other factors constant?
- (2) Does a household head's chronic illness have an effect on children's school participation outcomes, holding other factors constant?

The study uses data from the government of Malawi's 2004-2005 Second Integrated Household Survey, also known as the World Bank's Living Standards Measurement Study, to investigate these questions. Household heads were asked to self-identify information regarding their health status based on a series of questions contained in the survey.

This study draws on a body of literature that addresses the relationship between extreme health shocks (such as parental mortality) and child educational participation. This paper also intends to add to the existing body of knowledge by focusing on a topic which has not yet been thoroughly investigated: the relationship between household head morbidity and child educational participation, and concludes with comments on the potential for health care access and treatment interventions to mitigate the detrimental effects of health shocks on child education.

## **II. Literature Review**

A subset of the literature on health in Sub-Saharan Africa examines how households are affected by health shocks, such as the illness or death of one or more household members. This is typically measured by determining changes in household consumption tied to the negative health shock. Individuals who fall ill are often no longer able to bring income into the household; additionally, attendant medical expenditures may rise within the household, drawing precious resources away from other categories of consumption. Estimates of the effects of health shocks on household consumption vary. Asfaw et al (2004) find that in rural Ethiopia, a head of household becoming ill is associated with a 24 percentage point decrease in quarterly non-food consumption. Another analysis of illness in rural Ethiopia (Dercon et al 2005) finds that long-term illness of a household member was associated with a nine percent decrease in household consumption during the survey year, relative to other households.

Much of the literature on health shocks in Sub-Saharan Africa addresses the impact of the HIV/AIDS epidemic in particular. Beegle et al (2006), for example, find that HIV/AIDS-related prime-age adult deaths in Tanzania are associated with a seven percent decrease in household consumption for the first five years after the death. This gives a snapshot of relatively long-term effects of an extreme health shock. Other

research from rural Malawi (Davies, forthcoming) finds that health shocks are associated with immediate decreases in consumption, but that households may recover quickly and experience only short-term effects. While the magnitude and duration of the effects of health shocks on household consumption are therefore contested, there is a general consensus in the field that health shocks do indeed negatively affect households. The variation in household consumption that results from a health shock can be devastating and has the potential to push households into poverty, especially for households near the poverty line (Malawi Poverty and Vulnerability Assessment, 2007). More research, however, is needed to replicate the results of existing studies in a number of settings.

As a corollary to the negative consumption effects of health shocks, much of the literature on health shocks examines the coping mechanisms of affected households. According to basic microeconomic theory, a household will gain utility from smoothing consumption over time, and may do so in a variety of ways. Asfaw et al (2004) find that in Ethiopia when a head of household falls ill, communal or familial risk-sharing arrangements may act to protect and stabilize the household's level of food consumption, but that these arrangements cannot insure against decreases in non-food-item consumption. Wagstaff (2005) analyzes data from Vietnam and finds that while health shocks may result in an increase in unearned household income (as in

assistance and support from extended family members), most households cannot stabilize consumption levels or insure against loss completely. In particular, Wagstaff finds that poor households, which are already at a bare minimum of consumption, must rely on dissaving and borrowing in order to smooth consumption as much as possible in the event of a health shock.

The coping mechanism most relevant for the current study consists of shifting the time commitments and activities of individual household members. The general theoretical model predicts that when an adult in a developing-country household falls ill, household consumption is reduced and higher medical expenditures consume the household's limited resources. Children in the household who attend school may therefore be pulled out of school in order to work and earn income for the household to supplement consumption. Alternatively, these children may be needed to care for the sick individual and take care of household tasks (Grant, 2008). Beegle et al (2005) suggest that the labor effects associated with extreme health shocks (here, prime-age adult HIV-AIDS related deaths) may be the most severe in households which are unlikely to receive assistance from new adult co-residents, such as members of extended family, in the event of an adult's death. More research is necessary to quantify the labor effects on children within a household where an adult falls ill.

There is a large body of literature which examines the effects of extreme health shocks (parental mortality) on child school participation in developing countries. Evans et al (2004) find a negative but statistically insignificant decrease of two percentage points in school participation prior to parental death in households in Kenya, followed by a larger and statistically significant decrease of five percentage points after parental death. Gertler et al (2006) find that in Indonesia, parental death in the previous 12 months doubles a child's probability of dropping out of school in that year. Ainsworth et al (2006) highlight a key gap in the literature regarding the study of parental morbidity, with potentially large schooling impacts for children. More research is needed on this topic, as the majority of the literature examines the effects of parental death on HIV/AIDS orphans, with less research having been conducted on parental morbidity. There exists a range of health sector policy interventions with the potential to mitigate the effect of parental illness on child school participation, based on children receiving more education and building more human capital in their formative years. These interventions would ultimately encourage positive development outcomes.

### **III. Conceptual Framework and Hypotheses**

Using cross-sectional data from the 2004-2005 Malawi Second Integrated Household Survey, this study analyzes the determinants of children's school

participation as a function of the respective household head's health factors (temporary illness or injury, chronic illness, and treatment-seeking behavior) and exogenous individual and household characteristics (including age, sex, household head's education, location, religion, household composition, and annual household expenditures). The units of analysis are individual children. The survey sample is narrowed to include only children of school age (five to eighteen years of age).

The study employs a traditional statistical model of multiple linear regression to investigate two hypotheses.

*Hypothesis 1: Among children with a temporarily ill or injured head of household, seeking treatment increases children's school participation, holding other factors constant.*

This first hypothesis examines differential child educational participation outcomes based on whether the sick household head sought treatment for his or her ailment. Holding other factors constant, a household head seeking treatment (assuming said treatment is successful, on average) is expected to increase respective children's educational participation, on average, by reducing the need to substitute children's time use towards household chores and economic activities as opposed to schooling.

A linear probability model is employed to investigate a second hypothesis:

*Hypothesis 2: Chronic illness of a household head decreases children's school participation, holding other factors constant.*

This second hypothesis examines differential child educational participation based on the respective household head's health status in the particular circumstances of chronic illness.

#### **IV. Data and Methods**

##### ***Malawi Second Integrated Household Survey***

The World Bank financed the Malawi Second Integrated Household Survey (IHS-2), or Living Standards Measurement Study, which was conducted over a 12 month period from March 2004 to March 2005. The National Statistics Office (NSO) of Malawi designed this survey as a follow-on to the First Integrated Household Survey (IHS-1), which was completed in 1998. The IHS-2 measures household welfare and behaviors by including indicators for a wide array of topics such as health, education, and income (NSO, 2005). While much of the IHS-2 is comparable to the IHS-1, the more recent IHS-2 is more comprehensive and includes additional modules. The World Bank and the International Food Policy Research Institute provided technical assistance in the design of the survey.

### ***Survey Sample***

The Malawi IHS-2 survey sample is nationally representative, excepting the population of Likoma Island on Lake Nyasa. The sample includes all three regions of Malawi (North, Center, and South), and was drawn from a sample frame using the 564 Enumeration Areas (EAs) from Malawi's 1998 Population Census (see map, Appendix). The sample consists of a total of 11,280 households, 20 from each enumeration area. The sample is stratified into urban areas (Lilongwe, Bantyre, Mzuzu, and Zomba) and rural areas (all other areas). Additionally, the sample is sub-stratified by Malawi's 27 administrative districts (again excepting the Likoma District).

Sample selection was a two-stage process based on the number of households in each sub-stratum. If an administrative district consisted of less than 75,000 households, 12 Enumeration Areas were sampled from that district. If the administrative district consisted of between 75,000 and 125,000 households, 24 Enumeration Areas were sampled. 36 Enumeration Areas were sampled from districts with between 125,000 and 175,000 households, and 48 Enumeration Areas were sampled from districts with between 175,000 and 225,000 households. Based on these guidelines, Enumeration Areas (EAs) were randomly selected from the total number EAs in each district. 20 households and five replacement households were then randomly sampled and surveyed from each randomly selected Enumeration Area.

Replacement households were used for roughly five percent of the sample. The need for replacement arose mostly from dwellings being unoccupied, absent of household members, or destroyed at the time of survey (the household listing exercise had taken place in early 2004). The proportion of respondents refusing to take the survey was low, accounting for less than one half of one percent of the sample.

### ***Survey Data***

The IHS-2 survey was designed to “provide a complete and integrated data set to better understand target groups of households affected by poverty” by collecting data on consumption, agricultural activities, and recent shock at the household level, and on labor supply, time use, health and education for each household member (NSO, 2005). Information was collected based on questions and prompts contained in a series of questionnaires or modules, shown in table 1. The analysis in this paper draws on data from modules 1 through 5.

<i>Module</i>		<i>Contents of Questionnaire</i>
1	Household Roster	Age, sex, relationship to head of household, migration history, and marital status of each household member
2	Education	Literacy, highest educational qualification attained, and school attendance for all household members aged five and above
3	Health	Incidence of illness and injury, treatment sought, chronic illness, and health care expenditures for all household members
4	Consumption <sup>1</sup>	Aggregate and categorical annual household expenditures, measured in Malawi Kwacha
5	Time Use and Labor	Hours spent on household tasks, household business activities, and non-household labor, current employment status and occupation, most recent wage payment and time period for all household members age five and above
6	Social Safety Nets	Benefits received by the household from various social welfare programs
7	Recent Shocks to Household Welfare	Economic, agricultural, and health shocks experienced by the household in past five years
8	Deaths in Household	Age, sex, cause of death, and assets lost for household members who have died in the past two years

<sup>1</sup> Consumption data is not collected in a standard survey module, but is compiled from a number of separate modules.

### ***Analysis Plan***

The present study focuses on a sub-sample of households in the Malawi IHS-2 Survey with school-aged children (age five to eighteen) currently enrolled in school. Multiple econometric specifications are employed to investigate the hypothesis that



Because the data is insufficient for measuring treatment-seeking behavior for chronic illness, a second analysis will involve a more general investigation of the effect of the head of household being chronically ill on a child's probability of temporarily withdrawing from school in the preceding twelve months (missing more than two consecutive weeks of school), relative to a child whose head of household is not afflicted by chronic illness. The second analysis of the sub-sample will examine school attendance differentials between households falling into one of two categories:

- The head of household reported suffering from a chronic or long-term illness, or,
- The head of household did not report suffering from a chronic or long-term illness.

A linear probability estimation method based on the following specification will be employed:

$$(3) \quad \text{Probability of Temporary Withdrawal from School in Past 12 months}_{(0,1)} = \beta_0 + \beta_1 \text{Chronic Illness}_{(0,1) \text{ HH Head}} + \beta_2 X + e$$

*Effects of Other Independent Variables*

Other independent variables in the model include demographic and socio-economic controls. Although household consumption tends to be more stable than household income, household consumption may be expected to have a positive effect on a child's school participation, as well-off households will generally be less likely to

need children to contribute their labor. Households in rural areas are expected to be less likely to send their children to school, due to concerns of distance and the need for children to participate in agricultural activities for the household. Female heads of household (accounting for almost one quarter of the sample) are often subject to more constrained resources, but may be more motivated to send children to school, thus the effect of sex of household head is uncertain.

The household head's education level is expected to positively affect child school participation, as higher levels of education are generally associated with increased income, and adults with higher levels of education may see sending children to school as a worthwhile use of limited resources. While education of the child's mother may be more closely associated with the decision to send children to school than that of the household head, the high rate of fostering and the prevalence of orphans in Malawi (with an estimated 850,000 orphans as of 2005) suggests the latter as a more appropriate variable (Sharma, 2005). Religion of household head may also affect schooling decisions, due to the existence of religious schools, and the varying degrees of traditional attitudes toward the value of schooling associated with particular religions.

Control variables for child demographic characteristics are also included. Female children would be expected to have less school participation than male

children. School participation is expected to increase with children's age up to a point where the returns to schooling are perceived to be declining enough to reverse the trend, such that increases in child age are expected to decrease school participation.

These independent variables are included in expanded specifications as follows:

$$\begin{aligned}
 (2) \text{ Days attended School in past two weeks} &= \beta_0 + \beta_1 \text{ Sick No Treatment}_{(0,1) \text{ HH Head}} \\
 &+ \beta_2 \text{ Sick Sought Treatment}_{(0,1) \text{ HH Head}} + \beta_3 \text{ Ln (Annual Household Expenditures)} \\
 &+ \beta_4 \text{ Rural}_{(0,1)} + \beta_5 \text{ Female}_{\text{HH Head}} + \beta_6 \text{ Education Level}_{\text{HH Head}} + \beta_7 \text{ Religion}_{\text{HH Head}} \\
 &+ \beta_8 \text{ Household Composition} + \beta_9 \text{ Female}_{\text{Child}} + \beta_{10} \text{ Age}_{\text{Child}} + \beta_{11} \text{ Age}^2_{\text{Child}} \\
 &+ \beta_{12} \text{ Time Use and Labor}_{\text{Child}}
 \end{aligned}$$

$$\begin{aligned}
 (4) \text{ Probability of Temporary Withdrawal from School in Past 12 months}_{(0,1)} &= \\
 &\beta_0 + \beta_1 \text{ Chronic Illness}_{(0,1) \text{ Head of Household}} + \beta_2 \text{ Ln (Annual Household Expenditures)} + \\
 &\beta_3 \text{ Rural}_{(0,1)} + \beta_4 \text{ Female}_{\text{HH Head}} + \beta_5 \text{ Education Level}_{\text{HH Head}} + \beta_6 \text{ Religion}_{\text{HH Head}} \\
 &+ \beta_7 \text{ Household Composition} + \beta_8 \text{ Female}_{\text{Child}} + \beta_9 \text{ Age}_{\text{Child}} + \beta_{10} \text{ Age}^2_{\text{Child}} \\
 &+ \beta_{11} \text{ Time Use and Labor}_{\text{Child}}
 \end{aligned}$$

### *Limitations*

The models employed in this study are subject to several limitations. Each analysis operates under the assumption that, controlling for the effects of the independent variables listed above, the determinants of illness and treatment-seeking behavior are independent of the determinants of child educational participation. This study does not address the existence of factors that drive both parental morbidity and child school participation, for which data are not readily available. Such factors may include poor hygiene practices within a household that may cause parents and children to fall ill, precipitating a decline in school attendance. Interpretation of results is therefore subject to concerns of endogeneity and omitted variable bias. Careful consideration of causality is therefore necessary in recommending policy interventions to alleviate the effect of parental morbidity on child school participation. Nevertheless, the relationships and associations found in this study may serve as a useful and illustrative starting point for further research.

Additionally, the decision to seek treatment serves as an imperfect indicator for access to health care. The survey data do not allow the analysis to control for distance to the nearest health clinic, nor for expenses incurred from treating a specific instance of illness, meaning that the same level of morbidity might induce one household head to seek treatment when health care is freely available at a nearby clinic, while another

household head who lacks access to healthcare may simply decide not to seek treatment.

Furthermore, health status is self-identified by survey respondents, and may be open to differing interpretations. To determine whether a respondent suffered from a short-term illness or injury, the respondent is asked if he or she suffered from an illness or injury during the past two weeks, and is then asked to identify the illness or injury from a list of potential choices. Similarly, to determine whether a respondent suffered from a chronic illness, the respondent is simply asked if he or she suffers from a chronic illness, and is then asked to identify said illness from a list of potential choices. Despite these limitations, however, the survey data provide a rich collection of information for econometric analysis.

## **V. Results**

### ***Descriptive Statistics***

Table 2 provides descriptive statistics for the variables used in the econometric analysis. The sample is limited to children of school age. On average, children in the sample report low levels of school attendance. In addition to schooling, the average Malawian child's time is allocated toward household chores (collecting water and fuel) and participating in economic activities. Household agricultural activities take up a

relatively large portion of children's time (roughly four hours per week, on average) compared to other economic activities such as helping with or running household enterprises or working for wages (each accounting for less than one hour per week, on average). Children's time use and labor are highly variable across the sample, with time spent on household agricultural activities in the previous week ranging from zero to 70 hours, and time spent on working for wages in the previous week ranging from zero to 98 hours.

The households of the sub-sample are characterized by poverty, with annual household expenditures averaging 114,000 Malawi Kwacha, or about 1,100 USD. Average per capita annual expenditures within the household amount to 17,757 Malawi Kwacha, such that the average Malawian lives just barely above the national poverty line. The sample is predominantly rural, and household heads have relatively low levels of educational attainment; forty three percent of household heads have not completed primary schooling. While the majority of household heads are male, almost one quarter of households are headed by women. Roughly thirty percent of household heads report being temporarily ill or injured in the two weeks prior to the survey, and sixteen percent of household heads report having a chronic illness, illustrating Malawi's high disease burden. Catholics (20 percent), Presbyterians (16 percent), Muslims (12 percent), make up the predominant religious groups in the sample.

<b>Table 2. Descriptive Statistics for Variables Used in Analysis</b>					
	Obs	Mean	St. Dev.	Minimum	Maximum
<b><i>Dependent Variables</i></b>					
Days Attended School in Past Two Weeks	14,281	6.6834	3.6863	0	14
Temporarily Withdrew from School in Past 12 Months	14,306	0.0788	0.2695	0	1
<b><i>Independent Variables</i></b>					
Household Head Temporarily Ill or Injured, Sought Treatment (0,1)	18,774	0.2649	0.4413	0	1
Household Head Temporarily Ill or Injured, Did Not Seek Treatment (0,1)	18,774	0.0409	0.1982	0	1
Household Head Chronically Ill (0,1)	18,799	0.1621	0.3685	0	1
<b><i>Household Characteristics</i></b>					
Total Annual Household Expenditures, Thousands MWK	19,023	113.98	118.39	1.2399	169.0550
Rural (0,1)	19,023	0.8868	0.3168	0	1
Household Head's Education: Some Primary School (0,1)	18,941	0.4329	0.4955	0	1
Household Head's Education: Completed Primary School (0,1)	18,941	0.1459	0.3530	0	1
Household Head's Education: Some Secondary School (0,1)	18,941	0.0700	0.2552	0	1
Household Head's Education: Completed Secondary School (0,1)	18,941	0.0602	0.2378	0	1
Household Head's Education: University or Technical College (0,1)	18,941	0.0171	0.1297	0	1
Female Household Head (0,1)	19,023	0.2323	0.4223	0	1
Household Size	19,023	6.4274	2.4853	1	27
<b><i>Child Characteristics</i></b>					
Female Child (0,1)	19,023	0.5024	0.5000	0	1
Age of Child*	19,023	10.7792	3.9653	5	18
Hours Child Spent Collecting Water†	18,755	0.3636	0.6219	0	10
Hours Child Spent Collecting Fuel†	18,762	0.1071	0.6729	0	10
Hours Child Spent on Household Agricultural Activities‡	18,780	3.8952	8.1163	0	70
Hours Child Spent Running Non-Agricultural Enterprise‡	18,779	0.1609	1.9715	0	80
Hours Child Spent Helping in a Non-Agricultural Enterprise‡	18,779	0.2413	2.2963	0	70
Hours Child Spent on Casual Labor‡	18,776	0.4618	3.1097	0	98
Hours Child Spent Working for Wages‡	18,776	0.2865	3.6874	0	98
* Sample is restricted to children of school age (5-18 years of age)					
† Signifies in the day prior to the Survey; ‡ Signifies in the 7 days prior to the Survey					

## ***Multivariate Analysis***

### *Treatment-Seeking Behavior for Short-Term Illness or Injury and School Attendance*

Table 3 provides results from the first set of regression analyses. Model 1 tests the hypothesis that children's school participation is lower in households where a temporarily ill or injured head of household does not seek treatment, compared to households where treatment is sought; model 2 incorporates controls. On average, children whose head of household reported being temporarily ill or injured and sought treatment are predicted to attend 0.2 fewer days of school over the two week recall period, compared to children whose head of household did not report being temporarily ill or injured, holding other factors fixed. However, this effect is not statistically significant. The study therefore finds no difference in the attendance rates of children whose household heads do not report having a short-term illness or injury, as compared with attendance rates of children whose household heads do report having a short-term illness or injury and seeking treatment, holding other factors constant.

Children whose household heads reported being temporarily ill or injured and *did not* seek treatment are predicted to attend 0.13 fewer days of school over the two week recall period on average, compared to children whose head of household did not report being temporarily ill or injured, holding other factors constant. The latter effect is significant at the ten percent level.

<b>Table 3. Days Attended School in Past Two Weeks</b>		
	<b>Model 1</b>	<b>Model 2<sup>1</sup></b>
Intercept	6.09537 (0.03877)***	5.7566 (0.71801)***
Household Head Temporarily Ill or Injured, Sought Treatment (0,1)	-0.37325 (0.07350)***	-0.19476 (0.15722)
Household Head Temporarily Ill or Injured, Did Not Seek Treatment (0,1)	-0.48897 (0.16637)***	-0.13665 (0.07140)*
<b>Household Characteristics</b>		
Ln Annual Household Expenditures (Per Capita within Household, MWK)		-0.26243 (0.06097)***
Rural (0,1)		-0.39078 (0.12141)***
Household Head's Education: Some Primary School (0,1)		0.10358 (0.07986)
Household Head's Education: Completed Primary School (0,1)		0.13969 (0.10780)
Household Head's Education: Some Secondary School (0,1)		0.42889 (0.13542)***
Household Head's Education: Completed Secondary School (0,1)		0.82669 (0.15165)***
Household Head's Education: University or Technical College (0,1)		0.64978 (0.25300)**
Female Household Head (0,1)		0.03036 (0.07837)
<b>Child Characteristics</b>		
Female Child (0,1)		-0.23591 (0.06492)***
Age of Child		0.70267 (0.05478)***
Age <sup>2</sup> of Child		-0.03541 (0.00223)***
Observations	15,705	15,505
R <sup>2</sup>	0.0020	0.1459
*** Significant at the .01 level    ** Significant at the .05 level    *Significant at the .10 level		

<sup>1</sup>Model 2 includes controls for household head's religion, household composition, and district (not shown). An F-test performed on a comprehensive group of seven child-level time use and labor controls included in model 2 (not shown) indicates a jointly significant and negative effect on attendance.

### *Chronic Illness and School Attendance*

Results from the second set of regression analyses are reported in table 4. This model tests the hypothesis that children's school attendance is lower in households where the head of household reports being chronically ill compared to households where the head of household does not report such an illness.

Children whose household heads report having a chronic illness are on average 2.4 percent more likely to have temporarily withdrawn from school in the prior year (missing more than two consecutive weeks of school) than their peers, whose household heads do not report being chronically ill, holding other factors constant. This effect is significant at all conventional levels of alpha.

<b>Table 4. Probability of Temporarily Withdrawing from School in Previous 12 Months</b>		
<b>School Aged Children (5-18) Currently Attending School</b>		
	<b>Model 3</b>	<b>Model 4<sup>1</sup></b>
Intercept	0.07340 (0.00248)***	0.16327 (0.05301)***
Household Head Chronically Ill (0,1)	0.03269 (0.00615)***	0.02368 (0.00628)***
<b><i>Household Characteristics</i></b>		
Ln Annual Household Expenditures (Per Capita within Household, MWK)		-0.00480 (0.00448)
Rural (0,1)		0.00535 (0.00886)
Household Head's Education: Some Primary School (0,1)		-0.02536 (0.00595)***
Household Head's Education: Completed Primary School (0,1)		-0.02470 (0.00789)***
Household Head's Education: Some Secondary School (0,1)		-0.03498 (0.00993)***
Household Head's Education: Completed Secondary School (0,1)		-0.03479 (0.01096)***
Household Head's Education: University or Technical College (0,1)		-0.02909 (0.01191)
Female Household Head (0,1)		0.00726 (0.00578)
<b><i>Child Characteristics</i></b>		
Female Child (0,1)		-0.00351 (0.00474)
Age of Child		-0.00297 (0.00415)
Age <sup>2</sup> of Child		0.000182 (0.000181)
Observations	14,052	13,851
R <sup>2</sup>	0.0020	0.01696
*** Significant at the .01 level    ** Significant at the .05 level    *Significant at the .10 level		

<sup>1</sup>Model 4 includes controls for household head's religion, household composition, and district (not shown). An F-test performed on a comprehensive group of seven child-level time use and labor controls included in model 4 (not shown) indicates a jointly significant and negative effect on attendance.

## **VI. Discussion**

While the results of these econometric analyses shed some light on the relationship between head-of-household morbidity and child school participation, the models remain subject to several important limitations. The scope of the school attendance, health status, and treatment-seeking behavior variables available in the data set constrains the analysis, and the models would benefit from additional controls, such as variables for distance to the nearest health clinic, expenses incurred by particular health shocks, and birth order of children. As mentioned above, concerns of endogeneity and omitted variable bias constrain the potential to make causal inferences from the results obtained.

Additionally, school participation is by no means an indicator of the quality of education being offered to children. Measurement and improvement of educational quality remains a persistent problem for Malawi's school systems (Al-Samarrai and Zaman, 2006). However, parents may find value in sending their children to school regardless of quality, as school feeding programs are available to thirty percent of primary school students in Malawi. The World Food Programme's school feeding program provided daily meals to over 600,000 primary school students in Malawi as of 2008, in addition to providing take home rations or maize for qualifying students (World Food Programme, 2008). However, it is unclear how consistent such feeding

programs might be in the long-run, given the potential for fluctuations in donor funding.

Nevertheless, despite the limitations inherent in the models, the results still indicate a significant relationship between parental morbidity and child school attendance. The results from the first set of regression analyses do confirm that in households with a sick or injured household head, children are predicted to attend slightly fewer school days (0.14 fewer days, on average, in a reference period of two weeks) when the household head *does not* seek treatment, compared to child school attendance in households where the household head does not report having a short-term illness or injury. School attendance between children with temporarily ill or injured household heads who sought treatment versus attendance for children with “healthy” household heads is statistically indistinguishable. These findings lend limited support to the idea that in the context of parental morbidity, health care access improves children’s school attendance. Given the motivating factors that drive treatment-seeking behavior, additional research is needed to confirm this study’s first hypothesis, that among children with a sick head of household, seeking treatment increases children’s school participation, holding other factors fixed.

These results further reinforce that the household head’s level of education is a primary determinant of child school attendance. Additionally, the results indicate that a

ten percent increase in annual household per capita expenditures is associated with a decrease of approximately 0.025 days of school attended in the prior two weeks. This negative and significant effect of annual per capita household expenditures on school attendance, however small, is unexpected. Increasing household expenditures are typically associated with increases in household income and a decrease in the need for children to be economically active as opposed to attending school. However, given the variety of coping mechanisms employed by households to maintain consistent levels of consumption, this result suggests that the use of a control for household income instead of household consumption may improve the model.

Results from the second set of regression analyses indicate that children whose household heads are chronically ill are 2.4 percent more likely to temporarily withdraw from school than their peers, whose household heads do not report chronic illness. This reduction in school participation is significant and confirms the findings of prior studies on parental morbidity and child school participation. Annual per capita household consumption does not have a significant effect in this specification.

F-tests conducted on the specifications of the first and second analyses confirm that the effects of child-level time use and labor variables are jointly significant: on average, as the amount of a child's time allocated towards household tasks and labor increases, his or her school attendance decreases, holding other factors constant. As

regards the second hypothesis that chronic illness of a household head decreases children's school participation, holding other factors fixed, it is interesting to note that even after the major factors of children's time use and economic activity are controlled for, the significant and negative effect of household head morbidity on child school participation persists. This implies that independently of one of the primary mechanisms through which parental morbidity is posited to decrease child school participation, illness of the part of the head of household still has an important effect on school attendance.

This, coupled with the finding that education of parents is still one of the strongest predictors of child schooling, indicates that there are mutually positively reinforcing benefits to human development investments in health and education (Currie, 2009). The findings of this study therefore suggest that investment in health care availability for adults may facilitate school attendance among children.

Future research in this area should involve investigation of the relationship between household head morbidity and child school participation with panel data in different settings and with a wider array of control variables to allow for a more robust analysis. Fruitful areas for further research may include establishing the efficacy (in terms of improving school attendance rates of children) of interventions to increase health care access, and of programs providing palliative care to ailing parents. As these

relationships are quantified, policymakers will be able to establish the extent to which a focus on parental morbidity would be a cost-effective approach to increasing school attendance. The importance of education in improving the next generation's development outcomes, in addition to the positive outcomes to be generated by healthcare access interventions, suggest that these research questions merit a thorough investigation.

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VIII. Appendix

*Figure 1. Map of Malawi*



Source: CIA Factbook