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Rishi R. Sekar

04/20/2010

The Effects of Economic and Domestic Factors on Personal Health in India: Where Can  
We Target Health Policy?

by

Rishi R. Sekar

Dr. Sara Markowitz  
Adviser

Department of Economics

Sara Markowitz  
Adviser

David Frisvold  
Committee Member

Andreas Fritz  
Committee Member

April 20, 2010  
Date

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Rishi R. Sekar

Dr. Sara Markowitz  
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An abstract of  
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## Abstract

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For the past several decades, India has struggled with numerous major health issues. Though many initiatives have been focused on eradicating these problems, only minimal progress has been made. This paper will take a comparative approach to determine which areas of life can be focused on to have the greatest impact on health. The impacts of Education, Location, Income, and Resources on personal health will be studied as well as what factors determine the resources available at health clinics. From studying the results, health policy can be refined and made more efficient, hopefully allowing the general health of India to improve.

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## **Introduction**

India, the second most populous country in the world and home to one of the fastest growing international economies, has made profound improvements in providing healthcare to its 1.2 billion citizens over the past several decades, but major health issues continue to afflict the country. With over 2.3 million people currently living with HIV/AIDS, approximately 900,000 annual deaths due to contaminated water and pollution, one of the world's highest malnutrition rates, and the vast majority of the population lacking access to adequate healthcare, it's evident that much progress and refinement are still necessary in order to tame India's healthcare issues. Though there have been several government organizations and policies focused on eradicating these problems over the years, India has continued to score poorly on several health indicators, sometimes far worse than many of its peers. So what factors, if any, lie at the heart of these problems and can be targeted in effective policy making? Are these changes feasible? And if so, how can India begin to make these necessary modifications?

One area of focus has been the distribution and sufficiency of India's growth and expansion. Throughout the past decades, the Indian healthcare industry has been growing at an astounding rate. During the 1990s, Indian healthcare grew at an annual rate of approximately 16%, more than twice of that in the United States (PricewaterhouseCoopers, 2007). In 2007, the Indian healthcare market was estimated at US\$35 billion and is expected to almost double within the next two years, eventually surpassing even the most developed nations (IBEF, 2010). The country has seen significant improvement and

proliferation in healthcare facilities, medical professionals, research, and technology. However, despite this growth, India's healthcare infrastructure has failed to keep up with the country's growing population and economy. Recent estimates have shown that though India's strong growth rate is promising, the per capita spending on healthcare by the Indian Government is still far below international recommendations (Boston Analytics, 2008). Further, most of this growth is accessible to only a limited portion of the population. Almost 75% of all health facilities and professionals are located in urban areas, while the vast majority of Indians reside in rural locations (Patil et al., 2002). Much of the lower class and rural populations continue to experience severely inadequate access to healthcare, if any, and are forced to undergo more traditional treatments, such as Ayurvedic medicine, Unani, and acupuncture (PricewaterhouseCoopers, 2007). Meanwhile, the growing middle class in urban areas is provided with high quality medical care and abundant medical resources far more advanced than the rest of the country. Though there has been a rapid rise and improvement in India's healthcare infrastructure, the scope and sufficiency of its effect are concentrated on only a small portion of the country, leaving most of the country without adequate health resources.

Another widely discussed issue is that of poverty. Amongst India's 1.2 billion citizens reside a third of the entire world's poor. The World Bank estimates that an astonishing 42% of the population falls below the poverty line (World Bank, 2010). From poverty arise several issues prompting poor health including the inability to afford even menial health services, poor living conditions, lacking nutrition, rural location, and the absence of general



knowledge regarding many common and preventable illnesses. A principal consequence of poverty on health in India has been the severe rates of malnutrition seen throughout the country. Almost half of India's children suffer from malnutrition causing India to comprise, "49% of the world's underweight children, 34% of the world's stunted children, and 46% of the world's wasted children" (World Health Organization, 2009). Further, poverty in India is accompanied by particularly abysmal living conditions including severely limited water sources, poor sanitation, overcrowding, and insufficient housing. UNICEF and the World Health Organization report that in rural areas only 83% of the population has access to improved water sources, and only 22% have adequate sanitation (2010). Compared to most countries of India's status, these numbers are severely lagging. With a large portion of the country living in such environments, it's no surprise that India is currently faced with such health issues as high rates of diarrhea, communicable diseases, infections, and other highly preventable conditions.

Insufficient education has also been studied as a major contributor to health problems in India. Without proper education a significant portion of the population remains unaware of many prevalent illnesses and common ways to treat or prevent them, even those that can be avoided with as simple measures as nutrition and proper hygiene (Paasche-Orlow et. al, 2007). Effects of this "medical illiteracy" are significantly more pronounced with the poor, where many of these conditions are simply ramifications of their daily ways of life. Consequently, there are numerous deaths each year from easily preventable conditions such as infected wounds, parasites, and improper use of medication.

Further, India is home to the largest population of illiterates in the world. Only 66% of the population is literate, which is significantly lower than the world average of 84% (UNICEF, 2010). Though this percentage has greatly increased from the time of British rule, these numbers have only sluggishly increased in the past decade. As a measure of general education, these high rates of illiteracy translate into the majority of the population lacking the human capital to acquire adequate jobs and social status, leading to comparatively difficult lifestyles and effectively, reduced health. Improvements in education, specifically on basic education to illiterates and the poor, can have an astounding impact on the overall health of India.

Location has also been highly debated. A staggering 70% of India's population resides in rural areas (Ratna, 2007). With only a fifth of India's medical clinics and doctors located in such areas it's easy to see how these resources are severely strained. Further, with the majority of these rural clinics being publicly funded, only the most basic healthcare is provided due to limitations in funding and resources. Thus, in areas where people are arguably more prone to illness and disease exist relatively inadequate health resources. More specifically, because the majority of India's poor live in these locations, transportation to higher quality medical clinics can also create an obvious problem. With the poor already struggling to afford shelter, food, and other living expenses, it may not be imperative for them to spend additional money on making trips to these health clinics. Though transportation has been quickly developing in urban areas, it is almost non-existent outside city limits. Rural residents are forced to take relatively costly motives from distant locations

compared to urban residents who can simply take a lucrative autorickshaw or bus ride. In addition to health resources, several other factors such as availability of water, food, and shelter are also limited in rural areas. Improving the access to and concentration of medical facilities and resources in rural India could have a profound impact on India's health.

Throughout the past few decades, the Indian government has made many attempts to alleviate India's health problems; specifically the one's mentioned above. First, through the National Health Policy of 1983, India's government aimed to expand healthcare to all citizens by year 2000, improve its infrastructure for primary health, and improve many aspects of healthcare such as vaccinations, research, and medical training (World Health Organization). Yet, almost 30 years later, few of these goals have been adequately met and India especially continues to struggle with the policy's main goal, healthcare for all citizens. As mentioned earlier, though there have been drastic improvements in training, technology, and other resources, the effects have been minimal and confined. In 2002, the National Health Policy was revised, focusing more on "an acceptable standard of good health among the general population", which has arguably yet to be accomplished, especially due to the harsh inequality of healthcare available between the poor/rural and non-poor/urban populations (World Health Organization). Other policies include the 73<sup>rd</sup> and 74<sup>th</sup> Constitutional Amendments, which focus on improving India's sanitation, poverty issues, drinking water, and family health. Common criticisms of these initiatives include the severe lack of funding, limited scope in regards to the diverse socioeconomic spread of India, and negligence of the inequalities between

regions (Banerji, 1983). Improvements are being made, but it appears the focus of these policies have failed to target the underlying issues. Though these government actions have brought much needed attention to India's health issues, they have only made marginal advances and have considerable room for improvement, which furthers the question, what areas can be focused on to more effectively alleviate India of its health issues?

Though causal relationships between many of these mentioned factors and personal health can be explained, it's not always the case that improving these factors will have a positive impact on health in practice. With personal health being subject to numerous influences and aspects of life, direct relationships are rarely so clear. So how can we figure out where to target certain policies to effectively improve the health of Indian citizens? This study will hopefully uncover plausible targets, if any, by utilizing multivariable regressions encompassing many of the aforementioned variables from data provided by the India Human Development Survey, 2005. Variables covering economic and domestic factors from Individual and Household datasets will be employed to uncover the relationship between Personal Health, Income, Education, Location, and Resources. In addition, to study the relationships affecting the resources available to health clinics, variables covering Available Health Services, Location, Funding, and Clinic Type will be studied. Overall, we find that specific economic and domestic factors can have a significant impact on personal health, but clear trends and causal relationships were unclear across different measures of personal health, specifically illnesses. Health clinic resources, however, showed

strong trends in terms of funding and clinic type.

## **Literature Review**

India's persistent and widespread healthcare issues have been a source of considerable research and debate over the years. For a country with such a growing economy and advanced society, the health issues facing India are surprising and in some aspects comparable to far less developed countries. Studying which factors contribute to India's health dilemma has provided much insight into developmental and health issues across the world, specifically in many other emerging countries.

Much research has been done regarding the distribution and funding of health resources throughout India. As noted earlier, though India's healthcare industry has experienced considerable growth throughout the past decades, health resources still appear to be limited. However, a comparative socio-economic study by Dr. Milind Deogaoknar shows that overall healthcare resources in India should be "ample" enough to sustain a reasonable level of health throughout the population, especially in light of significant improvements in the number of hospitals and medical professionals across the country. He argues that the problem lies in the allocation of resources, with the ratio of doctors to population six times lower in rural areas than urban areas. Further, out of the 6% of the GDP focused on healthcare, only a mere 17% is comprised of state spending while the remaining 82% comes from "out of pocket" payments from the people, hinting at the severe underfunding of public healthcare in India

(Deogaonkar, 2004). These two factors combined create an extremely inefficient healthcare system, leading to much of the inadequacies experienced by the people and the large difference in medical care received by the upper and lower classes. In another study by the World Bank of India, Jishnu Das and Jeffrey Hammer analyze the relationships between effort, competence, and hospital funding in Delhi, India. An intriguing pattern in their data reveals that in the public sector, education subsidies and salary payments had inconsequential effects on the effort and quality of care provided by healthcare professionals, which already lag behind that in the private sector, suggesting the lack of competence and discipline inherent in publicly funded health facilities (Das and Hammer, 2006). This discrepancy only worsens many of the shortcomings experienced by rural populations where almost 80% of health resources are publicly funded.

Extensive research on the effects of poverty on general health has been performed in India as well as in many other developing countries due to its widespread impact and prevalence. A study by the World Health Organization analyzing the underlying causes of health inequalities supports the commonly held idea that the poor are usually worse off in terms of health than the non-poor, usually due to community issues, such as education and location, as well as the inability to pay for health services. Further, they go on to show that in most developing countries, a prevalent issue is that the poor are inadequately focused on by publicly financed healthcare, a problem seen throughout India's healthcare system. The WHO concludes that to eliminate inequalities in healthcare, policies must focus on both improving the availability of health resources as well as improving income, knowledge, medical literacy, and environmental factors

(Wagstaff, 2002). Studies in other countries further support these findings. In a study by Haan et. al, a random sample of residents in Oakland, California were examined to show that residents of poor areas experienced higher mortality rates than residents of non-poor areas, even when adjusted for age, race, sex, baseline health, insurance, and behaviors. They conclude that the community environment of the poor plays a key role in the association between low socioeconomic status and excess mortality (Haan et al.). Thus, in order to address the problem of poverty, a wide range of issues must be addressed.

Research has also been done relating the level of education to health, another commonly accepted relationship in many developing countries. A study by Dr. Catherine Ross and Dr. Chia-ling Wu, using multiple regression analysis of data from the National Survey of Personal Health Practices and Consequences, takes a thorough look at the causal links between health and education. They find that higher levels of education improve health through three main relationships: 1) work and economic conditions, including employment and income 2) social-psychological resources, including confidence and social status and 3) health life style, including smoking, drinking, and use of health services (Ross and Wu, 1995). Their findings suggest the complex and compelling influence education can have on one's health, as well as the importance of improving the dire education levels in India. Education not only directly improves health by increasing awareness of medical conditions, but also by creating better lifestyles.

With location being a unique issue in India, as seen with its high population density in rural areas, significant research has been focused on unraveling the relationship between medical care and location. One focus has

been on the quality of medical professionals in relation to location. A study in Delhi, India revealed that as one moves from low to mid income communities, the average competence of medical professionals increased by 0.5 standard deviations, and 1.0 standard deviations as one moves from low to high income communities (Das and Hammer, 2007). Further, a study on Nigeria by the Department of Geography in Ontario, Canada showed that patients in rural third world countries, similar to rural citizens in India, tend to delay utilizing clinics at greater distances while opting for more traditional forms of medicine especially when faced with limited transportation such as bicycles and walking (Stock, 1983). These studies reveal the drastic effects location can have on one's access to quality healthcare, especially in a country like India where a considerable gap separates urban from rural.

In general, research seems to support the significant influence education, poverty, location, and access to resources can have on personal health. However, few studies have analyzed the relative impacts of these factors in order to show which factors can be focused on to have a greater impact. With India suffering from a combination of the several issues mentioned already, it's important to pinpoint specific areas to focus on with policy.

## **Methodology**

The models used to describe personal health and health clinic resources consist of several accepted health indicators as determined by the World Health Organization. This was done to create as accurate a model as possible with the greatest relevance to India's current health situation. Further, variables that



could potentially be the source of policy were focused on to support the goal of the study. Several variables were selected as dependent variables in both models to assess the effect of independent variables across a wide array of measures for personal health and health clinic resources. Ideally, this will lead to a deeper and more accurate understanding of interrelationships between the variables.

Common trends can be examined and underlying causes can be unveiled. When selecting appropriate variables, correlations between variables were studied as to avoid any colinearity amongst variables. For example, amongst variables describing education, the correlation coefficient between LIT and STANDARDS was 0.6883 revealing a strong correlation between the two variables. Therefore, one was selected out of the two in order to avoid colinearity in the model.

To study the factors affecting personal health, we conceptualize Personal Health ( $HEALTH_P$ ) as a function of four topics, Education ( $E$ ), Location ( $L$ ), Income ( $I$ ), and Resources ( $R$ ):

$$HEALTH_P = f(E, L, I, R) \quad (1)$$

In order to study the influence of selected variables for each topic, multivariable OLS regressions were performed, revealing the weight of impact and directionality of each variable through its coefficient as well as the significance, provided by its t-value and p test. To compensate for possible outliers in the data, which are common in large survey data sets, the robust option was incorporated to adjust for any bias that may exist. Regression coefficients, t-values, and p tests were analyzed to determine which variables most significantly influence personal health and the direction of impact. The empirical model was estimated:

$$Y_{personal\ health} = \beta_1 E + \beta_2 L + \beta_3 I + \beta_4 R + \varepsilon \quad (2)$$

where  $\beta_n$  notes the respective regression coefficient and  $\varepsilon$  notes the error term of the regression.

To study the factors affecting resources available to health clinics throughout India, similar steps were taken. We conceptualized Health Clinic Resources ( $RESOURCE_c$ ) as a function of Funding Source ( $F$ ), Location ( $L_c$ ), and Medical Practice Type ( $M$ ):

$$RESOURCE_c = f(F, L_c, M)$$

Multivariable OLS regressions were then performed, and the regression coefficients, t-values, and p tests were similarly analyzed to determine which variables most significantly influence Health Clinic Resources and the direction of impact. The empirical model was estimated:

$$Y_{clinic\ resources} = \beta_1 F + \beta_2 L_c + \beta_3 M + \varepsilon_c$$

By analyzing regression statistics for both models, potential targets for effective health policy were analyzed. Significance was measured at the 1%, 5%, and 10% levels, allowing a comparison to be made about which variables contributed most to personal health and health clinic resources in their respective models.

Dependent variables describing personal health consisted of two groups: “Illness” and “Treatment”. “Illness” was described by the number of days ill in the past month and the presence of fever, cough, diarrhea, STDs, and heart disease. This group was designed to study what factors determine the actual health of an individual. “Treatment” was described by medical expenses, confidence in the medical system, and whether or not treatment was pursued. This group was designed to study what factors determine an individual’s ability to acquire medical care. Together they provide a more holistic depiction of personal health.

The analysis on Health Clinic Resources was included to further study the impact of location and resources on personal health since clinics and facilities are a key method through which the government influences healthcare.

To clarify analysis of logit regression, odds ratios were generated. These can be interpreted as the odds of the dependent variable happening. For example, if the odds ratio of a independent variable is 1.94, it can be interpreted as the presence of the independent variable increasing the presence of the dependent variable by a factor of 1.94.

## **Data**

The Indian Human Development Survey (IHDS) was the primary source of data for this study. The IHDS began as an extensive multi-topic survey of over 41,000 households in 1503 villages and 971 urban neighborhoods across India. Data was collected through two hour-long interviews per household covering issues of health, education, economic status, employment, marriage, fertility, gender relations, and social capital. Years later the survey was expanded to cover exhaustive information describing villages, schools, and medical facilities. The Medical Facilities survey, which was also incorporated into this study, covers issues of funding, location, facility types, services provided, and physical characteristics of medical facilities throughout India. The database was created through collaboration from the University of Maryland, the National Council of Applied Economic Research in New Delhi, and the National Institutes of Health

For this study specifically, Personal Health analysis utilized combined data from the Individual and Household databases, while the Health Clinic Resources

analysis utilized data from the Medical Facilities database. Survey style data was convenient for this study because it combines personal accounts into a populational representation. It allows us to differentiate and study the impact of individual characteristics on several dependent variables in order to reveal certain trends throughout the population. The enormous size of the data set also provides a holistic depiction of various facets of the population, ranging from lower class, rural citizens to upper class, urban citizens as well as representation from all different races, states, and backgrounds. Summary statistics are presented in **Table 1**, and by studying the ranges and standard deviations of variables describing income class, education, and household resources, it's evident that a wide representation of the population is included in these models.

A large portion of the variables utilized from this the IHDS were converted into dichotomous/dummy variables in order to incorporate them into the regression models. Data used in regressions was self-selecting as regression commands in STATA use listwise deletion of missing data. Thus, for all the individuals and health clinics incorporated into this study, data for all variables was provided.

## **Results**

**Table 2** presents the regression outputs of several relevant independent variables on measures of personal health/illness, including the number of days ill in the past month, fever, cough, diarrhea, STDs, and heart disease. **Table 3** presents the regression outputs of several independent variables on personal health/medical care, including medical expenditures, confidence in the medical

system, and whether or not treatment was pursued. **Table 4** presents regressions outputs of several independent variables on the resources available at health clinics, including treatment, staff, and medical supplies. Coefficients resemble the effects, both in magnitude and direction, of incremental increases in the independent variable on the dependent variable. For dummy variables this simply translates into the effect of the presence of the independent variable on the dependent variable. Robust standard errors are presented in parentheses below the coefficients and levels of significance are noted with asterisks. R-squared values are presented at the bottom of the tables.

As shown in **Table 2**, we find that many of the independent variables have a significant influence on personal health with varying degrees of impact, as notified by their respective coefficients and significance levels. By just studying the regression for DAYSILL, an overall indicator of personal health, we can see that household resources, such as water, sanitation, and electricity seem to play the most influential role as they have the largest coefficients as compared to the other significant variables, of which most are also dichotomous variables. Education, specifically adult literacy, Location, and income levels also seem to play substantial roles, but with less of an impact. For most of these significant variables, relationships support previous studies in terms of the directional relationships they have. Outputs for specific illnesses were less conclusive. For the regressions describing common illnesses like FEVER and COUGH, the only consistent factors that contributed significantly were the presence of daily meals, location, and sanitation. Other significant variables did not follow expected directional relationships. With less common illnesses such as DIARRHEA, STDs,

and HEARTDIS, the findings were less conclusive. The only variable that was consistently influential was household electricity. Other significant variables showed no consistent influence over the three dependent variables, and often contradicted logical and proven relationships. In addition, it was interesting to see that government income and health insurance had relatively insignificant impacts on health across all dependent variables. Ultimately, across all dependent variables describing personal health/illness, it appears that household resources, location, and education have the widest significant influence, with household resources having the greatest impact.

As seen in **Table 3**, significant relationships were much less consistent between independent and dependent variables. Many described relationships contradicted previous studies, but important findings exist. By focusing on the regressions for MEDTREAT and MEDEXPRS, several relationships stand out, specifically those describing location. The coefficients for TREATVILLAGE explain the higher use of healthcare with proximity to health clinics as well as the decrease in money spent acquiring care. RURAL explains the increase in medical spending, including travel costs, associated with rural locations. Other significant variables showed no relevant findings.

**Table 4** presents the regression outputs of several independent variables on health resources in clinics, as measured by the number of beds, number of employees, understaffing, and the availability of immunizations, saline IVs, prenatal care, childbirth, and Penicillin. Several key relationships appear consistently. Between public and private hospitals, it's evident that private hospitals provide significantly more health services than public hospitals as seen

by the larger coefficients for PRIVHOSP across all resources. In addition, government funding allows hospitals to provide significantly more health resources, ranging from the number of beds and employees to vaccinations. This can be observed by comparing the coefficients of GOVFUND to RELFUND and CHARFUND in all the regressions. The effect of DIST, the distance of a clinic from the district hospital, was insignificant for most health resources. The type of medicine practiced, ALLOPATHIC vs. AYURVEDIC, also had profound affect on health resources across all variables, with allopathic medical facilities providing more abundant capital. Most these findings seem to support previous research and general causality.

## **Discussion**

As observed from the regression results, there are certain factors that seem to contribute most to personal health, allowing us to potentially refine India's health policy. From the regressions describing personal health/illness in **table 2**, health resources, location, and education seem to have the most influential impact on health, with health resources having the greatest effect as determined by the coefficients. From the regressions describing personal health/medical care in **table 3**, location seemed to be the most important factor in determining whether or not people pursue treatment. These findings have many implications. As India's government continues its attempt to eradicate many of India's health issues, they should focus more resources on improving public issues such as water availability, sanitation, and electricity, problems that have existed for decades. On a more household focus, the prevalence of certain household

appliances should be focused on, perhaps providing subsidies on refrigeration and bedding to the large poor population. A larger issue, location, obviously needs more focus but is a difficult problem to approach. As India continues to expand its infrastructure, more focus needs to be placed on equalizing the concentration of health clinics and general resources between rural and urban areas. Due to the severe lack of funding India has allocated to health issues, efficiency must be stressed. Focusing on the more influential aspects of health should be prioritized in order to have the greatest impact.

Regression results for health clinic resources provided a clearer picture. Several themes were prevalent throughout and gave strong support to previous studies that showed the greater relative availability of resources in private hospitals and clinics supported by government funds. Further the idea that rural location negatively affected availability of resources was supported by studying regression coefficients of SUBCENTRE, which represents divisions of larger clinics located in less populated areas. These results provide considerable insight for public policy due to the fact that there is a severe inequality between public and private hospitals in India. With 80% of clinics in rural areas being publicly funded, a drastic shortage of medical resources is present in clinics located in areas that already face strained health resources. Effective policy-making should therefore be focused on equalizing the distribution of public and private hospital, perhaps even allocating the majority of private funds to rural areas.



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**Table 1: Summary Statistics of Independent and Dependent Variables**

<b>Variables</b>	<b>Description</b>	<b>Obvs.</b>	<b>Mean</b>	<b>Std Dev.</b>
STANDARDS	Standards completed 1-12	215754	4.63804	4.6871
ADULTLITERACY	Literate adult in household?	215453	0.81257	0.3903
HEADEDU	Education of head of household	215747	3.47352	12.708
INCOMECLASS	Income Class 1-5	215751	3.24668	1.4582
HEALTHINSURANCE	Health insurance?	215754	0.29654	0.1696
GOVINCOME	Amount (Rp) received from government	215749	138.644	4972.2
INSURANCEPREMIUM	Amount (Rp) paid in insurance premiums	215754	1084.67	3651.8
TREATVILLAGE	Treatment Center in village?	215754	0.47245	0.4992
TREATTRAVCOST	Cost of travel for treatment (travel, boarding etc.)	25506	22.3884	118.65
URBANSLUM	Located in urban slums?	215754	0.01798	0.1329
RURAL	Located in rural areas?	215754	.6706944	0.47
DRINKWATER	Household has access to drinking water?	215754	0.43889	0.4963
HOUSEWATER	Household has plumbing?	215754	0.53142	0.5012
NOTOILET	No toilet/latrine?	215754	0.54077	0.4983
WASHHAND	Wash hands regularly?	215754	0.98943	0.1023
HOUSEELEC	Electricity In household?	215754	0.76901	0.4372
REFRIG	Refrigerator/cooler in household	215106	0.17727	0.3819
AIRCOOL	Aircooler in household?	215141	0.13862	0.3456
BEDDING	Propper bedding in household?	215442	0.8637	0.3431
VEGRS	Amount (Rp) spent on vegetables in past month	215754	236.425	244.6
FRUITRS	Amount (Rp) spent on fruits in past month	215754	76.2917	139.17
DAILYMEALS	Daily meals?	215754	2.82583	0.9298
PERSCARERS	Amount (Rp) spent on personal care	215754	16.464	75.381
TOILRS	Amount (Rp) spent on Toiletries	215754	73.5308	91.56
MEDEXPRS	Amount (Rp) spent on medical treatment/supplies	215754	266.131	789.93
NPERSONS	Numper of people in household	215754	6.38417	3.1266
MEDCONFIDENCE	Confidence in medical system (1-3)	215290	1.41929	0.6985
AGE	Age	215754	27.3466	19.348
SEX	Male?	215754	1.49106	0.4999
MARRIED	Married?	215754	0.4551	0.498
DAYSILL	Number days ill in past month	25506	4.25876	5.5072
FEVER	Fever in past month?	25506	0.86956	0.3368
COUGH	Cough in past month?	25506	0.69341	0.4611
DIARRHEA	Diarrhea in past month?	25506	0.20238	0.4018
STD	STD, HIV, AIDS?	13018	0.06614	0.4044
HEARTDIS	Heart Disease?	13018	0.06614	0.5132
MEDTREAT	Medical treatment in last month?	25506	0.94327	0.2313

**Table 2: Impact on Personal Health as Measured by Illnesses**

VARIABLES	(1) DAYSILL	(2) FEVER	(3) COUGH	(4) DIARRHEA	(5) STD	(6) HEARTDIS
STANDARDS	-0.0217** (0.00845)	-0.00397 (0.00494)	-0.0344*** (0.00367)	-0.0447*** (0.00473)	-0.0154 (0.0166)	0.0102 (0.0148)
ADULTLITER ACY	-0.241** (0.0954)	-0.159*** (0.0530)	0.0843** (0.0370)	0.0600 (0.0415)	-0.0814 (0.157)	-0.0848 (0.146)
HEADEDU	0.000127 (0.00278)	-0.000496 (0.00152)	0.00160 (0.00116)	-8.90e-05 (0.00128)	-0.00130 (0.00530)	-0.000457 (0.00480)
INCOMECLAS S	-0.126*** (0.0297)	-0.00271 (0.0164)	0.0126 (0.0120)	-0.0399*** (0.0140)	-0.0413 (0.0480)	0.00725 (0.0436)
HEALTHINSU RANCE	-0.133 (0.179)	-0.105 (0.111)	-0.00206 (0.0886)	-0.242** (0.121)	0.601* (0.331)	0.704** (0.301)
GOVINCOME	-2.37e-06 (2.19e-06)	2.73e-07 (2.94e-06)	-1.12e-06 (2.01e-06)	-3.27e-06 (4.61e-06)	-3.15e-05 (5.26e-05)	-1.09e-05 (1.75e-05)
INSURANCEP REM	-5.63e-06 (8.57e-06)	-1.68e-05*** (5.37e-06)	-5.13e-06 (4.60e-06)	1.09e-05* (5.59e-06)	5.82e-06 (1.85e-05)	9.43e-06 (1.60e-05)
TREATVILLA GE	-0.205*** (0.0748)	-0.130*** (0.0393)	-0.0506* (0.0286)	-0.156*** (0.0331)	0.128 (0.118)	0.0387 (0.107)
TREATTRAVC OST	0.00700*** (0.00173)	0.000790** (0.000307)	-8.09e-05 (0.000115)	0.000245** (0.000118)	-4.82e-05 (0.000512)	0.000103 (0.000436)
URBANSLUM	0.408 (0.258)	0.0997 (0.145)	-0.213** (0.107)	0.0597 (0.136)	0.602 (0.455)	0.294 (0.452)
RURAL	-0.147* (0.0864)	0.288*** (0.0493)	0.0685* (0.0375)	-0.0597 (0.0450)	0.0521 (0.153)	-0.0658 (0.137)
DRINKWATER	-0.241*** (0.0772)	0.00638 (0.0440)	0.00330 (0.0326)	-0.278*** (0.0400)	-0.444*** (0.134)	-0.352*** (0.121)
HOUSEWATE R	-0.213*** (0.0756)	0.0620 (0.0425)	0.374*** (0.0313)	0.253*** (0.0359)	0.128 (0.126)	0.151 (0.114)
NOTOILET	0.401*** (0.0824)	-0.162*** (0.0476)	-0.133*** (0.0351)	-0.0340 (0.0409)	0.0898 (0.143)	-0.0504 (0.129)
WASHHAND	-0.425 (0.510)	-0.103 (0.247)	0.624*** (0.160)	0.0358 (0.198)	-0.380 (0.548)	-0.282 (0.516)
HOUSEELEC	-0.396*** (0.0872)	0.0254 (0.0479)	-0.0710** (0.0344)	-0.565*** (0.0373)	0.517*** (0.153)	0.198 (0.137)
REFRIG	-0.354*** (0.104)	0.112* (0.0670)	0.144*** (0.0514)	-0.285*** (0.0659)	-0.358* (0.210)	-0.289 (0.182)
AIRCOOL	-0.198* (0.105)	0.157** (0.0697)	-0.124** (0.0515)	-0.0573 (0.0652)	0.734*** (0.202)	0.530*** (0.185)
BEDDING	-0.242** (0.106)	0.0244 (0.0554)	-0.117*** (0.0410)	-0.128*** (0.0467)	0.0562 (0.172)	-0.0705 (0.156)
VEGRS	-2.60e-06 (0.000122)	-0.000113* (6.38e-05)	-7.50e-05 (5.59e-05)	0.000227*** (5.90e-05)	-8.00e-05 (0.000215)	-4.25e-05 (0.000191)
FRUITRS	-	-3.60e-05	7.01e-05	0.000112	0.000194	0.000752

	0.000600***					
	(0.000225)	(0.000155)	(0.000133)	(0.000151)	(0.000449)	(0.000507)
DAILYMEALS	-0.000707	-0.273***	-0.242***	-0.0496**	0.0895	0.155**
	(0.0475)	(0.0276)	(0.0204)	(0.0230)	(0.0858)	(0.0780)
PERSCARERS	0.000140	-0.000741**	-0.000216	0.00132***	-0.00105	-0.000239
	(0.000464)	(0.000303)	(0.000262)	(0.000285)	(0.00126)	(0.000950)
TOILRS	0.000699	-0.00100***	0.000535*	-0.000606**	-1.68e-05	-0.00109
			*			
	(0.000449)	(0.000261)	(0.000250)	(0.000309)	(0.00117)	(0.00107)
MEDEXPRS	0.000769***	9.05e-05***	0.000132*	4.16e-05**	-0.000106	-1.52e-05
			**			
	(7.93e-05)	(2.91e-05)	(2.12e-05)	(1.95e-05)	(7.07e-05)	(5.59e-05)
NPERSONS	0.0722***	0.0128*	0.00699	0.0331***	-0.0197	0.0275
	(0.0135)	(0.00765)	(0.00571)	(0.00621)	(0.0249)	(0.0217)
MEDCONFIDENCE	-0.0415	-0.0632**	0.0877***	0.253***	-0.233***	-0.149**
	(0.0487)	(0.0262)	(0.0193)	(0.0220)	(0.0799)	(0.0714)
AGE	0.0451***	0.000104	0.000425	-0.00508***	-	-0.00278
					0.00781**	
					*	
	(0.00261)	(0.00126)	(0.000911)	(0.00111)	(0.00290)	(0.00261)
MARRIED	0.00872	-0.0419	-0.166***	0.00316	-0.0579	-0.129
	(0.107)	(0.0536)	(0.0386)	(0.0480)	(0.125)	(0.113)
SEX	-0.200***	0.0620	-0.120***	-0.167***	-0.0256	-0.0423
	(0.0686)	(0.0382)	(0.0282)	(0.0327)	(0.118)	(0.107)
Constant	4.522***	2.800***	0.909***	-0.719***	-0.681	-0.864
	(0.559)	(0.285)	(0.190)	(0.230)	(0.707)	(0.658)
Observations	25,339	25,339	25,339	25,339	2,074	2,074
R-squared	0.085	0.015	0.020	0.051	0.034	0.022

Table 2A: Odds Ratios for Logit Regressions of Dichotomous Variables

VARIABLES	FEVER	COUGH	DIARRHEA	STD	HEARTDIS
STANDARDS	.9960	.9662	.9562	.9848	1.010
ADULTLITERACY	.8528	1.0880	1.0619	.9218	.9187
HEADEDU	.9995	1.0016	.9999	.9987	.9995
INCOMECLASS	.9973	1.0126	.9609	.9596	1.0073
HEALTHINSURANCE	.9007	.9979	.7848	1.8248	2.021
GOVINCOME	1.0000	.9999	.9999	.9999	.9999
INSURANCEPREM	.9999	.9999	1.0000	1.0000	1.0000
TREATVILLAGE	.8779	.9507	.8558	1.1370	1.0395
TREATTRAVCOST	1.0008	.9999	1.0002	.9999	1.0001
URBANSLUM	1.1048	.8081	1.0616	1.8255	1.3420
RURAL	1.3332	1.0709	.9420	1.0534	.9364
DRINKWATER	1.0064	1.0033	.7570	.6412	.7031
HOUSEWATER	1.0639	1.4509	1.2875	1.1368	1.1634
NOTOILET	.8504	.8753	.9665	1.0939	.9509
WASHHAND	.9020	1.8671	1.0364	.6835	.7544
HOUSEELEC	1.0257	.9315	.5681	1.6769	1.2185
REFRIG	1.1183	1.1554	.7517	.69912	.7492
AIRCOOL	1.1694	.8833	.9443	2.0844	1.6987

<b>BEDDING</b>	1.0247	.8893	.8798	1.0578	.9319
<b>VEGRS</b>	.9999	.9999	1.0002	.9999	.9999
<b>FRUITRS</b>	.9999	1.0000	1.0001	1.0002	1.0008
<b>DAILYMEALS</b>	.7607	.7854	.9516	1.0936	1.1672
<b>PERSCARERS</b>	.9993	.9998	1.0013	.9989	.9998
<b>TOILRS</b>	.9990	1.0005	.99939	.9999	.9989
<b>MEDEXPRS</b>	1.0000	1.0001	1.0000	.9989	.9999
<b>NPERSONS</b>	1.0129	1.0070	1.033	.90804	1.0279
<b>MEDCONFIDENCE</b>	.9388	1.0916	1.2880	.7924	.8612
<b>AGE</b>	1.0001	1.0004	.9949	.9922	.9972
<b>MARRIED</b>	.9589	.8469	1.0031	.9438	.8791
<b>SEX</b>	1.0639	.8868	.8462	.9747	.9585

**Table 3: Impact on Personal Health/ Medical Care**

VARIABLES	(1) MEDTREAT	(2) MEDCONFIDENCE	(3) MEDEXPRS
STANDARDS	-0.00296*** (0.000390)	-0.000460 (0.00117)	4.011*** (1.475)
ADULTLITERACY	0.00473 (0.00397)	-0.0268** (0.0131)	-23.65* (12.72)
HEADEDU	6.94e-05 (0.000103)	-0.000285 (0.000356)	0.501 (0.363)
INCOMECLASS	-0.00215* (0.00123)	-0.00154 (0.00394)	-2.352 (4.648)
HEALTHINSURANCE	-0.00733 (0.00886)	0.0211 (0.0277)	-55.23** (28.14)
GOVINCOME	-2.70e-07 (3.22e-07)	-3.54e-07 (4.38e-07)	0.000252 (0.000422)
INSURANCEPREM	5.75e-07 (3.95e-07)	6.43e-06*** (1.47e-06)	0.00326* (0.00170)
TREATVILLAGE	0.0248*** (0.00308)	0.0135 (0.00939)	-51.63*** (10.52)
TREATTRAVCOST	8.77e-05*** (2.37e-05)	1.40e-05 (3.26e-05)	0.742*** (0.205)
URBANSLUM	-0.0128 (0.0122)	-0.104** (0.0431)	-70.79** (28.93)
RURAL	0.0132*** (0.00401)	-0.129*** (0.0123)	28.63** (13.08)
DRINKWATER	-0.000102 (0.00330)	-0.0763*** (0.0103)	-5.199 (12.85)
HOUSEWATER	0.00961*** (0.00319)	0.0351*** (0.0101)	-3.588 (10.93)
NOTOILET	0.0261*** (0.00379)	-0.0113 (0.0115)	2.864 (12.45)
WASHHAND	-0.0130 (0.0180)	-0.0569 (0.0587)	30.98 (46.23)
HOUSEELEC	0.0559*** (0.00446)	-0.113*** (0.0118)	63.19*** (11.07)
REFRIG	0.00104 (0.00475)	0.0119 (0.0156)	-10.78 (19.09)

AIRCOOL	0.0205*** (0.00423)	-0.0847*** (0.0150)	-4.644 (20.73)
BEDDING	0.00787 (0.00480)	0.00830 (0.0146)	71.58*** (12.15)
VEGRS	-3.31e-06 (5.57e-06)	7.76e-05*** (2.26e-05)	0.0981*** (0.0223)
FRUITRS	3.07e-05*** (9.18e-06)	-5.27e-05 (3.25e-05)	0.211*** (0.0584)
DAILYMEALS	-0.0121*** (0.00215)	-0.0339*** (0.00634)	8.418 (6.177)
PERSCARERS	4.79e-06 (2.39e-05)	6.09e-05 (7.62e-05)	0.190* (0.0979)
TOILRS	6.51e-05*** (1.80e-05)	-0.000293*** (7.33e-05)	0.258*** (0.0842)
MEDEXPRS	1.40e-05*** (1.63e-06)	2.69e-05*** (6.00e-06)	
NPERSONS	0.00133** (0.000530)	0.0157*** (0.00186)	16.40*** (1.943)
MEDCONFIDENCE	-0.000656 (0.00206)		31.42*** (7.288)
AGE	-7.08e-05 (9.47e-05)	-0.000728** (0.000304)	0.536 (0.346)
MARRIED	0.00260 (0.00431)	0.0243* (0.0128)	13.78 (14.53)
SEX	-0.00770*** (0.00291)	-0.00148 (0.00925)	-17.54* (9.952)
Constant	0.903*** (0.0205)	1.722*** (0.0672)	36.84 (55.50)
Observations	25,339	25,339	25,339
R-squared	0.027	0.022	0.031

**Table 4: Impact on Health Clinic Resources**

VARIABLES	(1) NUMBEDS	(2) CHILDIM MUN	(3) SALINEIV	(4) PRENATC ARE	(5) CHILDBIR TH	(6) PENICILI N	(7) NUMEM PLOY	(8) NUMUNDE MPLOY
PUBLICHOSP	63.78*** (2.733)	-0.813*** (0.208)	0.109 (0.186)	-0.107 (0.182)	0.464*** (0.161)	0.330** (0.150)	30.33*** (1.762)	3.794*** (0.353)
PRIVHOSP	17.98*** (2.580)	1.602*** (0.136)	1.203*** (0.177)	1.412*** (0.137)	2.054*** (0.139)	0.336*** (0.127)	10.12*** (1.664)	-0.00694 (0.333)
SUBCENTRE	-12.05*** (2.759)	-0.457* (0.241)	-1.506*** (0.149)	-1.079*** (0.155)	-0.692*** (0.139)	-1.575*** (0.145)	-13.47*** (1.779)	-2.379*** (0.356)
ALLOPATHIC	9.746*** (2.395)	2.250*** (0.206)	1.905*** (0.144)	0.755*** (0.146)	1.811*** (0.211)	1.524*** (0.162)	6.928*** (1.545)	0.687** (0.309)
AYURDEVIC	0.462 (1.714)	-0.738*** (0.114)	-0.222** (0.0954)	-0.497*** (0.0943)	-0.541*** (0.107)	-0.504*** (0.0879)	0.695 (1.106)	-0.0480 (0.221)
GOVFUND	11.48*** (1.621)	3.819*** (0.134)	1.160*** (0.100)	2.361*** (0.0995)	2.399*** (0.0959)	0.866*** (0.0828)	13.55*** (1.045)	2.881*** (0.209)
RELFUND	14.64**	-0.0293	-0.601*	-0.142	0.860**	0.177	7.326**	0.354

	(5.792)	(0.337)	(0.321)	(0.312)	(0.340)	(0.295)	(3.735)	(0.747)
CHARFUND	0.927	-0.258	0.690***	-0.255*	0.0945	0.0138	0.219	0.0695
	(2.806)	(0.168)	(0.174)	(0.149)	(0.170)	(0.139)	(1.809)	(0.362)
DIST	-0.121***	-0.000989	0.00635***	0.000989	0.00499***	0.00225**	-	-0.00230
							0.0732***	
Constant	(0.0208)	(0.00143)	(0.00131)	(0.00120)	(0.00122)	(0.00107)	(0.0134)	(0.00268)
	-4.012	-3.119***	-1.418***	-1.203***	-3.372***	-1.642***	-1.584	-0.386
	(2.647)	(0.225)	(0.161)	(0.159)	(0.230)	(0.172)	(1.707)	(0.341)
Observations	3,777	3,777	3,777	3,777	3,777	3,777	3,777	3,777
R-squared	0.195	0.4105	0.1260	0.2509	0.2487	0.0883	0.176	0.122

**Table 4A: Odds Ratios for Logit Regressions of Dichotomous Variable**

Variables	CHILD IMMUN	SALIN EIV	PRENA TCARE	CHILD BIRTH	PENI CILIN
PUBLICHOSP	.4432	1.1155	.8988	1.5911	1.3904
PRIVHOSP	4.963	3.3302	4.1056	7.7959	1.3987
SUBCENTRE	.6331	.2217	.3400	.5007	.2070
ALLOPATHIC	9.4919	6.7195	2.1274	6.1161	4.5920
AYURDEVIC	.4779	.8013	.6084	.5824	.6041
GOVFUND	45.5452	3.1887	10.5997	11.012	2.3777
RELFUND	.9711	.5482	.8672	2.3627	1.1937
CHARFUND	.7722	1.9933	.7751	1.0992	1.0139
DIST	.9990	1.0063	1.0010	1.0050	1.0022