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Community Needs Assessment of Mayasandra Village, Karnataka, India

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Capstone

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Introduction

On December 31, 2009 University of Kentucky Shoulder to Shoulder Global (UK STSG) director Dr. Thomas Young led a small exploratory medical brigade to India. The brigade, consisting of five UK pediatric faculty and six pediatric residents, provided free medical treatment to children in Mayasandra during a health fair day and collected data to conduct a needs assessment of the population. The visit was part of STSG's exploration of potential sites for a permanent clinic.

With the assistance of community members and nurses from the Bangalore Hospital, 419 children were examined and treated during a one day clinic. Nurses, bilingual in Kannada and English, administered surveys while physicians and residents diagnosed and treated children. Volunteer students from Bangalore addressed language and literacy barriers by acting as interpreters and data takers. Attending doctors noted high levels of developmental issues, chronic diseases and respiratory disorders. Due to the high prevalence of disabled children, the development of a rural health center for children with chronic disease and disabilities is being considered.

Health care in southern India has become a focus of STSG. This capstone examines data collected from the surveys to provide a descriptive analysis of the population, to assess certain health indicators of Mayasandra, and guide prospective planning of a future health clinic. This research potentially could become the basis for further funding.

Background: Indian Health

India has taken great strides to improve the overall health of its people since its independence from the United Kingdom in 1947. Improvements in health include an increase in life

expectancy by nineteen years, a decline in total fertility to three children per woman, a 50% decrease in infant mortality and progress in the control of communicable diseases (World Bank, 2007). Blindness was once very high in India- more than one third of the world's total blind population historically lived in India. Through a collaboration of NGOs and the private sector, the (now closed) Cataract Blindness Control Project performed a total of 15.3 million cataract operations. According to the World Bank, the incidence of cataract blindness has been reduced by more than half in the areas covered (World Bank, 2007).

Despite continual government investment in the health sector in the form of public health initiatives, the incidence of preventable disease and child-birth complications persists. According to the Aga Khan Development Network (AKDN), nearly 10% of children under five years old die each year from preventable diseases such as diarrhea, pneumonia and malaria. Additionally, the incidence of chronic disease is increasing. Moreover, remote communities do not have access to affordable and quality health care. In response to these issues, in 2005 the government implemented an initiative, the National Health Mission, restructuring health departments at every level and creating the national Rural Health Mission. Organizations such as the World Bank and the World Health Organization have worked in conjunction with the Indian government, supporting health, nutrition, and infectious disease projects. Maternal and child health has also been a focus of the Indian government in its efforts to reduce infant and child mortality: pregnant women have been targeted to receive tetanus vaccines to decrease infant mortality rates and children are immunized against a variety of infectious diseases and receive vitamin A supplements through the National Program of Prevention of Blindness. Regardless of these advances, however, the health agenda in India remains unfinished

India ranks among the countries with the highest infant mortality rates in the world. In 2009, the infant mortality rate in India was 50.7 per 1000 live births (CIA World Fact Book), a statistic that is commonly used to measure overall access to health care and is indicative of nutrition levels and treatment of acute illnesses. The infant mortality rate indicates the government's inability to provide its people with adequate medical care.

Medical Brigades

Medical missions are defined as "travel by a group of physicians to a foreign country for the purpose of making a special study or of undertaking a special study of a short-term duration" (Maki et al., 2008). Through medical brigades, physicians and non-governmental organizations (NGOs) seek to fill the gaps where government and private practice fail to meet the health needs of the impoverished. Physicians and other medical professions are drawn to medical brigades as a result of their philanthropic and hands-on patient care approach. Ideally, partnerships with private, public and non-profit organizations are created to respond to the needs of populations in the form of sustainable, community-driven initiatives. Major challenges to these brigades include dearth of follow-up data, unsustainability, and poor relations with the local health care system, which can actually undermine the brigade's purpose (Maki et al., 2008).

Shoulder to Shoulder

"The Shoulder to Shoulder model, which combines an educational mission (training health professionals) with long-term community development, is a form of volunteerism for practitioners. By developing strong community boards in poor areas and a consistent local paid staff, Shoulder to Shoulder offers volunteer health professionals the infrastructure on which to build lasting programs that can influence the health of a community" (Heck et al., 2007). In

short, STS seeks to train medical students and volunteers (both foreign and local) while simultaneously engaging community participation and developing strong partnerships with local agencies, institutions, and community members. Medical brigades tend to be short-term and periodic. Long-term relationships, however, may allow for continuity of care and more comprehensive health promotion and disease prevention (Shoulder to Shoulder Inc, 2009). This approach facilitates sustainability through long term health care independence and differs from many other volunteer organizations which serve poor areas solely through periodic, short term medical brigade visits.

Shoulder to Shoulder Global is a sister organization of Shoulder to Shoulder Inc. Cincinnati. Unlike Shoulder to Shoulder Inc., STSG is an unincorporated non-profit organization under the University of Kentucky umbrella. The UK chapter of STSG began as Shoulder to Shoulder Ecuador and has primarily focused on providing medical services there since 2002. In 2007, STSG constructed a small medical clinic in a poor peri-urban community in Santo Domingo, Ecuador. The health center also serves as the site for annual medical brigades comprised of UK faculty, students and community members. In 2009, STSG received a $55,000 contribution, the main purpose of which was to explore the expansion of services into southern India. To affirm its global commitment and its planned expansion, STS Ecuador changed its name to STSG. In December of 2009, STSG took a small medical brigade to Karnataka, India to collect the data to conduct a preliminary needs assessment of the Mayasandra community and to explore potential partnerships in the region.

Needs Assessments

The literature regarding needs assessments is very minimal. Generally, needs assessments can be divided into two main methods: simple surveys and clinical assessments. Moreover, such

assessments can be used to measure a variety of issues including the evaluation of healthcare interventions, the monitoring of health status trends in populations, or the assessment of equity of access to medical care across population subgroups (Liberatos et al, 2000). The simple survey solicits information on the individual's use of, access to, and source of care. In addition, females of childbearing age are queried on their access to prenatal and child health care. The simple survey is the less costly of the two methods and when properly adapted to the population, can yield significant information on the unmet health needs of a community.

The clinical approach uses clinicians to determine the unmet needs of the target population through medical examinations and "has been used by population based studies such as those conducted by Trussell and Elinson in Hunterdon, New Jersey and Carr and Wolfe in Nashville, Tennessee as well as on an ongoing basis by the National Health and Nutrition Examination Survey…" (Liberatos et al., 2000, p.20). Clinical assessments are expensive and require a great deal of planning, coordination and resources. Limitations associated with both methods include a disconnect between provider/researcher and patient.

Shoulder to Shoulder combines both approaches to conducting needs assessments.

Mayasandra

Mayasandra is an agrarian village of roughly five thousand inhabitants in the taluk of Turuvekere, located in the southwestern part of the administrative district of Tumkur in Karnataka, India. The only access to health care is through a government-operated primary care center staffed by 1 physician, 3 nurses, and 4 community health workers. The center provides primary care services, uncomplicated deliveries and government-run immunization programs. There is currently no access to pediatric care in the area.

Unfortunately, demographic data, such as sex and age composition of the population, for Mayasandra are inaccessible and/or nonexistent. However, according to the 2001 India Census, 13,275 people inhabited Turuvekere of which 52% were males and 48% females. Eleven percent of the population in Turuvekere is under six years of age. Further data for Turuvekere are also inaccessible and/or nonexistent, but data are available for Tumkur. According to the World Health Organization, Tumkur is one of the most malaria affected districts of Karnataka. Tumkur has a population of 2.5 million inhabitants and reports approximately 3000 malaria cases per year. Of the 2.5 million inhabitants, only 20% (507,000) live in urban areas. Major mosquito breeding sites include four major dams, 26,712 tanks, 16,943 wells and over 50,000 bore wells (World Health Organization). Tumkur is home to two general hospitals, seven taluk hospitals, 38 health units, 93 primary health centers and health units and 276 sub-centers.

Research Objectives

Specific research objectives included the following:

(1) Provide a descriptive analysis of the data collected in the survey

(2) Identify the health problems in Mayasandra

(3) Assess clinic demand and estimate willingness to pay for health services

(4) Conduct regression models of breast feeding, which is a significant public health question both in developing and industrialized countries, and water quality (i.e. source and treatment), which is an issue in India. These models will control for demographics (family size and structure, and education) and will be compared to district data from the Ministry of Health and Family Welfare of India.

Methodology

Study Sample

The convenience study sample consisted of children from the Mayasandra village and environs who attended the one-day free clinic offered by UK Shoulder to Shoulder Global in Mayasandra on December, 31, 2009. STSG advertised the free clinic via radio and posters in Mayasandra.

Data Collection

Data about health needs and behaviors and physical and mental health problems were collected via oral survey during registration by nurses and students bilingual in Kannada and English and were recorded on intake sheets. The front of the survey instrument served as a medical intake sheet and queried information such as name, age, date of birth, height, weight, blood pressure and hematocrit and hemoglobin levels of patient. The back of the survey solicited information on family structure, prenatal care, delivery, breastfeeding practices, immunization history, source of drinking water, and water treatment practices. Finally, clinic demand was assessed as well as willingness to pay using regression.

Nurses collected data on height and weight using stadiometers and standard scales. Children were asked to remove shoes for both measures. It is unclear how infant height and weight were measured, but given the absence of infant scales, it is likely that infants were weighed by having the caretaker hold the child on the scale and subtracting the caretaker's weight. Nurses took blood samples from children to test for anemia, both hematocrit and hemoglobin levels were reported by machine printout. Medical diagnoses were recorded during medical exams, which were provided in a community building with private rooms in typical brigade layout (as described in Appendix 1). Physicians and residents reviewed results from previous stations,

diagnosed and treated acute problems and made recommendations and referrals to the pharmacy station as needed.

Measures

Children with hematocrit levels under 30 were deemed to have anemia. Due to malfunction in the hematocrit machine, hemoglobin levels became the instrument to measure the presence of anemia, less than halfway through the clinic. Normal hemoglobin levels in children are 11-13 grams of hemoglobin per deciliter (Medicine Net, 2010). Children with hemoglobin levels under 11 were considered to have anemia.

Data Analysis

Data were manually transferred from paper form to Microsoft excel spreadsheet and checked for errors. A total of 28 variables from 419 participants were entered. The primary tool for analysis was descriptive statistics. Data analyses were conducted using STATA 10 and consisted of regression analysis. Statistical significance was defined as a t score greater than 1.96 or lower than negative 1.96. This means a P value <.05 was used to define significance. Regression was run on the dependent variable, willingness to pay, to estimate what non-socioeconomic factors driving the respondent's willingness to pay. Independent variables included gender, age, height, weight, and a list of eighteen acute problems.

Results

Results of the descriptive data were divided into broad categories and may be viewed in table format in Appendix 2. An exhaustive list of diagnoses is available in Appendix 3.

Demographics. Survey data was collected concerning 419 children in Mayasandra. Survey respondents were assumed to be children's caretakers and data refer to the children and their households. Data analysis revealed that 54% of sample was male while 46% were female and

that the mean age of the participants was six. Household size averaged 5, of which 2 were children. Thirty-six percent of the sample used bore wells as primary drinking source, while 55% used tap water. Fifty-eight percent of the sample treated water, either by boiling or filtration methods.

Prenatal care/Delivery. Prenatal care was received by 91% of mothers and the mean number of visits equaled 6.8, of which 81% were provided by doctors. Seventy-nine percent of the deliveries were institutional (hospital, health center, clinic), while 20% of children were delivered at home. Sixty-five percent of total deliveries were attended by a doctor, 25% were delivered by nurses, 3% by midwives and 7% by other (usually by the neighbor or mother-in-law).

Breastfeeding. Ninety-seven percent of women breastfed children for an average of 14 months and although the most frequent responses for length of breast feeding were 12, 18 and 24 months, they are only thought to be estimates rather than exact lengths of breastfeeding. The mean age at which children started solid foods was 7 months. Some children were currently breastfeeding at the time of the visit as 13% of the sample was less than two years of age.

Preventive Care. Ninety-four percent of children had received all immunizations to date and 95% received vitamin A supplements, both of which are administered by the Health Ministry of India. Ninety-four percent of mothers in the sample received a tetanus shot.

Diagnoses. Most frequent health concerns included respiratory disorders, of which 24% of the sample was diagnosed. Respiratory disorders included pneumonia, upper respiratory infections, bronchitis, asthma and allergies. Blood problems including anemia and other deficiencies were present in 5% of the sample.

Malaria. Eight percent of the patients had a history of malaria, supporting the data that indicate that Tumkur has one of the higher prevalence of malaria in the state. Sixty-one percent of children use bed nets at night; however, data was not taken on whether bed nets were treated.

Access to care. Seventy one percent of the sample stated that it had access to some form of healthcare. A handful of participants claimed that distance to the clinic and the absence of pediatric care were major issues. As a result, 24% of the population expressed the need for a family doctor and 72% felt the need of a pediatrician. All of the participants (100%) were interested in a partnership with STSG.

Regressions

The average willingness to pay per service equaled 59 rupees, the equivalent of $1.30. It is difficult to determine the driving factor behind willingness to pay without data on education and income level of the child's caretaker. Interestingly, regression tests demonstrated that lower height (controlling for age) had a statistically significant positive impact on the amount that a parent would be willing to pay for medical services. Perhaps parents were responding to height as a medical measure.

Table 1: Regression results predicting willingness to pay for health services

Explanatory variable	Coefficient	Standard Error	T	P-value
Age of child	-1.176	1.272	-0.92	0.356
Height of child	-0.365	0.179	-2.04	0.042 **
Weight of child	$+0.867$	0.522	+1.66	0.098 ***
Children per household	-0.848	2.170	-0.39	0.696
Constant	$+90.427$	11.554	+7.83	< 0.001

Sample size: 340, test of regression: $F(4, 335) = 3.63$, $p=0.007$, $r^2 = 0.04$
Statistical significance: * 1%, ** 5%, *** 10%

Regression predicting child's height based on breastfeeding shows that longer breastfeeding is associated with greater height, but is only statistically significantly between the 5% and 10% levels. A similar regression predicting child's weight shows no statistically significant effect of breastfeeding on weight at the 10% level.

Table 2: Regression results predicting length of breastfeeding (months) on child's height

Explanatory variable	Coefficient	Standard Error	T	P-value
Length of breastfeeding	+0.465	0.252	+1.84	0.066 ***
Constant	+99.595	3.86	+25.78	< 0.001

Sample size: 345, test of regression: F(1, 343) = 3.40, p=0.007, r^2 = 0.07
Statistical significance: * 1%, ** 5%, *** 10%

Longer breastfeeding also is associated with fewer digestive disorders, as demonstrated by the negative coefficient below.

Table 3: Regression results predicting length of breastfeeding on incidence of digestive disorders

Explanatory variable	Coefficient	Standard Error	T	P-value
Length of breastfeeding	−0.0064	0 .0026	-2.41	0.01 *
Constant	+0.189	0.045	+4.66	< 0.001

Sample size: 364, test of regression: F(1, 362) = 5.79, p=0.0016, r^2 = 0.013
Statistical significance: * 1%, ** 5%, *** 10%

Additionally, it seems that children who were breastfed have a lower prevalence of eye disorders than those who were not.

Table 4: Regression results predicting whether a child was breastfed on incidence of eye disorders

Explanatory variable	Coefficient	Standard Error	T	P-value
Breastfed (dummy)	−0.278	0 .051	-5.36	0.00 *
Constant	+0.3	0.051	+5.85	< 0.001

Sample size: 380, test of regression: F(1, 378) = 3.26, p=0.07, r^2 = 0.0086
Statistical significance: * 1%, ** 5%, *** 10%

Regressions predicting whether water quality (source and whether treated) affected health outcomes (eighteen variables) revealed no statistically significant results.

Results also show a strong association between tetanus immunizations and the receipt of prenatal care. Women who received tetanus shots were also likely to receive prenatal care.

Table 5: Regression results predicting whether receipt of tetanus shot is associated with prenatal care in mothers

Explanatory variable	Coefficient	Standard Error	T	P-value
Tetanus shot	+0.275	0.077	+3.53	0.00 *
Constant	+0.640	0.078	+8.17	< 0.001

Sample size: 243, test of regression: F(1, 243) = 12.47, p=0.0005, r^2 = 0.048
Statistical significance: * 1%, ** 5%, *** 10%

Discussion

Data collected by STSG compare favorably to data collected by the International Institute for Population Sciences University of Mumbai on the district of Tumkur Karnataka, India from 2007 to 2008. They reported similar rates of maternal tetanus vaccination rates, prenatal care rates, place of delivery, child immunization rates and Vitamin A supplement rates, child feeding practices, and drinking sources. Moreover, the sex ratio is skewed in the same direction with more males than females. This demonstrates that Mayasandra has a similar population (with similar health outcomes) to that of the larger district of Tumkur.

Contrary to expectations, regressions on water quality and health outcomes were not associated. Regressions on willingness to pay and household structure and age did not reveal statistically significant results, but coefficients hint at lower willingness to pay as both increase.

Although the prevalence of respiratory disorders appears high, it is comparable to studies conducted on gastro-intestinal and respiratory tract infections of adults in rural populations in the Varanasi district (Mohapatra, Singh and Gaur, 1989). Regressions were conducted on the data from Mayasandra to discern contributing factors, but no associations were found to be statistically significant. Known contributors to respiratory disorders include poor indoor and outdoor air quality, high levels of certain pollutants, and close living quarters. Other researchers have suggested that nitrate-rich drinking water in rural Rajasthan is making children more susceptible to recurrent acute respiratory tract infections (Gupta and Bassin, 2000). The data collected by STSG, however, do not provide any possible causes. Future surveys should incorporate data on potential causes of respiratory disorders.

Ethnic differences were present in the sample. Though the majority of participants spoke Kannada, the official language of Karnataka, a small minority spoke Ourdu, the language spoken by the Muslim population of Karnataka. Ethnic differences were not explored due to the limited presence of the Ourdu group, but should be explored in future studies.

Limitations

Unfortunately, the survey administered by Shoulder to Shoulder Global did not collect information on possible social and economic factors (social status, education, maternal age, literacy, immunization history, job status, income, etc.) that may affect health status, health behaviors, and willingness to pay. This is problematic because such factors are frequently are associated with health outcomes and behavior. The absence of such indicators greatly limited the analysis, preventing the researcher from inferring relationships between education and family

structure. Future surveys should include information regarding household income, employment, education level and age.

Additionally, measurement errors in infant weight and height may have resulted from the absence of infant scales and tape measures. As mentioned in the measures section of the study, malfunctions in the hematocrit machine occurred during the clinic resulting in two measures to determine the presence of anemia in children. Future surveys should also attempt to use a single measure of anemia.

Furthermore, only limited data regarding bed net use was collected. Despite high reported rates of bed net use, it is unknown whether the bed nets were treated and whether or not they were consistently used, both of which increase effectiveness against mosquitoes. Further information on bed net use could serve as the basis for future malaria interventions.

Conclusion

Data collected by STSG indicate the medical coverage that the residents of Mayasandra currently receive and point to future health service needs. The government of India is clearly effective at immunizing children and providing them with vitamin A supplements; these are represented by high childhood immunization rates and rates of vitamin A consumption. The government has also shown success in providing prenatal care to its people, though room for improvement exists. High prevalence of disabilities indicate the need for the provision of services to this marginalized segment of society. It is unknown how much (if any) and what forms of support the government provides to children with disabilities and their families. Equally unknown is how children (and adults) with disabilities are perceived and treated in the larger community. These knowledge gaps represent potential areas for research during future STSG medical brigades and could

represent an area of focus for a future permanent clinic. These gaps indicate that new surveys should be created to collect this information and that additional assessment methods should be considered. In addition to the high prevalence of disabilities, a significant number (nearly a quarter) of children suffered from respiratory problems. A pediatric pulmonologist could be beneficial along with future research that targets the prevention of respiratory problems.

STSG has the opportunity to introduce pediatric services to the area. Out of the 419 respondents, seventy-two percent expressed the need for a pediatrician. The true need within the Mayasandra community is the long-term presence of STSG, preferably in the form of a permanent clinic targeting the pediatric, respiratory and special needs of the village. The people who responded to the opportunity to use the services of STSG strongly supported the continuation of the service. They also indicated a willingness to pay, so some clinic costs could be covered by fees. I strongly recommend that STSG continue to engage community leaders and make strategic partners (local, regional, national and international) to undertake a long-term and sustainable presence in the region.

Shoulder to Shoulder Global should follow the Shoulder to Shoulder Inc. model, providing preventive services in addition to health care and emphasizing community participation, allowing them to co-determine their unmet health needs and co-create projects and public health initiatives to meet those needs. Community engagement will generate support for STSG and could help mitigate issues of sustainability and continuity of care for the residents. STSG needs to decide which direction to take with regards to the disabled children in Mayasandra. Additionally, proper project management principles should be taken when implementing projects such as the construction of a clinic. Furthermore, programs and projects should be carefully

monitored and evaluated to ensure quality of care and meet accountability needs. By following these measures, STSG can help ensure a meaningful and significant presence in Mayasandra.

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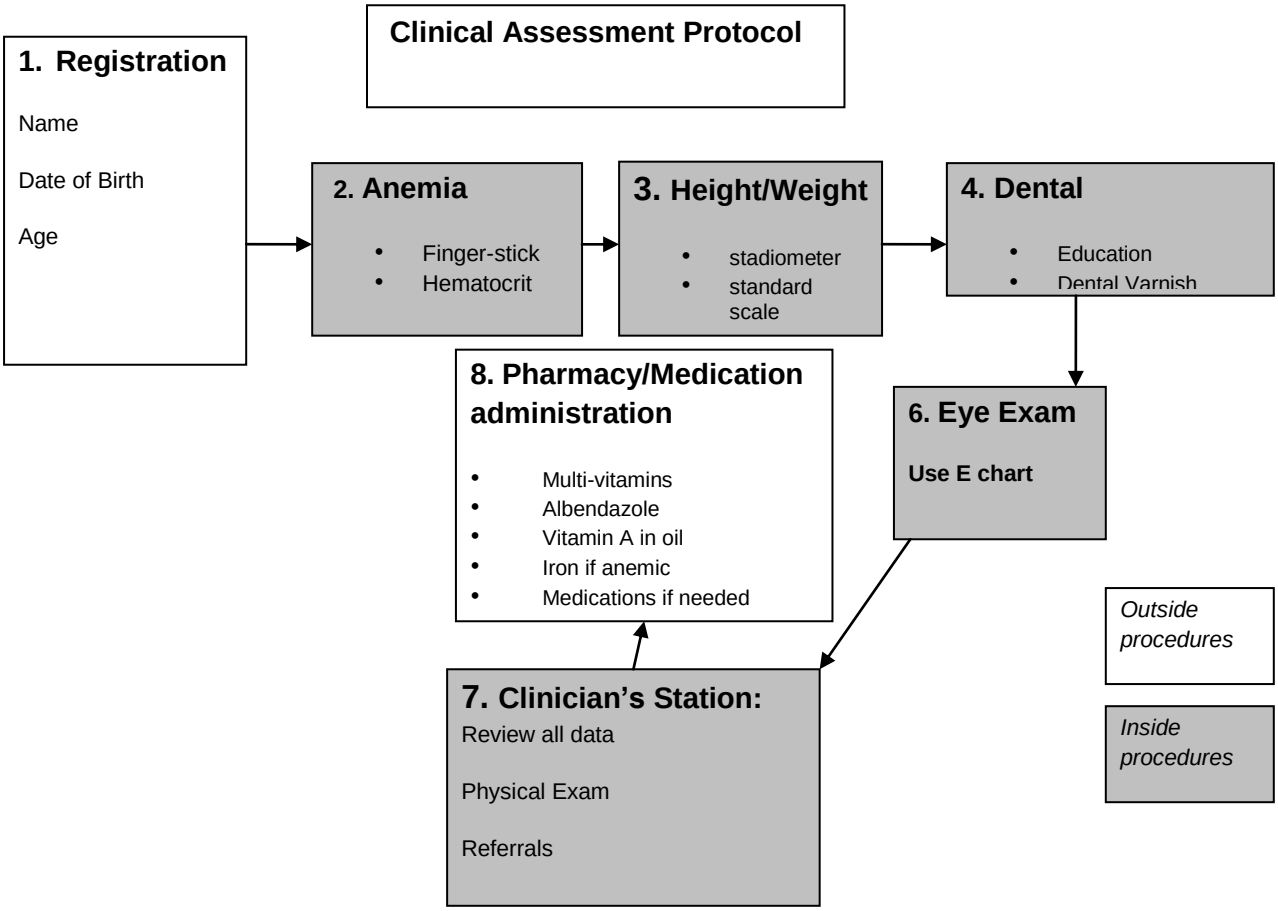
Appendix 1


Clinical Assessment Protocol
1. Registration
Name
Date of Birth
Age
2. Anemia
Finger-stick
Hematocrit
3. Height/Weight
stadiometer
standard scale
4. Dental
Education
Dental Varnish
6. Eye Exam
Use E chart
8. Pharmacy/Medication administration
Multi-vitamins
Albendazole
Vitamin A in oil
Iron if anemic
Medications if needed
7. Clinician's Station:
Review all data
Physical Exam
Referrals
Outside procedures
Inside procedures

Appendix 2

Mayasandra Indicators	
Population of children	419
Male	54%
Female	46%
Mean age of child	6
Mean household size	5
Mean children per household	2
Water source	
Borewell	36%
Tap	55%
Other	9%
Treated water (boiled or filtered)	58%
Maternal Health	
Mothers who received at least 3 prenatal visits	91%
Prenatal care provided by doctor	81%
Mean number of prenatal care visits	6
Mothers who had received tetanus shot	94%
Child delivered at hospital	79%
Child delivered at home	20%
Child delivered by doctor	65%
Child delivered by nurse	25%
Child delivered by midwife	3%
Child delivered by other	7%
Child Immunization and Vitamin A Supplementation	
Children fully immunized	94%
Children who received at least one dose of vitamin A	95%
Breastfeeding Practices	
Children breastfed	97%
Mean length of breastfeeding (months)	14
Mean age at which solid foods were introduced	7

Appendix 3

Acute Problems	
Central Nervous System Disorder (cerebral palsy, seizures and headache)	7.8%
Circulatory System Disorder	2%
Digestive System	10%
Endocrine & Metabolic Disorder	2.35%
Genitourinary Disorder	1.57%
Infectious Disease (parasites, scabies and malaria)	11.49 %
Respiratory System	24.54 %
(Pneumonia, bronchitis, URI, cough, asthma & allergy)	
Other	6.53%
Blood Problem	5.22%
Bone and Joint	2.87%
Dental	1.57%
Birth defect	3.66%
Mental illness	2%
Ear disorder (deafness and ear infection)	5%
Skin (eczema, rash)	6.27%
Eye disorder	2.87%
Injury	0.5%
No illness	13%