Master of Public Health Program Student
Publications

Master of Public Health Program

2012

Needs Assessment for the Mobile Health Clinic of the Sukhdev Raj Soin Hospital

Luke Rothermel

Wright State University - Main Campus

Needs Assessment for the Mobile Health Clinic of the Sukhdev Raj Soin Hospital

Luke Rothermel

MD/MPH Candidate

Wright State University Boonshoft School of Medicine

Boonshoft Physician Leadership Development Program

Table of Contents

Introduction:

India has an established system of medical and public health services to provide care to all citizens through a government-run network of providers and infrastructure. That system, though, is constrained by socio-economic limitations, a booming population, and the cultural variations of its population. In addition to the public efforts to provide health care, the private sector has grown to serve a large portion of the population. Many of these private initiatives are found in urban areas where the potential for financial gain are great, but others have spread into semi-urban areas and villages to serve the more rural populations. The Sukhdev Raj Soin Hospital (SRSH) is one of the latter institutions. Founded in 2007, it is a privately owned hospital in Haryana, India that offers tertiary medical and surgical care to the surrounding population. It is located in a rural region of the country 2 hours south of New Delhi along the Delhi-Mathura Highway (National Highway 2). The hospital's purpose is to provide state-of-the-art medical care to a population that lacks proximity and access to any similar resources.

In the region surrounding the SRSH, public health services are limited due to distance from the services and an underdeveloped system of referrals, leaving an estimated 2 million people marginalized in their access to quality medical care. This population is comprised from over 50 villages and semi-urban areas with an economy built largely on the agricultural production of its members. With the majority of families being subsistence farmers, little capital resources exist for commodities or services such as health care which has led to the practice of bartering with the SRSH for services. In one example, a seven-year-old boy was brought to the SRSH with a month-old femur fracture. The father admitted that he was hesitant to come to the hospital because he had heard that the village

providers could give the same interventions for a much lower cost. As a result, he took his son to a local bonesetter who wrapped the leg in a bamboo cast when the injury occurred. When hospital X-rays revealed a complete fracture of the femur with overlapping ends, the father agreed surgery was necessary but continued to delay the intervention for another day in order to bargain for a price he wanted to pay.

Because of its location in an underserved region of India, the SRSH is uniquely positioned to bridge the service gaps in the health system and to increase awareness and trust of modern health science and technologies. In order to facilitate this purpose, the SRSH employed a Mobile Health Clinic (MHC) to surrounding villages. The goals of the MHC are to achieve positive interaction with regional villagers; engender trust and encourage the use of SRSH facilities for healthcare; provide triage, referrals, and basic health care services to patients presenting to the MHC; and to distinguish the care provided by SRSH from the Rural Medical Practitioners (R.M.P.'s) and other providers in the villages.

This mobile health clinic has been used to meet the goals of the SRSH administration but its effectiveness in achieving those goals has not been formally monitored or reassessed since its inception. This document provides an assessment of that mobile health system's goals and offers a discussion for improving those outcomes.

Figure 1: Map of the Faridabad District, Haryana, India - Marked on the map include the Sukhdev Raj Soin Hospital (blue star), and the six villages served by the Mobile Health Clinic (blue circles) during the survey period. (Government of India, 2009)
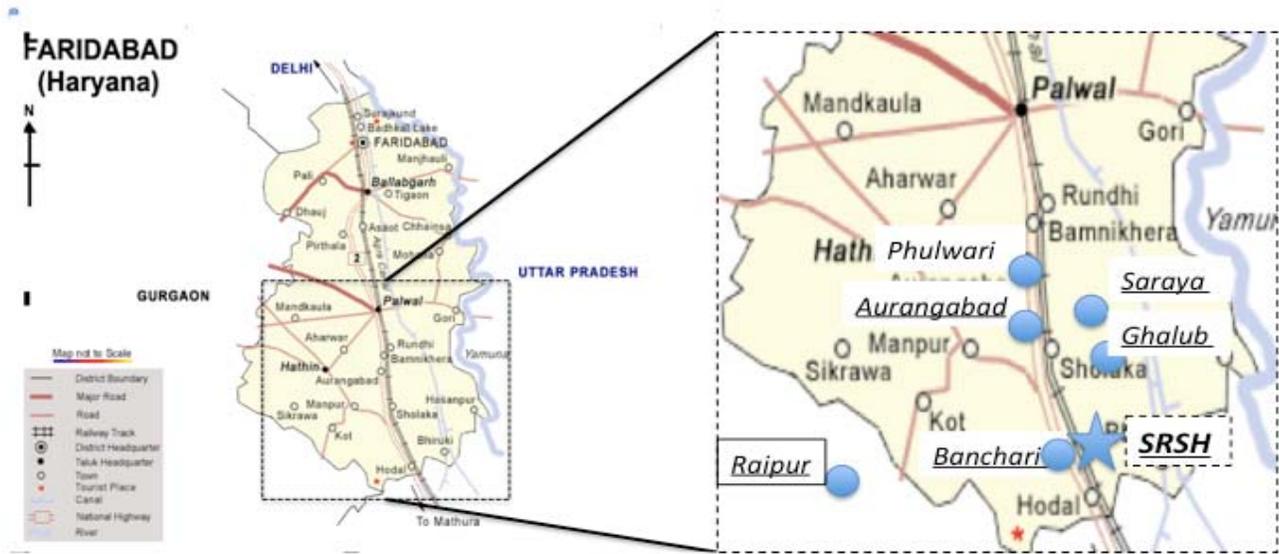
Purpose Statement:

The purpose of this needs assessment is to evaluate the effectiveness of the mobile health clinic of the SRSH and to identify performance problems that could be addressed to improve clinic outcomes. Variables used in this study are described in Table 1.

Table 1: Independent Variables		
Independent Variables	**Description**	**Level of Measurement**
Gender	Sex of the patient	Categorical: Male or Female
Age	Patient's reported age	Continuous
Ethnicity	Patient's reported ethnic identification	Categorical: Indian, Pakistani, Nepali, Other
Religion	Patient's reported religious affiliation	Categorical: Hindu, Muslim, Buddhist, Sikh, Christian, Other
Occupation	Patient's reported vocation	Categorical: Agriculture, Other Farming, Industry, Business, Banking, Health Care, Government Work, Education, Information Technology, Other
Level of Completed Education	The amount of educational experience that the patient had completed	Categorical: Primary School- partial or complete, Secondary School – partial or complete, College, Technical School, Graduate School
Typical Health Care Provider Type	Reported levels of health care that patients used	Categorical: Home, Rural Medical Practitioner (R.M.P.), Resident Medical Officer (R.M.O.), Medical Doctor (M.D.), Hospital, Mobile Health Clinic, Other

Table 1 (cont): Independent Variables		
Chronic Medical Issues of patients and the Treatments	As reported by the patients attending the MHC	Categorical: High Blood Pressure; Heart Disease; Stroke; Cancer; Pulmonary Disease; Tuberculosis; HIV/AIDS; Hepatitis; Malaria; Other Treatments Categorical: Medications; Surgery; Ayurvedic; Homeopathic; Other
Clinical Complaints/Diagnoses	Major health complaints gathered from the clinical exam during the MHC and recorded by the examining physician.	Categorical: Infection – viral, bacterial, parasitic, other, and not specified; Trauma – blunt, penetrating, auto; Chronic Condition – Cardiology, Pulmonary, Gastrointestinal, Genitourinary, etc.
Interventions Offered	This information was recorded by the MHC physician during the clinics.	Categorical: Medications – antibiotics; First Aid; Referral – diagnostic or treatment
Interventions Required	This was determined by the physician and recorded as a referral for further services	Categorical: Referral to various specialty services

Research Questions:

1)   What proportion of patients requires referral to additional services not provided by the mobile health clinic?

2)   What types of referrals are most commonly seen in the MHC?

3)   What are the demographics of the patients presenting to the MHC?

4)   Where are patients typically receiving their health care?

5)   What proportion of patients diagnosed with an infection received antibiotics?

6)   What trends exist in the types of diagnoses/chief complaints for individual villages, age groups, and genders?

Review of Literature:

Mobile Health Care:

Mobile health clinics are one facet of mobile health care delivery systems. These clinics are employed with the goal of bolstering the fixed local health services in underserved populations. Reports have described the use of mobile health units (MHU) in settings ranging from post-disaster recovery to preventive care and health promotion services. These systems are unique in their ability take health interventions to the location of the patients as opposed to requiring attendance at a fixed health care facility. This strategy overcomes many barriers to health care access such as limits to transportation, lack of awareness about the need for health care interventions, and often the lack of finances for health care. However, it often comes with its own set of intrinsic limitations, typically related to the absence of comprehensive care opportunities not delivered through the mobile health interventions and the difficulty of ensuring follow up care. Overall,

mobile health care is designed to "fill in the gaps" in the care of a population by its local health care system (Howe, 2009; Alexy, 1996; Du Mortier, 2006).

Mobile health care is not utilized as a comprehensive solution to health care delivery (Alexy, 1996). These mobile systems are designed to assist local health systems in meeting the needs of the communities they serve. They are often constrained by limited financial, personnel, or medical equipment resources from providing comprehensive health care in this setting. Time is also at a premium within these clinics (Alcoba, 2009). Nonetheless, clinics intended to meet specific needs of a target population (i.e. dental exams for children) can provide care that otherwise would not be accessed or accessible to those populations. These clinics are often served with resources that are brought in by the medical team (usually including medications and physical exam equipment, basic diagnostic tools, and sometimes specialty surgical equipment). The sustained impact of this approach on health outcomes in a community depends on the ability of the local health system to follow up the care started by the mobile clinics (Alcoba, 2009; Daviaud, 2008). Studies have noted that quality care is difficult to assess and achieve in these mobile service models largely due to the challenges of ensuring the follow up of care and having comprehensive and accessible medical records for the persons attending the clinics (Howe, 2009; Shieh, 2008).

Staffing of MHUs is dependent on the purpose of the clinics and the amount of resources invested in the clinics. Certain MHUs are vertically staffed, meaning skilled staff members are provided by another institution that is more specialized than the mobile health system, and these individuals are able to provide unique services such as surgical procedures on a temporary basis through the MHU. These services are often curative but

have relatively little impact on the overall health of the population served. Other MHUs focus on strategies of preventive medicine such as vaccination programs or health education encompassing issues such as hygiene and water sanitation. These clinics can be staffed by less specialized workers, but are often unprepared to treat many acute illnesses (Du Mortier, 2006). The utility and effectiveness of these mobile health units depends on the purpose of the clinics, cost limitations, and the acceptance of these interventions by the population being served (Edgerley, 2007; Peek, 2009; Holtshousen, 2007).

A recent study evaluating the Return On Investment (ROI) of a Mobile Healthcare Van providing primary care to underserved populations in Boston, Massachusetts revealed that this type of established program had an estimated ROI of $36 for every $1 spent to run the clinic. That program, known as the "Family Van," has been in service since 1992 and offers basic triage, preventive, and referral care services. In this example, the ROI was determined by calculating the cost of providing MHC services and comparing that with the estimated cost savings rendered by preventing emergency room visits by the population being served (Oriol, 2009). Because this analysis was done with an established MHC and in a specific U.S. population, the ROI cannot be assumed to render comparable results for all MHC programs, particularly those in developing countries. Still, the benchmark is set that strategic use of Mobile Health Clinics can positively impact the healthcare and finances of local health systems.

India/International Health:

India is considered the largest democracy in the world with a multiparty, parliamentary system of governance established under the Indian Constitution in 1950. This federal republic is comprised of 28 States and seven union territories that include

numerous culturally and linguistically unique groups. The U.S. Department of State reported in 2008 that India's population is the second largest in the world with over 1.1 billion people, growing at 1.3% per year. The population number is three times larger than that of the United States within a country that is one-third the land size of the United States. India's economy is the 12th largest in the world with a GDP of $1 trillion dollars, but nearly 70% of the population lives on $2 or less per day (United States Department of State, 2009). Currently, the population is 72.7% rural with 60% of the nation's workforce serving in the agricultural industry. Though certain cities have shown great advancements in technology and economic development, gaps exist for the majority of the population in the infrastructure necessary for economic, educational, and health care progress (Xirasagar, 2010).

India has a rich history of civilization out of which has birthed the Hindu, Buddhist, Sikh, and other religious traditions. Attempts have been made to bring the many cultural groups of India under the rule of various empires including Alexander the Great's Greece, the Persian Moghuls, and most recently as a colony of Britain. The latter lasted until 1947 when the nation of India achieved independence and, soon thereafter, established its Constitution. In addition to the unifying rule of law, the Constitution also outlawed the caste system that so deeply impacted the social structure of the nation. The economic model that was created was a mixed public and private system with the government assuming the majority of the responsibility for socioeconomic and health affairs to assist the traditionally oppressed castes in achieving equality. The economic development of India has been described in metaphor as a progression from,

"'mass famine (starvation deaths by the tens of thousands) in British India, to mass starvation in the sixties' (chronic caloric deficiency; not a single famine in postindependent democratic India)... to mass malnutrition in the 70s and 80s (calorie sufficient but nutrient deficient), and since then a rising middle class co-existing with significant micronutrient malnutrition among the poor." (Xirasagar, 2010).

This public sector-driven development was mired by corruption and dysfunctional regulation that nearly led to the bankruptcy of numerous industries, spurring major economic reforms in the early 1990's. These reforms promoted the free market, privatization of industries, and the dismantling of the regulatory system. As a result, India has seen incredible development in certain sectors including the information technology and the private health care industries. An undesired effect of these economic reforms included a widening of the gap between the rich and the poor that has undermined certain socioeconomic goals set forth since independence (Xirasagar, 2010).

The health care system in India has been developed upon the concept that the government would provide for the health care of its people. A systematic plan for this public health care involved the expansion of Primary Health Centers (PHC) throughout the country to provide essential preventive and acute care to communities throughout India. These PHCs were built in rural areas and were designed to serve a population of 20,000 people with one male and female medical officer, one male and female health worker, a field supervisor, a basic obstetric facility, and a laboratory for detection of major communicable diseases. Subcenters were also created with six such facilities serving under

one PHC. These were staffed by one resident female and one resident male health worker. These workers provided disease surveillance, basic treatments, and various environmental health considerations such as chlorination of wells and sanitation of public facilities. For tertiary care issues, one Community Health Center (CHC) was established to serve the area of 4 PHCs with specialty care surgical and medical issues. The infrastructural components of this plan were funded by the central government with the maintenance and administration of the facilities being the responsibility of the state governments. Continual development of this system is undertaken in a succession of Five-Year Plans that considers the needs and budgeting for these services at fixed intervals. Overall, the states account for roughly 80% of the public funding of the health care system (Xirasagar, 2010).
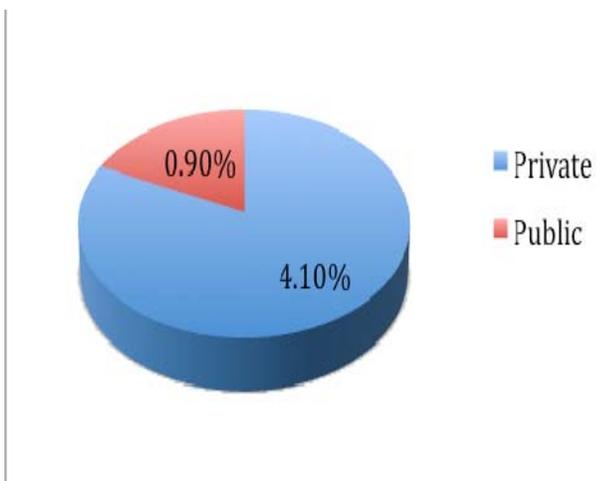
Figure 2: India Health Expenditure as a Percentage of GDP
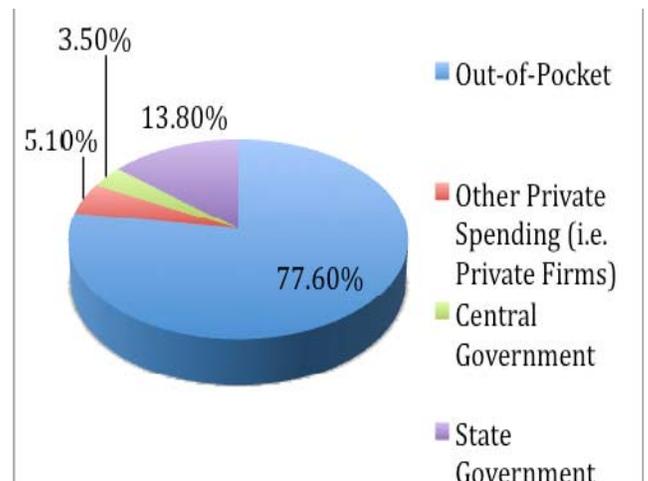
Figure 3: Total Health Expenditure in India, 2001

Recent reports have noted that India's public expenditure on health care is among the lowest in the world at 0.9% of GDP (National Commission on Macroeconomics and Health, 2005). At the same time, private spending on health is estimated to consume roughly 5-6% of household incomes, a cost that is too high for many of the poor and rural

members of society to afford (International Institute for Population Sciences and Macro International, 2007; Philips Electronics, 2008). The Indian government desires to reach a healthcare expenditure target of 2 – 3 % of its GDP by 2012 (Philips Electronics, 2008). Though achieving this goal could vastly improve the public healthcare system, the reality is that the current system depends remarkably on its rapidly growing private sector.

Positive steps have been made in health indicators since the country's independence in 1947, and were noted in the 2002 National Health Policy report. For example, life expectancy in India has risen from 36.7 in 1951, to 54 in 1981, and to 64.6 in 2000. The infant mortality rate (IMR) per 1,000 has dropped from 146 in 1951, to 110 in 1981, and to 70 in the year 2000. During this period, both birth rates and death rates declined. Again, disparities exist in these statistics between urban and rural locales. IMR per 1,000 in rural areas is 75 and in urban areas it is 44. Also, the percentage of children less than 3 years old who are more than 2 standard deviations underweight is 49.6% in rural areas, whereas in urban areas it was 38.4% (Ministry of Health and Family Welfare, 2002). These statistics are encouraging in regard to the progress of the national health goals, and the potential for further improvement is great considering the continued room for growth of the public health care system.

India trails other Asian nations in its percentage of public expenditure on health, which is reflected in its IMR per 1,000. For example, China spends around 5.5% more public funds on health but has an IMR that is less than half of India's 70 per 1,000. Sri Lanka's public expenditure on health is nearly 2.5 times that of India (around the level of the U.S.) and their IMR is recorded at 16 per 1,000 (Ministry of Health and Family Welfare, 2002). In 2006, the World Health Organization Health Systems Performance Assessment

described India relative to other Asia Pacific countries as continuing to have low numbers of hospital beds, physicians, and nurses per 10,000 persons (World Health Organization, 2006). This highlights the persistent shortcomings of the health care system despite the government initiatives of change.

Analyses have described the high rates of growth within the private health care sector as investments continue to fill in these care gaps while taking advantage of the booming market (Philips Electronics, 2008). According to a Pricewaterhouse Coopers report in 2007, the health care market in India is the third largest segment of the economy and is continuing its trend of rapid expansion, projected to be as large as $40 billion by 2012. The same report noted that the private sector of the healthcare industry provided an estimated 70 percent of the country's hospitals, 40 percent of hospital beds, 40 percent of all inpatient care, and 60 percent of all outpatient care (Pricewaterhouse Coopers, 2007).

India's approach to expanding its public health influence has changed recently with an emphasis on providing state funding for private services that are known to be effectively serving the rural and urban poor populations. In 2005, India adopted the National Rural Health Mission that commissioned community-based female volunteers, known as ASHA (Accredited Social Health Activists), to work with non-governmental organization initiatives and facilities that were established in various communities and demonstrating results through their interventions. The state governments then underwrote the funding of these initiatives. The training provided to these ASHA workers also included an emphasis on mainstream Indian health practices such as the AYUSH traditions (AYUSH=Ayurveda, Yoga, Unani, Siddha, and Homeopathy) that remain widely accepted throughout India (Xirasagar, 2010).

Alternative health care (Non-allopathic)

In their efforts to improve the public health system in India, the government tapped into their rich history of non-allopathic health care providers as a resource. In the 1960s, the government reassessed the nature of providers within the country and identified wide variations in the types of health practices being utilized, the training of the providers, and the typical locales of their practices. India has a rich history of therapies other than Allopathic medicine such as Ayurveda (1), Unani (2), Homeopathy (3), Siddha (4), and other (5) types of health practices that have been utilized for centuries (Xirasagar, 2010). Despite their deep roots in the cultures of India, Allopathic medical practitioners have criticized them as being "unscientific" and a hindrance to the development of a world-class allopathic health care system.

---

(1) **Ayurveda – "**Ayurveda provides an integrated approach to preventing and treating illness through lifestyle interventions and natural therapies. It is based on the view that the elements, forces, and principles that comprise all of nature - and that holds it together and make it function - are also seen in human beings. In Ayurveda, the mind (or consciousness) and the body (or physical mass) not only influence each other - they are each other. Together they form the mind-body." (International Cyber Business Services, 2007).

(2) **Unani –** Similar to Ayurveda, and adjunctively following in traditions of Hippocrates and Galen, **"**Unani medicine is based upon two important concepts. First, the Doctrine of the Naturals establishes the standards of the human body, from which disease states are deduced by deviation from the norms; second, the Doctrine of Causes identifies and explains the reasons for the deviations from the norms." The concept of the four humors is followed as those humors are used to identify pathology through observation (Chishti, 2003).

(3) **Homeopathy – "**Homeopathy is based on the principle that substances that are poisonous in large doses can be very beneficial in small doses. Homeopathy is a form of medicine that treats the body as a whole and helps it to heal itself. It can be used for the short-term (acute) illnesses and long-term (chronic) illnesses. The objective is to prevent the patient from getting the illnesses again (prevention)... Thus homeopathy simply means treating like with like." (International Cyber Business Services, 2007).

(4) **Siddha –** This tradition originated in southern India and is considered to be one of the oldest medical practices known in the world. "The concepts of Siddha medicine system are similar to Ayurveda, but in Siddha medicine the use of metal and minerals is predominant. Pulse reading and urine testing are important features of the Siddha medicine. Pulse reading was considerably developed by the Siddhas and was used in diagnosis and prognosis of diseases. Putting oil drops on the surface of urine and observing their movement was used to conduct urine examination. Besides, smell, colour, deposits, etc are also observed. Thus the Siddha system is basically a regional variant of Ayurveda, conditioned by the local Tamil culture and tradition." (Tiwari).

(5) **Other –** These are practices often incorporated into various therapies, such as yoga and acupuncture.

Nonetheless, the Indian government identified that areas in the country that were grossly underserved by allopathic practitioners often had other types of providers living and working in those areas. In an effort to increase the impact of these providers and the public health system overall, the government commissioned many of these workers to serve their local communities as Rural Medical Practitioners (R.M.P.). By accepting this commission, the R.M.P.s would also be required to receive training in basic medical diagnostics and interventions to standardize a part of their practice and supplement the primary care offered in these underserved areas. The impact of this program varies from state to state, but the role of the R.M.P. remains essential to providing care to the most rural populations in India (Takulia, 1977). The state of Haryana in which this study took place relies on these types of providers for care of their large rural populations.

Epidemiologic transition - challenges to India's health system

Future challenges and opportunities for the healthcare system in India lie in the issues of chronic diseases and health insurance opportunities. It was reported that in 2007, lifestyle diseases such as hypertension, obesity, and type II Diabetes Mellitus made up 27% of the disease afflictions in the Indian population. This was second only to acute diseases that recorded 36% incidence in that year (Pricewaterhouse Coopers, 2007; Philips Electronics, 2008). Analysts suggest that this number will only continue to increase with further development in India, as has been seen in all developed countries across the world. Current western standards of care of these chronic medical issues place heavy time and resource burdens on societies and will change the approach to health care in many communities

throughout India. This may also influence the goals of the public health care system as it decides how to allocate its funds in the future.

With free public health care being limited by heavy patient burdens, scarce financial resources, and incomplete dispersion into underserved communities, the private sector will continue to be relied upon for coherent patient care and health outcomes. For many populations, this will require an increase of the availability of health insurance that can be used to lower the burden of health costs on individuals. Currently, health insurance penetration in India is at 5% and more than 70% of the total healthcare expenditure is borne out of pocket (Philips Electronics, 2008). If the utilization of this service increases, even if only in the estimated 300 million persons within the Middle Class of India, the entire health market will broaden and it is expected that the provision of services will likely increase, at least within the private sector (Pricewaterhouse Coopers, 2007).

Health care in India will continue to develop as the population expands, health indicators improve, and the market remains open to investment. The decrease in infant mortality, the increase in life expectancy, and the improved care of acute diseases will bring many changes in Indian health status. Chronic diseases will consume a substantial portion of health resources and time while the challenges of infectious disease control will remain due to the lack of penetration of health care to the most rural populations. It is clear that the Indian system will rely on private investments like the SRSH to carry the load of the population for years to come.

Needs Assessment:

A needs assessment is a strategy utilized in organizational management to adapt to the changing needs of clients and organizations. This tool can be employed on different levels including the individual, small group, organizational, and societal depending on the scope and objectives of the organization (Kaufman, 1998). Needs assessments identify and prioritize needs but differentiate from a needs analysis or program evaluation in that needs assessments do not determine solutions for meeting those needs (Watkins, 1998; Soriano, 1995). Questions posed by a needs assessment allow organizations to gain awareness of the gaps between the results it desires in its production and the results that it is actually attaining. This information guides subsequent strategies used by an organization to improve the outcomes of its performance. It has been suggested that comprehensive assessments must consider the impact of each need on all levels of the organization. Many needs assessments do not address all of these levels raising criticism that those assessments cannot guarantee the impact that will be felt in the neglected areas (Kaufman, 1998).

Kaufman's Organizational Elements Model (OEM) was loosely followed as this needs assessment was developed. This model considers the impact of the results on various levels of the system being assessed, and differentiates the means from the ends in the assessment. Another commonly utilized approach is the Training Needs Assessment (TNA) that is often used in the context of human resource development. This approach was less suited to the design of this needs assessment than the OEM (Kaufman, 1998; Triner, 1995).

The development of this report's needs assessment was influenced by a number of resources that guided the step-by-step process of pre-assessment, data gathering, and

analysis (Rouda, 1995; Cline, 1993; Kaufman, 1998; Triner, 1996; Soriano, 1995). These resources suggested strategies for developing the data collection survey tool, the limitations of the survey as a result of a lack of "pretesting", the selection of a sample population, the identification of internal and external clients impacted by the services being assessed, and the consideration of various levels of impact of the assessment.

Methods:

Subjects:

All patients 18 and older seen in the Sukhdev Raj Soin Hospital Mobile Health Clinic were eligible to participate in the data collection. Participation was limited either by the refusal of a potential subject, or the limited number of surveys brought to each clinic. Of the patients presenting to the clinic, only those younger than 18 years of age were excluded. No limitations were employed regarding number of persons of a certain gender, age group, or health status.

Data Collection and Analysis:

This needs assessment for the SRSH's MHC was conducted using a novel data collection survey and focused key informant interviews with hospital administration to identify how closely the clinic system results aligned with the SRSH objectives. The survey tool was designed by the primary investigator in order to collect demographic and health care utilization data from patients along with data identifying the current medical needs of the patients and the interventions offered by the MHC. Participants agreed to take part in a semi-structured interview after having been seen by the physician in the MHC. During the

survey period, 254 patients were surveyed from 6 villages attended by the MHC. Of these, 96% (243) of these surveys were completed in their entirety and used for the data analysis. Excluded surveys lacked answers to one or more questions. No villages were visited more than once during this survey period.

The SRSH MHC was set up in 6 randomly selected villages throughout the region in places such as shared community spaces, school buildings, and even private homes. The choice of location for these MHCs depended on permission from village leaders and appropriate timing to gather the needed staff at the hospital. Staff for the clinics included 1 physician, 1-2 nurses, 1 pharmacy technician, 1 Public Relations Officer (P.R.O.), the van driver, the primary investigator and 1 translator. Nursing staff was present for organization of the clinics including registering each patient at check-in and triage. These staff members performed no physical health examinations.

Patients presenting to the clinic were first registered by name and age then asked to wait in line in order to be seen by the physician. Physician interaction with the patients occurred in a public setting with a secluded exam bed available in only 2 of the 6 clinics surveyed. Though a mobile health van was present at these clinics, it was used solely for transportation and not patient interaction. After being seen by the MHC physician, surveys were completed through a semi-structured interview process that involved the use of a Hindi-English translator. Diagnostic or chief complaint information, along with prescribed interventions, was documented by the physician on the survey itself. The remaining questions were addressed by the primary investigator and the translator in an interview setting. Following this, patients were directed to the pharmacy technician who dispensed the prescribed medications to the patients and discussed recommendations for referrals.

Data collected through the survey was organized in a Microsoft Excel spreadsheet and the Chief Complaints/Diagnoses were classified into categories determined by the primary investigator based on the likely specialty knowledge with which the patient would be approached. Interventions offered were also categorized in Excel based on what was offered by the MHC. These categories included "Medications," "First Aid," and "Referrals." Once the data collection was appropriately organized in an Excel spreadsheet, the information was transferred to SPSS (Statistical Package for the Social Services) to be analyzed. Data were analyzed to reveal frequency measures for variables and the relationships between certain variables that further elucidated trends in demographic and health care utilization at the MHC.

Statement Regarding IRB Approval:

Wright State University's Institutional Review Board reviewed and approved this study before data collection began. IRB approval was obtained to ensure that the survey tool and its planned use did not violate the rights or welfare of the research subjects. The international use of this survey raised questions regarding the need for approval from any type of IRB-like organization in India. No requirement for approval of this type of research was identified.

Results:

Through mobile health clinics in six villages surrounding the SRSH, 243 patient surveys were completed. Of these respondents, 36% (87) were male, and 64% (156) were female. This percentage was reflected similarly in the gender distribution of respondents in

each village. Figure 4 shows the gender distribution by age group. All patients identified themselves as Indian as opposed to Pakistani, Nepali, or any other ethnicity.
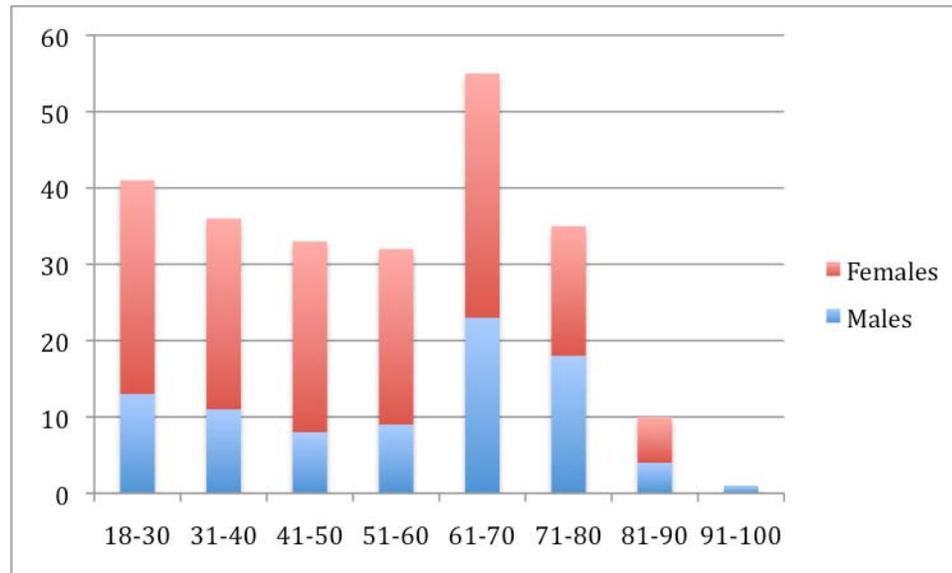
Figure 4: Gender by Age Range

Health Care Access:

Of the 243 patients surveyed, 3.3% (8) reported having attended a previous SRSH MHC prior to the survey period. Overall, the respondents reported that 38.3% (93) typically received health care from their local R.M.P., 35% (85) had no formal health care provider and treated their illnesses at home, 18.5% (45) saw specialist Medical Doctors, 3.3% (8) saw Resident Medical Officers*, only 1.2% reported receiving care at a hospital, and 4% (10) reported care from multiple sources.

_____

*Resident Medical Officer (R.M.O.) – a person trained in general allopathic medicine and holding a Bachelor of Medicine and Surgery (M.B.B.S) degree signifying completion of 4.5 years of medical schooling and one year of internship training.

Education Level:

The education level of the respondents varied with 87% (212) reporting no formal education, 7% (17) completed all or part of Primary School, 4% (10) completed all or part of Secondary School, and less than 2% (4) completed either college or another Graduate level program. Education in relation to age range is shown in Figure 5 below.
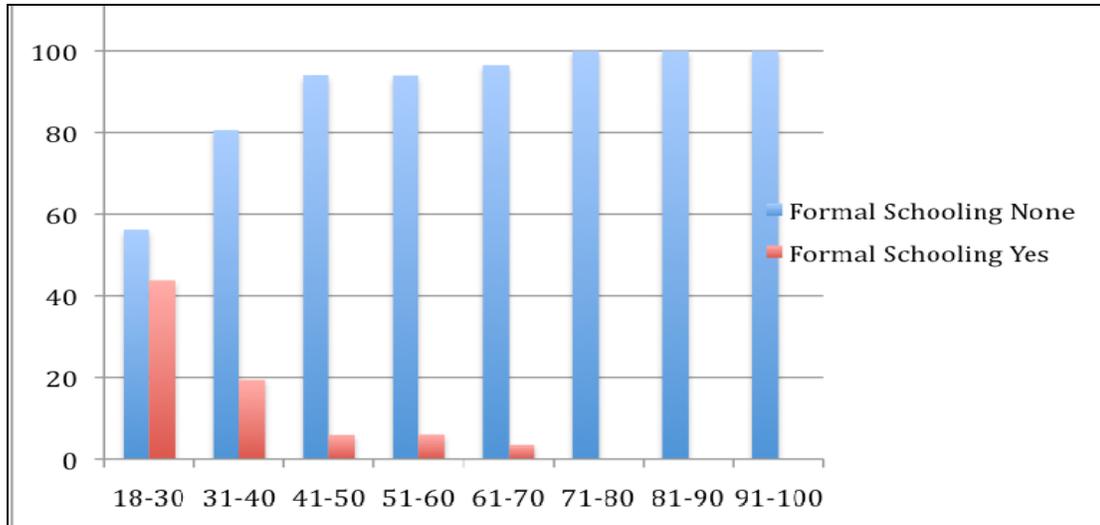
Figure 5: Formal Education by Age Group (%)

Religious Affiliation and Variation by Age:

Overall, 63% of patients identified as Hindu (154) and 37% were Muslim (89), with no one identifying himself or herself as Sikh, Buddhist, Jewish, Christian, or other. The respondents' religious affiliations indicated that individual villages were populated by persons of similar faiths. For instance, 100% of the patients presenting to the MHC from the villages of Aurangabad, Banchari, and Phulwari reported being Hindu. The village of Ghalub was essentially Hindu in religious affiliation, with only one respondent who self-identified as Muslim. Finally, the villages of Raipur and Saraya reported 100% identification as Muslim.

Patients presenting to the clinics in the Islamic villages of Raipur and Saraya had fewer attendees older than age 60 compared to those from the other Hindu villages. Nearly 70% (62) of the 89 Muslim patients were aged between 18 and 60, with only 2.2% (2 patients) being older than 80 years. In contrast, nearly 50% of the 154 Hindu patients (80) were older than 60 years, and 5.8% (9) were older than 80 years.

Occupation by Age and Location:

Within the six surveyed villages, 85% (207) of respondents worked in "agriculture" or "other farming" occupations. Other reported occupations included "business", "governmental work", "education", students, and housewives.

Irrespective of age, 85% (range 80-95%) of respondents worked in agriculture or other farming jobs. (Table 2) A notable exception was the 18-30 year old age range in which only 58.5% (24) of the 41 persons identified their occupations as agriculture. The remaining persons within this age group described themselves as students (59%; 7), housewives (15%; 6), artisans (2%; 1), electricians (2%; 1), drivers (2%; 1), and teachers (2%; 1).

		Occupation						
		Agricultural	Other Farming	Business	Government Work	Education	Other	Total
Age Range	18-30	24	1	0	0	1	15	41
	31-40	30	0	0	1	0	5	36
	41-50	29	2	2	0	0	0	33
	51-60	30	0	1	0	0	1	32
	61-70	46	3	1	0	0	5	55
	71-80	32	0	0	0	0	3	35
	81-90	8	1	0	0	0	1	10
	91-100	1	0	0	0	0	0	1
Total		200	7	4	1	1	30	243

Table 2: Age Range by Occupation Cross-tabulation

All but one village had between 85-100% of their populations working in "agricultural" or "other farming" occupations, such as raising livestock. The exception to this was the village of Phulwari, with 49% (17) of its 35 respondents reporting their occupations as "housewives" and 6% (2) as "students." "Agriculture" and "other farming" in this village accounted for only 37% (13) of MHC attendant occupations.

Typical Health Care Provider by Location:

Patients presenting to the MHC utilized a variety of health care strategies, with some variation according to location. A significant proportion of patients in each village (average 35%) had health care issues addressed at home, with the villages of Raipur (52.5%; 32 out of 61) and Banchari (37.3%; 19 out of 51) having the greatest percentages. Rural Medical Practitioners (R.M.P.) were also utilized quite commonly in all villages (average 38.3%),

though the 3 villages of Saraya, Phulwari, and Ghalub had the highest proportion of usage at 51.6% (16 out of 31), 43% (15 out of 35), and 47% (23 out of 49), respectively. Medical doctors were unevenly sought out for care, with utilization being high in the villages of Aurangabad (44%; 7 out of 16) and Ghalub (31%; 11 out of 35) but lower in the villages of Banchari (17.6%; 9 out of 51) and Raipur (11.5%; 7 out of 61).

Table 3: Typical Health Care Provider by Location Cross-tabulation [% (Number)]

| | Typical Health Care Provider | | | | | | |
Location	Home	Rural Medical Practitioner (R.M.P.)	Resident Medical Officer (R.M.O.)	Medical Doctor (M.D.)	Hospital	Multiple Health Care Providers	Total
Aurangabad	31.3% (5)	18.8% (3)	.0% (0)	43.8% (7)	.0% (0)	6.3% (1)	100.0% (16)
Raipur	52.5% (32)	31.1% (19)	1.6% (1)	11.5% (7)	1.6% (1)	1.6% (1)	100.0% (61)
Banchari	37.3% (19)	33.3% (17)	11.8% (6)	17.6% (9)	.0% (0)	.0% (0)	100.0% (51)
Ghalub	22.4% (11)	46.9% (23)	.0% (0)	30.6% (15)	.0% (0)	.0% (0)	100.0% (49)
Phulwari	28.6% (10)	42.9% (15)	2.9% (1)	20.0% (7)	2.9% (1)	2.9% (1)	100.0% (35)
Saraya	25.8% (8)	51.6% (16)	.0% (0)	.0% (0)	.0% (0)	22.6% (7)	100.0% (31)
Total	35.0% (85)	38.3% (93)	3.3% (8)	18.5% (45)	.8% (2)	4.1% (10)	100.0% (243)

Medical Questionnaire:

Ninety-six percent (233) of the 243patients answered survey questions for themselves. Parents answered the survey for an adult offspring in 1.6% of cases (4), 1.6% (4) had a husband who completed the questions, and 0.8% (2) had an RMP provide survey answers.

Patients' reported past medical histories are listed in Table 4. The "Other" category was comprised of items not contained within the survey tool, and included such conditions as 10.7% (26) reporting cases of cataracts that had surgical interventions in the past, 4.1%

(10) reporting cases of prolonged fevers or infections, 2.9% (7) reporting chronic pain requiring medications, 2% (5) were gynecologic cases, 1.2% (3) had orthopedic procedures, and there were singular reports of renal, thyroid, prostatic, hepatic, and endocrine issues (0.4% each).

Table 4 – Medical History Per Patient Report		
Condition	*Number*	*%*
High Blood Pressure	11	4.5
Heart Disease	0	0
Cancer	0	0
Stroke	3	1.2
Pulmonary Disease	22	9
Tuberculosis	3	1.2
HIV/AIDS	0	0
Hepatitis	1	0.4
Malaria	10	4.1
*Other	66	56.9
Total reporting past medical history	116	47.7
Total # Patients	243	100

* "Other" category includes medical histories of pain, cataracts, infections, hysterectomies, hernias, tubal ligations, diabetes mellitus, anemia, and other conditions.

The number of complaints reported per patient on the survey is described in Figure 6. The proportion of all 243 patients presenting with one complaint was 60% (147), 31.6%

(77/243) presented with 2 complaints, 7.4% (18/243) presented with 3 complaints, and just 0.4% (1/243) reported 4 complaints in the MHC.
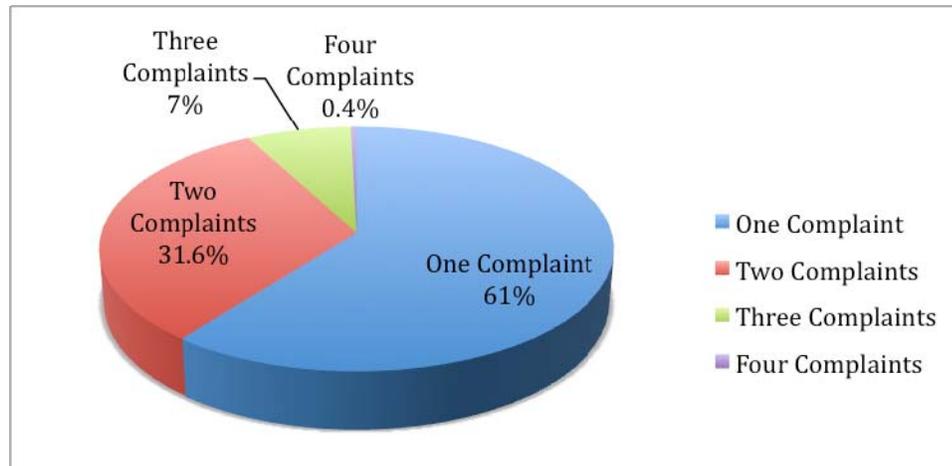
Figure 6: Number of Complaints per Patient Presenting to the SRSH MHC

Of the 147 single complaints, the ones most commonly recorded include 30% musculoskeletal (44), 13.6% dermatologic (20), 13% pulmonary (19), and 8% gastrointestinal (12). Pulmonary complaints were infectious for 16 of the 19 patients; eleven of the 20 dermatologic complaints were infectious; and 9 of the 12 gastrointestinal complaints were infectious demonstrating a high percentage of infections in these common single complaints.

Seventy-seven patients presented with 2 complaints, and again, the commonly reported complaints include musculoskeletal, pulmonary, gastrointestinal, and dermatologic issues. When patients presented with 2 complaints, pulmonary and musculoskeletal complaints comprised 7.8% (6), pulmonary and gastrointestinal complaints comprised 7.8% (6), and pulmonary and infectious complaints comprised 6.5% (5). These were the most common pairings with other variations comprising the rest of the 2 complaint pairings.

The diagnoses and/or chief complaints recorded by the examining physician are presented in Table 5.

Table 5 – Diagnoses/Chief Complaints				
		Number	Percent of Total Patients	Percent of Subcategory
	Infections			
Total # Infections		133	54.7	-
-	Unspecified Infection	105	-	79
-	Viral Infection	4	-	3
-	Bacterial Infection	10	-	7.5
-	Parasitic Infection	12	-	9
-	Other	2	-	1.5
	Trauma			
Total # of Trauma		1	0.4	-
-	Blunt	1	-	100
-	Penetrating	0	-	0
-	Auto	0	-	0
	Chronic Medical Condition			
Total Chronic Medical Conditions		314	n/a	-
-	Cardiac	2	0.8	0.6
-	Respiratory	48	19.7	15
-	Gastrointestinal	38	15.6	12
-	Genitourinary	12	4.9	3.8
-	Obstetrics	3	1.2	0.95
-	Gynecologic	20	8.2	6.4
-	Dermatologic	35	14.4	11
-	Musculoskeletal	80	32.9	25.5
-	Neurologic	0	0	0
-	Allergic	2	0.8	0.6
-	Endocrine	4	1.6	1.3
-	Ophthalmologic	19	7.8	6
-	Ear, Nose, and Throat	8	3.3	2.5
-	Headache	18	7.4	5.7
-	General	22	9	7
-	Psychologic	3	1.2	0.95

Common Complaints:

Probable Infections were seen in 54.7% (133) of the total number of persons examined, with 80% (106) of those 133 patients with infections not receiving any specific infectious diagnosis (Table 5). No diagnostic testing was performed during the MHC visit to delineate any specific infectious agents.

Chronic medical conditions were the largest category of complaints, with the most commonly identified conditions being musculoskeletal (32.9%; 80), respiratory (19.7%; 48), gastrointestinal (15.6%; 38), and dermatologic (14.4%; 35). Only 2 patients (0.8%) had complaints relating to suspected cardiac issues. Psychological issues such as depression were also rarely reported, with only 3 patients (1.2%) overall.

Only one patient reported a complaint related to a trauma and/or an accident. This trauma was described as a blunt trauma occurring when the patient dropped a weighted load upon his foot.

Common Complaints by Location:

Infections were a common complaint no matter where the patients lived, ranging from 46% (28) of the 61 persons in the village of Raipur to 63% (22) of the 35 persons and 64.5% (20) of the 31 persons in the villages of Phulwari and Saraya, respectively. The majority of these infections in each village were without a specifically identified pathogen. Forty percent (42) of these 105 patients were referred for further diagnostic services. The village of Aurangabad had an equal number of unspecified infections and suspected parasitic infections, each 18.8% (3) of the 16 total complaints. Raipur, with 61 patients, also had a significant number of infections designated as parasitic (11.5%; 7). Of the seven cases, five were suspected scabies and 2 were malaria.

Musculoskeletal complaints were common in most villages (average 33%; 80 of the total 243) but were disproportionately low in the village of Saraya at 13% (4) of the 31 patients.

Pulmonary issues were common, averaging 20% (49) of the complaints from the 243 patients presenting to the MHC. The range of these complaints varied in the different villages, ranging from 0% to 39% (12 of 31 patients in the village of Saraya).

Gastrointestinal complaints were reported in 15.6% (38) of the 243 MHC patients, with higher numbers occurring in patients from the villages of Aurangabad (25%; 4 of 16) and Phulwari (31.4%; 11 of 35).

Headaches were an infrequent complaint overall at an average of 7.4% (18) of the total 243 patients, but were reported by nearly 20% (10) of the 51 patients in the village of Banchari.

General complaints that did not fit into any other category occurred at an average of 9.1% (22) of the total 243 patients, but were disproportionately noted in the villages of Raipur (14.8%; 9 of the 61) and Saraya (19.4%; 6 of the 31).

Common Complaints by Age Range

Many complaints, such as infections, musculoskeletal, dermatologic, and general, had relatively even distributions amongst all age groups with the obvious exceptions of obstetrical and gynecologic issues occurring more frequently in younger patients between 18 and 40 years old. The 71-80 year old age group had 40% (14) of its 35 persons reporting pulmonary complaints, which was twice the generally reported average. Over 11% (4) in the same age group also reported genitourinary complaints, which again was more than twice the overall average (4.9%; 12). Gastrointestinal issues were reported by

30.6% (11) of the 36 persons 31-40 year old age group, which was nearly double the average of 15.6% (38) in all age groups.

Common Complaints by Gender:

Common complaints were similar between males (87 persons) and females (156 persons) in most categories. Males had higher percentages of ophthalmologic complaints (Males: 11.5% (10) vs. Females: 5.8% (9)), dermatologic issues (24% (21) vs. 9% (14)), genitourinary problems (9.2%; 8 vs. 2.6%; 4), and pulmonary diagnoses (26.4% (23) vs. 16%; (25)). Females had greater numbers as compared to males when gastrointestinal complaints (Females: 17.3% (27) vs. Males: 12.6% (11)), headaches (9.6% (15) vs. 3.4% (3)), and general complaints (11.5% (18) vs. 4.6% (4)) were reviewed.

Interventions of the Mobile Health Clinic (MHC):

The interventions offered by the MHC of the SRSH are described in Figure 7 and included medication prescriptions and referrals to outside services. Medications alone were given to 58% (141) of the 243 patients, referrals alone were offered to 2.9% (7) of patients, and 39.1% (95) of patients received both medications and referrals.
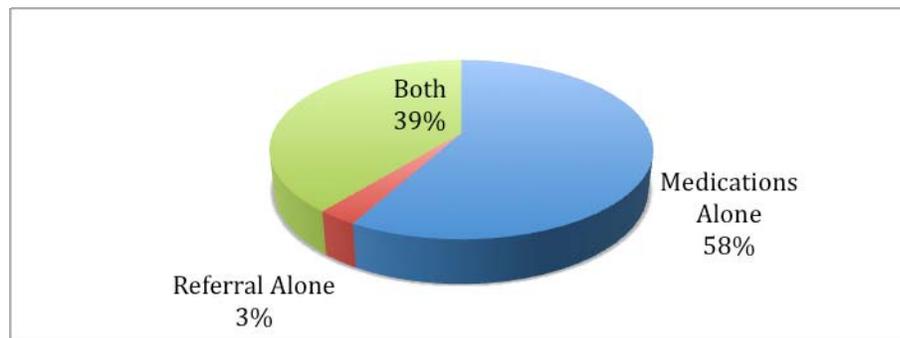

Figure 7: Interventions at the SRSH MHC

Table 6 lists the pharmaceutical interventions provided by the MHC, and Table 7 lists the referrals provided by the MHC. No patients were treated with first aid

interventions, such as cleansing and bandaging wounds. Medications were very frequently

prescribed to those who presented to the MHC, as 97% (236/243) of all patients received

some type of medication.

Table 6 – Pharmaceutical Interventions provided by the Mobile Health Clinic			
Intervention	*Number of Patients*	*Percent of Total Patients*	*Percent of Total Medications*
Medications	236	97	-
- Antibiotics	142	-	58.4
- Pain Medications^	127	-	52.2
^ - These pain medications included Non-steroidal Anti-inflammatory Drugs (NSAIDs), Paracetamol, Aspirin, various muscle relaxors, and herbal supplements			

Table 7: Referrals Provided by the Mobile Health Clinic			
Intervention	*Number of Patients*	*Percent of Total Patients*	*Percent of Total Referrals*
Total # Referrals	134	n/a	-
Total # Patients Receiving Referrals	102	41.9	-
- Diagnostic Referral	119	-	86.5
- Treatment Referral	15	-	13.5
Referral: Ophthalmology	5	-	3.7
Referral: Radiology	33	-	24.6
Referral: Pathology	44	-	32.8
Referral: Urology	4	-	3
Referral: Orthopedics	12	-	8.
Referral: Gynecology	17	-	12.7
Referral: Surgery	8	-	6
Referral: Internal Medicine	11	-	8.2
Referral: Dental	0	-	0
* - This number reflects the total diagnostic and treatment referrals ordered. The number of patients receiving referrals was 102. Seven patients received both a diagnostic and a treatment referral to a single department. Twenty-one patients received diagnostic referrals to two different departments; one patient received diagnostic referrals to three departments.			

Antibiotics by Infection Type:

Of all 133 patients who were diagnosed with presumed infection, 88% (117) received antibiotics as part of the MHC interventions. In those 105 patients diagnosed with an infection without a specific pathogen (i.e. viral, bacterial, parasitic, or other), 93.3% (98) were prescribed antibiotics as part of the MHC intervention. All four of the patients that had presumed viral infections received antibiotics as part of their treatment course. Nine out of ten patients with presumed bacterial infections received antibiotics from the MHC. The only patient who did not receive antibiotics was presumed to have tuberculosis. There were twelve patients who had presumed parasitic infections, mostly diagnosed clinically with malaria. No anti-malarial drugs were distributed through the MHC but all of these patients were referred for diagnostics and treatment at the SRSH. However, four of these patients did receive supplemental anti-bacterial medications as part of their treatment course. Finally, two patients had presumed infections in the "other" category and both were treated with antibiotics through the MHC. It is notable that 24.5% (27) of the 110 patients without any suspicion of infection received antibiotics from the MHC. (Table 8)

Table 8: Antibiotic Use by Infection Type		
	Antibiotics	
	<u>No</u>	<u>Yes</u>
Total Infections	12% (16)	88% (117)
Infections Not Specified	6.7% (7)	93.3% (98)
Viral	0% (0)	100% (4)
Bacterial	10% (1)	90% (9)
Parasitic	66.7% (8)	33.3% (4)
Other	0% (0)	100% (2)
No Documented Infection	-	24.5% (27)

Referrals by Location and Gender:

Of the total 243 patients, referrals were submitted for 104 patients (42.8%) through the MHC. This number reflects a diagnostic referral, treatment referral, or both. Seventy-four percent (23) of the 31 patients surveyed from the village of Saraya had referrals for extended services, while Raipur had referrals for 47.5% (29) of its 61 patients, Ghalub had 45% (22) of its 49 patients referred, Phulwari had 40% (14) of its 35 patients referred, Aurangabad had 31% (5) of its 16 patients referred, and Banchari had referrals for 21.6% (11) of its 51 patients. (Table 9) The majority of referrals were given for diagnostic services such as radiology, pathology, or clinical specialist recommendations. Solely diagnostic referrals accounted for 85.6% (89) of the 104 total referrals, 6.7% (7) were solely treatment referrals, and 7.7% (8) were both. The highest number of treatment referrals was ordered for patients in the village of Raipur where 16.4% of the 61 patients (10) had issues that required medical or surgical interventions that could not be provided through the MHC.

Table 9: Location Code by Total Referrals Cross-tabulation				
		Total Referrals		
		No	Yes	Total
Location	Aurangabad	68.8% (11)	31.3% (5)	100.0% (16)
	Raipur	52.5% (32)	47.5% (29)	100.0% (61)
	Banchari	78.4% (40)	21.6% (11)	100.0% (51)
	Ghalub	55.1% (27)	44.9% (22)	100.0% (49)
	Phulwari	60.0% (21)	40.0% (14)	100.0% (35)
	Saraya	25.8% (8)	74.2% (23)	100.0% (31)
Total		57.2% (139)	42.8% (104)	100.0% (243)

Referral percentages were similar between males (87 persons) and females (156 persons), 40.2% (35) and 44.2% (69), respectively. This applied for both diagnostic and treatment referrals, with most sub-types of referrals following suit. When compared to females, males had a higher percentage of radiologic referrals (Males: 16.1% (14) vs. Females: 10.9% (17)), and a lower percentage of pathologic referrals (10.3% (9) vs. 22.4% (35)).

Discussion:

Overview:

The Sukhdev Raj Soin Hospital (SRSH) administration described the purposes of the Mobile Health Clinic (MHC) as (1) achieving positive interaction with regional villagers, (2) encouraging the use of the SRSH facilities for healthcare needs, (3) providing triage, referrals, and basic health care services for patients attending the clinics, and (4) distinguishing the SRSH care from the care that patients received from other local providers. The format of the MHCs left many gaps between the administration's objectives for the clinics and the results that were seen during the survey period.

These gaps included limited patient-physician interaction in overloaded MHCs, a lack of diagnostic and treatment abilities in the clinics, little effort toward the professional development of Rural Medical Practitioners (R.M.P.), and no formal strategy for encouraging the use of the SRSH for referral services. It is uncertain whether the reputation of the SRSH with the villagers was improved following the services of the MHC.

This needs assessment identified that the majority of patients attending the clinics were agrarian workers with little to no formal education, two-thirds of whom utilized

either local R.M.P.s or sought no formal health care at all. These patients commonly presented with musculoskeletal, respiratory, dermatologic and/or gastrointestinal complaints. Infections were also a common issue seen in the clinics, and without necessary diagnostic tools available, antibiotics were prescribed liberally regardless of the type of infection present. Due to the format of the MHC having few diagnostic technologies and interventions, medications were commonly prescribed as 97% of patients received them, and referrals for further services were recommended in nearly 42% of cases encountered.

Patient Demographics:

- Religion

During six clinic days in which the SRSH ran mobile health clinics in various regional villages, over 776 patients attended the clinics and of these 243 fully participated in the survey process. Demographics of this group varied by village.

Sixty-three percent of patients were Hindu and the remaining 37% were Muslim. This is a higher number of Muslims than the country average (11% Muslim, 82% Hindu) and likely represents a high concentration of Muslims in this part of India, but may only be the result of small sampling numbers (World Health Organization, 2006). Another observation regarding the religious affiliation of the sampled populations was that each village was almost entirely uniform in their religious identification, highlighting the importance of religion in shaping the cultures of these villages. The data did not reveal any trends between diagnoses and the religious homogeny. All respondents, both Muslim and Hindu, identified themselves as Indian.

- Age

Interestingly, the reported ages of the patients attending the clinics disproportionately fell as multiples of 5, such as 25 years old, 30 years old, etc. This observation was consistent between all age groups above 18 years of age and may be attributable to a cultural disinterest within the villages toward the specific age of its population that leaves its members uncertain of their actual ages. It was also noted that the Muslim villages of Raipur and Saraya had a lower percentage than the largely Hindu villages of persons attending the MHC who were older than 60 years old. Possible explanations include an overall lower life expectancy in those villages; a reluctance of older Muslim generations to seek health care services; or rather this may have only been by chance due to the small number of sampled villages and patients. If there is a lower life expectancy in these villages, lifestyle factors may contribute to this and may be targetable by SRSH public health services in an effort to improve relations with these villagers. This data did not identify lifestyle factors specific to those villages on which to focus.

- Occupation

A large majority of the persons in all villages (85%) identified their occupations as 'agricultural' or 'other farming' supporting the claim that this region of India thrives on its agrarian economy. Other occupations were represented in small numbers with the youngest age group (18-30 years old) having more persons identifying with these (Table 2). The non-agricultural occupations for this group included students, an artisan, an electrician, an auto driver, and one teacher, possibly reflecting a slow push in the younger generations of these villagers toward

the development of skilled labor beyond agriculture. Notably, people identifying as housewives came in the highest numbers in the Hindu village of Phulwari and may represent a distinction of these women's roles in agricultural families that was not made in the other villages.

- Education

The Indian education system is largely government run and is divided into primary and secondary levels. Primary school covers children from the ages of 6 through 14. Secondary school covers children from 14 through 18 years of age. Beyond these, the country offers a large system of public and private colleges, graduate schools, and trade schools. Eighty-seven percent (212) of the 243 respondents to this survey reported no formal schooling, but corresponding with the observations above, the 18-30 year old age group had the highest proportion of persons having completed at least some level of formal education. The high number of persons with no formal education may be over-represented in this survey because they are the population that have the time at midday to attend a clinic, or they are the ones that do not utilize any other type of health care outlet and therefore see a greater value in these clinics than persons who have a higher level of education.

- Prior mobile health clinic visits

Within this group of six rural villages, 3% (8) had attended a prior SRSH MHC. Since MHCs had been previously run in these villages within the past year, it is unclear whether this low number of repeat attendees is by chance or whether it is a reflection of the patient satisfaction with the MHC. It is possible that patients at

prior MHCs are more willing to utilize hospital services now due to their past experience with the MHC and therefore have no need for the MHC services, or else if they had poor impressions of the MHC they may have avoided the current MHCs. This level of satisfaction with the MHC would be an appropriate variable to measure in future studies so that the clinic can be responsive to its patients' concerns and continue building the SRSH reputation.

- Typical health care providers

The most utilized type of health care providers were R.M.P.s at 38% (93) of the total 243 patients, with Medical Doctors and R.M.O's, both allopathically trained providers, being used by at least 21.8% (53) of the patients. Few patients (3.3%; 8) identified R.M.O.s as their providers, and it is possible that the distinction between M.D.s and R.M.O.s was not well understood in these villages, and that more persons were familiar with the designation of M.D. Both types of providers are titled "doctor" and both are trained as general practitioners within the Indian system of allopathic medicine, but M.D.s have undergone extra years of formal training in a medical or surgical specialty. The majority of the remaining respondents (35%; 85/243) reported that they have utilized no formal providers for their personal health care. It may be reasonable to think that a higher percentage of this population will utilize hospital facilities in the future due to the increased access on account of the proximity of the SRSH to their villages.

Reported Medical Histories versus National Standards:

The reporting of medical histories during the survey process identified variable rates of illnesses when compared with the national averages. High blood pressure, for

instance, was reported in 4.5% of respondents, though the 2005 rate in India was 8.7% for males and 13.2% for females (World Health Organization, 2005). The National Family Health Survey-III (NFHS-3) from 2005-2006 reported a national rural prevalence of tuberculosis at 0.47%, and a prevalence of 0.34% in Haryana, whereas this survey identified 3 of 243 persons (1.2%) who had previously diagnosed cases of tuberculosis. (2 of the 3 were extra-pulmonary manifestations per the patient reports) (International Institute for Population Sciences and Macro International, 2007). The higher prevalence of tuberculosis in our population may be a reflection of the setting in which our patients were surveyed. Whereas the NFHS-III was a door-to-door survey of families in their home setting, this survey population was of persons presenting to a medical clinic. This clinical setting makes it more likely that persons with tuberculosis would present for issues relating to that disease or other co-morbidities that are common to tuberculosis patients.

Malaria is another example, with the prevalence in Haryana estimated to be 0.15%, but our surveyed population reported a prevalence of 4.1% (Kakkilaya, 2009). Without appropriate facilities for testing, and confirming these diagnoses, it is possible that some of these cases were over-reported. This high percentage may also reflect on the health culture in this part of India that, due to the high prevalence of malaria relative to other parts of the world, may assume a diagnosis of malaria when persistent fevers are reported for an extended period of time.

Notably, 4.5% of the patients surveyed reported a history of high blood pressures and 1.2% reported a history of a stroke. No patients reported heart disease, though this may have been a limitation of the survey's definition of what constituted "heart disease". Other studies in parts of India have used symptom descriptions, such as "angina/chest

pain," or a further breakdown of the category "heart disease" into specific conditions (i.e. Myocardial Infarction, Cardiomyopathy, etc.) in order to study this issue. Using different terms for cardiovascular disease may have allowed for an increased reporting of this morbidity on the surveys since it is presumably more common than what presented to the MHCs. The national prevalence rate for coronary heart disease alone in rural areas is estimated at over 5% (Indrayan, 2005). Cardiovascular disease was noted in 2002 to be the leading cause of death in India and a significant burden on the healthcare system with health expenditures expected to increase 50% by 2012 to 12% of the total healthcare market (Chronic Care Foundation, 2007). It is likely that this population has a higher prevalence of cardiovascular diseases than was identified in this study and that addressing these issues may be one important way for the hospital to impact these communities. Health education will promote the awareness of heart problems and may lead to increased recognition of these issues in the future so that people are not only presenting for health care when acute cardiovascular issues occur.

Pulmonary issues were commonly reported in the patients' medical histories and often correlated with the reason for attending the MHC (i.e. chronic cough, wheezing, and shortness of breath.) Specific diagnoses such as asthma, chronic obstructive pulmonary disease, and others could not be confirmed in the MHC due to a lack of formal testing and a lack of time given to the history and physical exams. It would be beneficial to identify various risk factors within these villages for pulmonary diseases, such as smoking rates, cooking methods, and occupational air pollutants.

Barriers to Health Care Access:

Overall, within this selected population, many do not generally utilize the resources of the medical profession for their care. The reasons for this are less clear, but hypotheses include a lack of access to medical care (the nearest tertiary care center other than the SRSH (all villages lie within a 15km radius from the SRSH) is ~40 km in either direction along National Highway 2 with the nearest government hospital being a two hour drive), the cost of certain services, and a cultural suspicion of allopathic medical practices. The NFHS-3 reported that in the state of Haryana, 72.8% of people do not use public health care, with 54.9% citing poor quality of care as their reason, 42.1% citing no nearby facilities, and 25.2% citing long waiting times as their reason (International Institute for Population Sciences and Macro International, 2007). These barriers continue to limit the utilization of medical care and are a clear disadvantage for the sustainability of a facility like the SRSH. In contrast, those perceived barriers to accessing care could be used to establish goals for the SRSH care that would improve the hospital's reputation and image within the surrounding communities.

Hospital Competition: Rural Medical Practitioners

In discussions with the hospital administration, the largest perceived competition to the hospital was the local health care providers known as Rural Medical Practitioners (R.M.P.s). These practitioners are individuals with variable levels of training who were commissioned by state governments to serve their rural communities as health care providers. An example of the qualifications required to achieve this designation is provided

in an online description of courses offered by the Institute of Alternative Medicines and Research in Kolkata, India:

> "**1.** Any practitioner having at least 3 years experience in any branch of alternative medicines. (Acupressure, Acupuncture, Bach Flower remedies, Yoga, Massage, Herbal Treatments, Magnetic Therapies, Su Jok or any form of "Alternative Medicine".)
>
> (Your experience is more important. Even if you have self studied or learned from someone. You may be eligible for certification after providing Experience Certificate (for 3 years) and Character Certificate)
>
> OR
>
> **2.** Diploma and / or Degree holders of any authentic institution." (Institute of Alternative Medicines and Research, 2006).

The lack of standard training for these practitioners has led some allopathic physicians to consider these people "less than fully qualified" and "quacks." Nonetheless, these providers are highly regarded in the villages surrounding the SRSH. R.M.P.s are the first line providers for most persons in the villages and they are the trusted source for deciding when a person requires a referral to another provider or the SRSH. With this culture in place, the SRSH relies on the positive referrals of the R.M.P.s for patients to present to the hospital and trust the services provided there. Positive professional relationships with local R.M.P.s must be an essential goal for the SRSH administration. The MHC has a unique opportunity to meet the R.M.P.s in their own villages and offer assistance with medical and educational resources that could bolster their relationships and potentially improve the quality of care provided by the R.M.P.s.

Quality Care in the Mobile Health Clinic (MHC):

The SRSH MHC has an objective to earn the trust of the population by providing a distinct quality of care to patients who attend the clinics that differs from the R.M.P.s. It is debatable that the MHC achieved this goal due to the limited interventions that were offered by the physician at the clinics, limited history and physical exams, and very little interpersonal conversation at the clinics. Contrast this to the description provided by SRSH physicians about the care of the R.M.P.s who are a constant presence in the villages, who also do limited physical exams, but who treat liberally with medications such as steroid and antibiotic injections, arguably building confidence in part by allowing patients to feel immediate relief of most ailments with questionable interventions (K. K. Gupta, M.D., personal communication, February 28, 2010). This comparison, plus the traditional "authoritarian" attitude of physicians toward patients (Fochsen, 2006) may be perpetuating forces behind the cultural suspicion of allopathic "Western" medicine in the villages surrounding the hospital. It may also be that the interpersonal relationships that patients have with their R. M. P.s is a strong part of why these patients trust those providers for their care. The SRSH may do well to consider this difference in care as they improve their services to these communities. Finally, no comparison has been made between the outcomes of care provided in the MHC and that of the R.M.P.s, but this would provide data that might delineate the medical value of these clinics or of the R.M.P.s for that matter.

Diagnostic Limitations of the Mobile Health Clinic (MHC):

The limitation of the diagnostic abilities in the MHC was demonstrated through analysis of the types of comments recorded in the "chief complaint/diagnosis" section of

the Data Collection Tool. As stated above, these comments were recorded on the tool by the physician attending the clinic. Many diagnostic assumptions were made in these assessments leaving the approach to care difficult to focus. For instance, the "general" category had 9% (22) of patients with complaints that did not readily fit into a more specific category. Common complaints included general "Body Pain," "Weakness", "Giddiness", and "Body Swelling." It is possible that some of these complaints could have a psychological origin relating to diagnoses such as depression and anxiety, but this could not be formally assessed in the MHC. Also, the "Infections" category involved 54% (133) of the total patients with only 21% (22) of those 133 receiving a judgment as to whether it was a viral, bacterial, parasitic, or other infectious cause (i.e. Fungal). Even with the presumed designation of a viral infection, four out of four of these patients received an antibiotic prescription as part of their intervention from the MHC. Patients for whom the physician had a suspicion of a serious, or non-self-limiting infection were referred to the hospital for further diagnostic testing such as a sputum Acid-fast Bacilli test for tuberculosis, a Widal test for Salmonella typhi among other causes of enteric fever, an Ova and Parasites stool test, or blood tests for malaria. The MHC may be more useful if it could establish a system of mobile testing and follow-up for these common cases, but the added costs to the hospital and the difficulty in tracking patients may limit this intervention.

Referrals and Follow-up:

Triage and examinations provided by the MHC resulted in 41.9% (102/243) of patients surveyed being referred for further services at the hospital. Unfortunately, the SRSH did not have a formal process established for tracking whether the referred patients actually presented for the recommended services. The MHC also made no effort to ensure

presentation of the referred patients to the hospital for the appropriate follow-up. Transportation was not provided and no communication avenues were created to make it easier for the patients to schedule appointments or request help if needed. This lack of follow-up effort made it hard to assess the impact of the MHC, but is a simple area on which to focus performance improvement initiatives. Through this, the value of the MHC to the SRSH would be clearer as the administration would be able to consider the revenue added from the referral service proceeds.

Low Hospital Utilization by Villagers:

Another observation taken from the collected data was that only 1.2% (3) of the 243 patients surveyed reported ever attending a hospital, showing the likelihood that this population is reserved about presenting to the SRSH due to their overall unfamiliarity with hospitals. If referred patients were provided transportation to the referral services at the hospital there would be a potential benefit to many of the SRSH MHC goals. This would likely increase patient exposure to the hospital, hopefully improving the impression of the hospital services, leading to better health outcomes, and distinguishing the SRSH care from the R.M.P.s. The SRSH might also benefit from the increased number of surgical patients who are referred from the MHCs. These patients could then receive these more complex interventions and pay for high-value services from the hospital.

Sukhdev Raj Soin Hospital (SRSH) Publicity:

Publicity for the hospital is being provided with each MHC, but it was unclear whether brief attendance at these free clinics had a positive or negative effect on the perception of the SRSH and its services. It is noteworthy that the patients presenting to

those clinics are sacrificing work time and potential income to attend. This makes it necessary for the MHC to provide a valuable experience in the clinics in order for patients to see this service as worth more than what they give up to be there. A future study considering patients' impressions of the care they receive at the MHC and the hospital after having attended a MHC would give a more in-depth assessment of the issue.

Variations of Clinic Charges: Benefits and Limitations

Five out of six of the mobile health clinics during the survey period were run at no charge to the patients and limited supplies of prescribed medications were dispensed for free in these clinics. The rationale for this was that more people would attend the clinics if there were no charge, and this would increase the publicity and potentially increase the number of referrals to the hospital. During these clinics, an average of 144 patients attended in a time period from 10:00am until 2:00pm. The patient volume in that limited time frame made the encounters little more than a discussion between the physician and patient regarding chief complaints and some exploration of the patient's medical history. The cost of these clinics for the hospital included personnel, travel, equipment, and medications, all coming at a loss to the SRSH. A comparison was made between this type of clinic and mobile health clinics run when the hospital was initiated. At the initial clinics, a registration fee was charged and medicines were sold at cost. The results showed comparable referral numbers and minimal fixed costs despite an average of only 74 patients attending these clinics. The cost presumably auto-regulated the number of non-acute patients presenting to the clinic but did not stop the patients who were more likely to require extended services. It was not clear from this assessment whether more time was spent examining each patient during the "for charge" clinics than at the "no charge" clinics,

Needs Assessment for the Mobile Health Clinic   51

though the physician attending those clinics reported that it was so. Costs for personnel time were considered equivocal as the same number and types of workers were present for all clinics.

During the survey period, the administration of the SRSH decided to run the MHC in the village of Saraya with an attendance cost of 3 Rupees (equivalent to just over 6 cents in U.S. currency). This clinic was attended by 54 patients, and of the 31 patients surveyed in this MHC, 74.2% (23) were referred for further services. This proportion of patients referred in this setting is consistent with the percentages of referrals from MHCs charging for attendance prior to the survey period, and bolsters the argument that charging money for these services decreases the number of patients with minor complaints. Nine patients presented to this clinic but decided their issues were not important enough to justify the cost of seeing the physician. Considering these trends, it is recommended that the SRSH affix a cost to these MHCs in order to prevent overcrowding at the clinics, allow more time for health examinations, and recoup some of the financial investment of the hospital.

Limitations of the Needs Assessment:

This needs assessment was limited by the small number of survey participants, the short period of time during which the survey was administered, a lack of survey pretesting, a reliance on a translator for interview services, a lack of follow-up capabilities for patients after the clinics, and inconsistent costs for attendance at the various MHCs.

Summary:

The SRSH MHC was operated during this survey period in a format that reached many persons in various villages surrounding the hospital. The interventions offered were limited to certain medications and referrals to additional services, though no formal plan was instituted for following-up the recommendations. Several gaps were identified in the actual versus desired achievements of the MHC, and suggestions were made regarding opportunities to better reach the administration's goals. The problems readily identified included limited patient-physician interaction, overcrowded clinics for the amount of time allotted, lack of a cogent strategy for following-up patients or ensuring the use of referral services, and no plan for advancing relations with the R.M.P.s. In short, the MHC appears to have done little to develop the reputation of the SRSH in its surrounding communities. Some recommendations for improvement include using the MHC to assist the professional development of local R.M.P.s through educational and medical resources; establishing a system to monitor patient follow-up and promote the use of referred services; and investing in mobile diagnostic technologies. Another strategy that might enhance the reputation of the SRSH in the long run would be to apply a minimal cost to MHC attendance and, perhaps, medications. This could limit the number of patients with minor complaints presenting to the clinics, hopefully leading to longer and more substantive interactions between the MHC physician and patients. A secondary benefit of a nominal charge for MHC access and medications could be to offset, in some fashion, the costs incurred by the SRSH to operate the MHCs. Upcoming assessments ought to address the limiting factors of this study in order to achieve better quantitative and qualitative data for analysis.

Conclusion:

This needs assessment for the SRSH MHC delineated the demographics and the medical needs of the patients presenting to these mobile clinics, and also accounted for the interventions offered to those patients. Potential exists for improving the outcomes of the MHC in order to meet the stated goals of the SRSH administration. Future studies that could follow-up on the care given to patients at the MHC and also assess patient satisfaction with the MHC would provide useful data for identifying the impact of these clinics.

References:

1. Alcoba, N. (2009). Hitting the road to alleviate India's rural doctor shortage. *Canadian Medical Association Journal*. 2009 May 12;180(10):E34-6

2. Alexy, B. B., & Elnitsky, C. A. (1996). Community outreach: rural mobile health unit. *Journal of Nursing Administration.* Lippincott-Raven Publishers. 1996 Dec;26(12):38-42

3. Alexy, B. B., & Elnitsky, C. A. (1998). Rural mobile health unit: outcomes. *Public Health Nursing*. 1998 Feb:15(1):3-11

4. Bednar, A. (1988). Needs Assessment as a Change Strategy: A case study. *Performance Improvement Quarterly.* 1(2). p. 31-39.

5. Boland, P. (2007). The emerging role of cell phone technology in ambulatory care. *Journal Ambulatory Care Management*. 2007 Apr-Jun;30(2):126-33.

6. Burton, J., & Merrill, P. (1988) Needs Assessment: Goals, Needs and Priorities. In L.J. Briggs, K. L. Gustafson, M. H. Tillman, (Eds.), *Instructional Design: Principles and Applications.* Englewood Cliffs, NJ: Educational Technology Publications.

7. Chandrasekhar, C. P., & Ghosh, J. (September 19, 2006). *Health expenditure in india. The Hindu Business Line*. Retrieved November 18, 2008, from http://www.thehindubusinessline.com/2006/09/19/stories/2006091901451100.htm

8. Chishti, I. (2003). *Unani herbal healing.* The American institute of Unani medicine. Retrieved February 24, 2010, from http://www.unani.com/whatisunani.htm

9. Chronic Care Foundation. (2007). *Chronic Diseases: The Indian Scenario.* Retrieved January 16, 2010, from: http://www.chroniccareindia.org/chronic_disease_india.htm

10. Cline, E., & Seibert, P. (*1993*). Help for first-time needs assessors. *Training & Development Journal.* 47:S, p99(3).

11. Country studies. (n.d.). *India: health care.* Retrieved November 12, 2008 from http://www.country-studies.com/india/health-care.html

12. Daviaud, E., & Chopra, M. (2008). *How much is not enough? Human resources requirements for primary health care: a case study from South Africa.* Bulletin World Health Organization. 2008 Jan;86(1):46-51.

13. Du Mortier, S., Michel, M., Berzig, A., & Perrin, P. (2006). *Mobile health units: methodological approach.* Geneva, Switzerland: International Committee of the Red Cross.

14. Edgerley, L. P., El-Sayed, Y. Y., Druzin, M. L., Kiernan, M., & Daniels, K. I. (2007). Use of a community mobile health van to increase early access to prenatal care. *Maternal Child Health Journal.* 2007 May;11(3):235-9.

15. Fochsen, G., Deshpande, K., & Thorson, A. (2006). Power Imbalance and Consumerism in the Doctor-Patient Relationship: Health Care Providers' Experiences of Patient Encounters in a Rural District in India. *Qualitative Health Research*, Nov 2006; 16: 1236 - 1251.

16. Franklin, V. L., Greene, A., Waller, A., Greene, S. A., & Pagliari, C. (2008). Patients' engagement with "Sweet Talk" - a text messaging support system for young people with diabetes*. Journal of Medical Internet Research.* 2008 Jun 30;10(2):e20.

17. Government of India. (2009). *District Faridibad.* Retrieved April 5, 2010 from: http://faridabad.nic.in/

18. Goyal, S. K., & Yadav, J. P. (1979). Allocation of doctors to health centres in Haryana State of India – A case study. *Journal of the Operational Research Society* 1979 May;30(5):427-431.

19. Gupta, M.D., & Rani, M. (November 2004). *India's public health system. How well does it function at the national level?* The World Bank. [Electronic version]. Retrieved November 17, 2008 from: http://scripts.mit.edu/~varun_ag/readinggroup/images/1/1e/Paper.pdf

20. International Cyber Business Services. (2007). Ayurveda. International cyber business services, Inc. Retrieved March 8, 2010, from: http://www.holisticonline.com/ayurveda/ayv-introduction.htm

21. Holtshousen, W. S., & Smit, A. (2007). A cost-efficiency analysis of a mobile dental clinic in the public services. *Journal of the South African Dental Association.* 2007 Sep;62(8):334, 336-8, 340.

22. Howe, E. C., Buck, D.S., & Withers, J. (2009). Delivering health care on the streets: challenges and opportunities for quality management. *Quality Management in Health Care.* 2009 Oct-Dec; 18(4): 239-46.

23. Index mundi. (2008). *India demographics profile 2008.* Retrieved November 1, 2008 from: http://www.indexmundi.com/India/demographics_profile.html

24. Indian child. (2000). *Healthcare india. Role of the government.* Retrieved November 5, 2008 from: http://www.indianchild.com/healthcare_india.htm

25. Indrayan, A. (2005). *Forecasting vascular disease cases and associated mortality in India.* Background Papers: Burden of Disease in India, National Commission on Macroeconomics and Health*,* Government of India, 2005: 197-215.

26. Institute of Alternative Medicines and Research. (2006). *Eligibility check-list for "RMP – AM" certification.* Kolkata, India. Retrieved 2/24/2010 from: http://www.onlinediploma.in/RMP-AM.htm

27. International Institute for Population Sciences and Macro International. (2007). *National Family Health Survey (NFHS-3), 2005–06: India: Volume I*. Mumbai: IIPS.

28. Kakkilaya, B. S. (2009). Malaria in India. *Malaria Site.* Retrieved March 13, 2010 from: http://www.malariasite.com/malaria/malariainindia.htm

29. Kanjlal, B., Mondal, S., Samanta, T., Mondal, A., & Singh, S. (2007). A parallel health care market: rural medical practitioners in West Bengal, India. *Research Brief: Institute of Health Management Research* 2007 June;02 retrieved 2/2/2010 from: http://www.docstoc.com/docs/18266728/A-Parallel-Health-Care-market-Rural-Medical-Practitioners-in

30. Kaufman, R. (1998). *Strategic thinking guide to identifying and solving problems.* American society for training & development/International society for performance improvement. Arlington, VA & Washington, D.C.

31. Lafuente, C. R., Eichaker, V., Chee, V. E., & Chapital, E. (2007). Post-Katrina provision of health care to veterans in a mobile clinic: providers' perspectives. *Journal American Academy of Nurse Practitioners.* 2007 Aug;19(8):383-91.

32. Maini, B. (2007, July 23). *10 ways to improve india's healthcare system*. Rediff India abroad. Retrieved November 12, 2008 from: http://www.rediff.com/money/2007/jul/23health1.htm

33. Ministry of Health and Family Welfare. (2002). *National health policy-2002.* Government of India*. [Electronic version]. Retrieved November 12, 2008 from: http://mohfw.nic.in/np2002.htm

34. National Commission on Macroeconomics and Health. (2005, September). *India's health system: the financing and delivery of health care services.* New Delhi, India: Ministry of Health and Family Welfare, Government of India.

35. Oriol, N. E., Cote, P. J., Vavasis, A. P., Bennet, J., Delorenzo, D., Blanc, P., & Kohane, I. (2009). Calculating the return on investment of mobile healthcare. *Bio Med Central.* 2009 Jun 2;7:27.

36. Pahau, D., & Brian, G. (2009). Free cataract surgery may undermine local services in developing countries. *Clinical & Experimental Ophthalmology*. 2009 Jul;37(5):532-3

37. Pasricha, A. (2006, May 3). *India offers both best, worst of health care*. New Delhi. Accessed November 1, 2008 from: http://www.voanews.com/english/archive/2006-05/2006-05-03-voa32.cfm

38. Patel, N. (August 31, 2005). Evaluating the role of primary health centers in India. *Express healthcare management.* Retrieved November 18, 2008 from: http://www.expresshealthcaremgmt.com/20050831/ruralhealthcare01.shtml

39. Peek, M. E., & Han, J. H. (2009). Compliance and self-reported barriers to follow-up of abnormal screening mammograms among women utilizing a county mobile mammography van. *Health Care for Women International*. 2009 Oct; 30(10):857-70.

40. Philips Electronics. (2008, July 7). *Background information on the Indian healthcare sector.* Retrieved February 12, 2010 from: http://www.newscenter.philips.com/main/standard/about/news/press/20081121_indian_healthcare_backgrounder.wpd

41. Pricewaterhouse Coopers. (2007). *Health care in India: Emerging market report 2007*. Pricewaterhouse Coopers.

42. Rouda, R. H., & Kusy, M. E. (1995). *Needs Assessment: The first step*. Retrieved October 12, 2010 from: http://alumnus.caltech.edu/~rouda/T2_NA.html

43. Shieh, Y. Y., Tsai, F. Y., Anavim, A., Shieh, M., Wang, M. D., & Lin, C. M. (2008). Mobile healthcare: the opportunities and challenges. *International Journal Electronic Healthcare*. 2008;4(2):208-19.

44. Singh, J. (September 3, 2002). *India's deteriorating health care system.* BBC news online. Retrieved November 1, 2008 from http://news.bbc.co.uk/1/hi/world/south_asia/2233762.stm

45. Soriano, F. (1995). *Conducting needs assessments – a multidisciplinary approach*. Sage Human Services Guide 68. SAGE Publications, Inc. Thousand Oak, California.

46. Srinivisan, R. (2004). *Health care in India – vision 2020: issues and prospects.* Government of India. [Electronic version]. Retrieved November 12, 2008 from http://www.planningcommission.nic.in/reports/genrep/bkpap2020/26_bg2020.pdf

47. Stillman, P. C., & Strong, P. C. (2008). Pre-triage procedures in mobile rural health clinics in Ethiopia. *Rural Remote Health*. 2008 Jul-Sep;8(3):955.

48. Takulia, H. S., Parker, R. L., & Murthy, A. K. (1977). Orienting physicians to working with rural medical practitioners. *Social Science & Medicine* 1977 Mar;11(4):251-256.

49. Tiwari, L. (n.d.). *Siddha medicine: its basic concepts.* Infinity foundation. Retrieved 2/26/2010 from: http://www.infinityfoundation.com/mandala/t_es/t_es_tiwar_siddha.htm

50. Triner, D., Greenberry, A., Watkins, R. (1996). *Training needs assessment: a contradiction in terms?* Educational technology. 36(6):51-55.

51. United States Department of State. (2009, November 12). *Background note: India.* Retrieved January 13, 2010, from http://www.state.gov/r/pa/ei/bgn/3454.htm#

52. Watkins, R., Leigh, D., Platt, W., & Kaufman, R. (1998). *Needs Assessment – A Digest Review, and Comparison of Needs Assessment Literature.* Performance Improvement. Vol. 37(7). P. 40-53. Retrieved December 27, 2009 from: *home.gwu.edu/~rwatkins/articles/NAdigest2.pdf*

53. Watkins, R. & Kaufman, R. (1996). *An update on relating needs assessment and needs analysis.* Performance Improvement. V35, n10.

54. World Health Organization. (2005). *India: blood pressure, raised*. WHO Global InfoBase. Retrieved March 8, 2010, from: https://apps.who.int/infobase/reportviewer.aspx?rptcode=ALL&uncode=356&dm=18&surveycode=102782a1

55. World Health Organization. (2006, July). *World health survey, 2003: health system performance assessment in India*. World Health Organization and International Institute for Population Sciences.

56. Xirasagar, S., & Misra, P. (2010). India. In J. A. Johnson & C. H. Stoskopf (Eds.), *Comparative health systems: global perspectives* (pp. 237-259) Sudbury, MA: Jones and Bartlett Publishers, LLC.

Appendix: Data Collection Tool

Sukhdev Raj Soin Hospital: Mobile Health Clinic   #_____

Data Collection Tool

(Please Check All That Apply)

1) Patient Age: _____   **2)** a) Male:_____   b) Female:_____

3) Ethnicity/Race: a) Indian_____ b) Pakistani _____ c) Nepali _____ d) Other(Specify)_____

4) Religious Affiliation: a) Hindu_____ b) Muslim_____ c) Buddhist_____ d) Sikh_____ e) Christian_____
f) Other(Specify)_____

5) Occupation: a) Agriculture____ b) Other Farming____ c) Industry____ d) Business____
e) Banking_____ f) Health Care____ g) Government Work _____ h) Education _____
i) Information Technology____ j) Other (Please specify)_____

**6) Level of Completed
   Education:**
a) None _____ b) Primary School – (Part?_____ Complete?_____)
c) Secondary School – (Part?_____ Complete?_____)
d) College _____ e) Technical School _____ f) Graduate School _____

**7) Has the Patient been seen in
   this clinic before?**
Yes_____ No_____ (If yes, **Month?**_____ **Year?**_____)

**8) Where is health care usually
   obtained?**
a) Home_____ b) Resident Medical Practitioner (RMP) _____
c) Resident Medical Officer (RMO)_____ d) Medical Doctor(MD)___
e) Hospital_____ f) Mobile Health Clinic_____
g) Other Health Care Providers (Specify)_____

9) Any Medical Conditions: **Treatments: (check all that apply)**

a) High Blood Pressure_____   Medications_____; Surgery_____ Ayurvedic_____;
Homeopathic____ Other (Please specify)_____

b) Heart Disease_____   Medications_____; Surgery_____ Ayurvedic_____;
Homeopathic____ Other (Please specify)_____

c) Cancer_____   Medications_____; Surgery_____ Ayurvedic_____;
Homeopathic_____ Other (Please specify)_____

d) Stroke_____   Medications_____; Surgery_____ Ayurvedic_____;
Homeopathic_____ Other (Please specify)_____

e) Pulmonary Disease_____   Medications_____; Surgery_____; Ayurvedic_____;
Homeopathic_____; Other (Please Specify)_____

f) Tuberculosis_____   Medications_____; Surgery_____ Ayurvedic_____;
Homeopathic_____ Other (Please specify)_____

g) HIV/AIDS_____   Medications_____; Surgery_____ Ayurvedic_____;
Homeopathic_____ Other (Please specify)_____

h) Hepatitis____   Medications____; Surgery____ Ayurvedic____;
                                              Homeopathic____ Other (Please specify)_____

i) Malaria____   Medications____; Surgery____ Ayurvedic____;
                                              Homeopathic____ Other (Please specify)_____

j) Other (Specify)_____   Medications____; Surgery____ Ayurvedic____;
                                              Homeopathic____ Other (Please specify)_____

12) Relationship of Person
**   Completing Form to the Patient:**   1) Self_____ 2) Parent_____ 3) Husband_____
                                           4)Other(Specify)_____

(For Clinic Use Only)

Chief Complaint:

Interventions: