



# Tele-Health delivery models in India

## - An analysis

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## **Acknowledgements**

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## Background & Overview

The booming Indian healthcare sector is facing enormous challenges, particularly in the area of rural healthcare delivery. Inadequate infrastructure and qualified medical practitioners are considered the main reasons for the poor state of rural healthcare. Task-shifting, with paramedics taking a greater responsibility of care, is growing but this often needs to be supplemented with doctors' opinions. Tele-health has evolved over the last decade as an interesting solution to provide distance support to healthcare workers at scale. Technology solutions can also serve to support monitoring and data management which also are major challenges in today's healthcare systems. Most innovations are currently found in the private sector and it is important to establish a discussion on how tele-health can be integrated with the public healthcare system to address the challenges in primary care. With this background in mind, ACCESS Health International undertook a comparative analysis of three innovative models in tele-health to facilitate a discussion with policy makers on how the government can benefit from these innovations and what it can do to bring good practices to scale.

Towards this end, ACCESS Health International has undertaken a comprehensive analysis of three innovative tele-health models currently operational in India. This report is the outcome of the study, and aims to give the reader an understanding of the various aspects of a tele-health delivery model.

## Methodology

ACCESS Health developed an exhaustive framework to analyze various aspects of tele-health delivery models. The framework was used to analyze models of three tele-health organizations currently operational in India – CARE Rural Health Mission, World Health Partners and E-Health Point. Each of these organizations looks to increase healthcare access in rural India. Each organization is unique in terms of its funding, operational and clinical delivery model.

Primary and secondary research was undertaken to understand the state of tele-health in India. Interviews were conducted with senior executives and ground staff of each of the three organizations. Field visits were undertaken to study on-the-ground working of each model. Based on this research, ACCESS Health identified key success factors for tele-health in India, as well as challenges and opportunities in this field. Based on these findings, ACCESS uncovered the main hindrances to large-scale adoption of tele-health solutions in India and came up with recommendations to fasten the adoption of tele-medicine in the country.

## Model 1: CARE Rural Health Mission

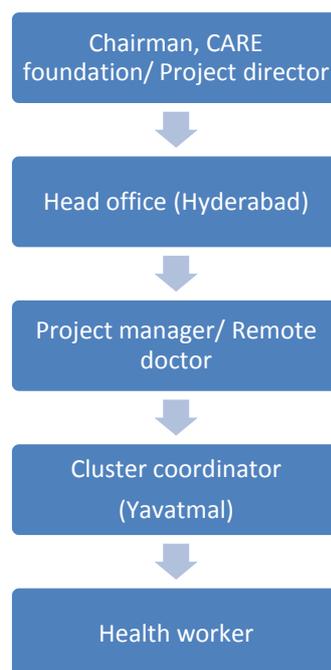
### Network model & Scope of services

CARE has a hub-and-spoke model for tele-health delivery. It operates a central hub, based in Yavatmal district of Maharashtra that serves 40 villages (spokes) in nearby areas. It serves close to 1000-1200 patients per month across its various primary care centres. Each of the forty primary care centres (spoke) provides diagnostic services for basic ailments such as high blood pressure, diabetes, anaemia etc. In addition to clinical services, it also provides drugs, sanitary napkins and nutritional supplements to the rural patients. The spokes are manned by the 'Village Health Champion' (VHC), who is a married woman based in the village, and is trained by CARE in providing basic diagnostics.

The primary care centres are serviced by a central hub located in the town of Yavatmal. The hub has an advanced diagnostic lab that houses equipment for blood tests, ECG, Ultrasound etc. The hub also has a well-stocked pharmacy used to supply drugs to the primary care centres. Doctors see patients at the hub at specified hours during the day.

Care Rural Health Mission is the winner of mbillionth South Asia 2011 and winner of NASSCOM Emerging IT application awards.

### Organizational hierarchy



CARE appoints one rural health worker for each village. The health worker, also called Village Health Champion (VHC) is a female who has considerable social equity in the village. She is responsible for undertaking day-to-day visits to patients in the village, primary care treatment and screening, insurance enrolments etc. For patients requiring treatment, she captures the symptoms on a standardized diagnosis form and informs the remote doctor of the same, who then prescribes the medicine that is delivered to the patient by the VHC. All cluster coordinators report to the project manager who is responsible for coordination of activities across all villages.

CARE is headquartered at Hyderabad, Andhra Pradesh.

## Infrastructure

Local community provides physical space for the primary care centre in each village, which is usually housed in pre-existing facilities such as the '*Anganwadi*'. The VHC is available for approximately four hours each Monday in the primary care centre where villagers can come and consult her. On other days, the VHC visits the nearby communities to gather information about the general state of health of the people and to check on any patients who were unable to visit her. As mentioned in the earlier section, in cases where patients require medication and further consultation, the VHC captures symptoms on a standardized diagnosis form and informs the remote doctor of the same, who then prescribes the medicine that is delivered to the patient by the VHC.

The hub has the following physical infrastructure:

- Front office
- 3 beds
- Pharmacy
- 2 chambers for visiting physicians
- Administration space

The staff members (all reporting to cluster coordinator) at hub are:

- Front office person
- Administrator
- Pharmacist
- Micro-insurance officer
- Supply chain executive
- Lab technician

Technology infrastructure components at the hub include:

- ECG machine
- Laboratory
- Blood pressure monitoring equipment
- Blood sugar (glucose) monitor
- For X-ray and Ultrasound, patients are referred to a nearby hospital.

The Village Health Champion carries a kit that includes the following:

- Blood Pressure monitor
- Weighing machine
- Thermometer
- Anemia kit
- Blood glucose monitor
- Drugs
- First aid kit

In the current model, only basic technology is used to provide health access to the rural population. Technology does not seem to play a key role in the provision of services, other than providing a communication channel between the rural patients and medical practitioners. CARE is currently piloting handheld devices that would be given to a sample of VHCs. As of December 2011, 8 VHCs had been given these handheld devices for use under the pilot program. The handheld point-of-care devices have Java or Android-based applications built in to support various tasks (such as disease identification, recording information on past health, current

symptoms, insurance etc.) currently manually performed by the VHCs. The device would have a built-in decision-support system to assist the VHC in her decision-making. The device would be used to record medical and micro-insurance transactions. To enable easy adoption of devices, the applications are being built in local languages. Each handheld devices costs approx. INR 23,000 to procure. In the near future, CARE is planning to migrate to android smartphones/tablets in the scale up program of villages in the states of Andhra Pradesh and Odisha.

65% of the primary care problems are treated at the village level by the village health champion and 35% at hub clinic. Villages are now connected 24 X 7 and CARE Hospitals Doctor attend calls of health workers at any time of the day, if required.

### Revenue model

The villagers are typically charged Rs. 10 per consultation by the VHC. At the town level (Hub), they are charged Rs. 20 per consultation. Average total cost of treatment (as reported by CARE) is Rs. 37 including consultation, drugs and basic lab investigations.

CARE also operates a cost-plus drug pricing model at village level, depending on affordability levels of local community. Drugs are typically sold below MRP at village health centers, but sold at MRP at town-based hospitals. CARE also operates a micro-insurance model that has helped to increase the patient enrolment rates.

CARE Foundation currently funds 25% of all costs incurred, while the rest 75% funding comes from external donors. It is planned to make the model self-sustainable in the next 2 years.

### Value-added services: Micro-insurance

High healthcare costs are a major hindrance to the adoption of healthcare services by low-income rural population. To alleviate this issue, CARE has a unique micro-insurance model that covers the major ailments and services required by rural patients. Patients have the option of choosing from monthly, semi-annual and annual premium schemes. This provides flexibility and also enables patients to pay smaller amounts on a monthly basis, resulting in lower one-time expenses. The three schemes are summarized below:

Annual premium* = Rs. 300	Semi-annual premium * = Rs. 150	Monthly premium* = Rs. 30
<ul style="list-style-type: none"> <li>•High one-time cost</li> <li>•Low enrolment rates</li> <li>•Low enrolment even after introduction of health savings card</li> </ul>	<ul style="list-style-type: none"> <li>•Recently introduced</li> <li>•Relatively higher enrolment levels</li> </ul>	<ul style="list-style-type: none"> <li>•Low one-time cost</li> <li>•Highest enrolment rates</li> </ul>

\*per family

Approximately 1000 families (~4000 persons) are currently enrolled in these schemes.

Some of the diseases covered under the insurance scheme are:

- Minor cough and cold/flu
- Diarrhoea/Dysentery
- Constipation
- Joint pains
- Stomach ache
- Headache

- First aid
- IV fluid requirements
- Fever
- General weakness

Most of the covered diseases require patients to visit the hub/specialist clinic. Medicines are provided to insured patients at reduced cost.

There are 5-6 hospitals in the nearby areas which honour the micro-insurance cover. According to figures reported by CARE, value added services provided to the micro-insurance members benefit each insured family by more than Rs.140 (apart from savings on transportation costs, loss of wages etc.)

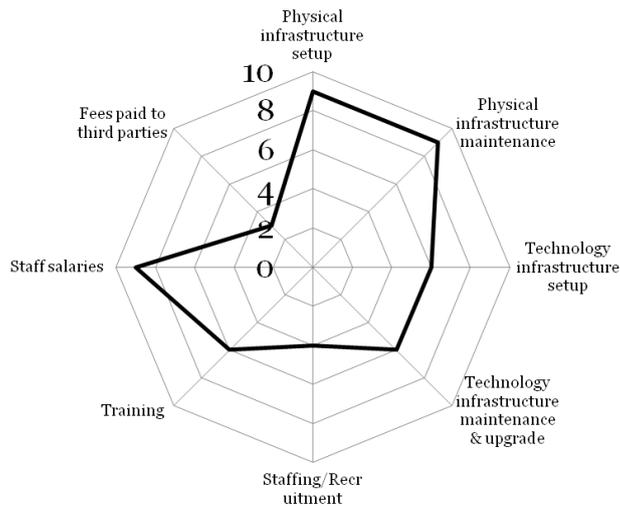
A self-reported snapshot of micro-insurance indicators for the period June 2010 to November 2011 is given below:

<b>Indicator</b>	<b>Results</b>
Members enrolled	765 policies (4336 lives)
Premium collection	Rs. 249,012
Net operating income	Rs. 93,590
Overall incurred claims ratio	72%
Claims ratio at hub clinic level	50.5%
Claims ratio at VHC hub clinic level	49.5%
Renewal rate ratio	Not yet started
Coverage ratio	9.5%
Claims rejection ratio	0
Frequency of per-capita claims	1.28

### **Cost & Time components**

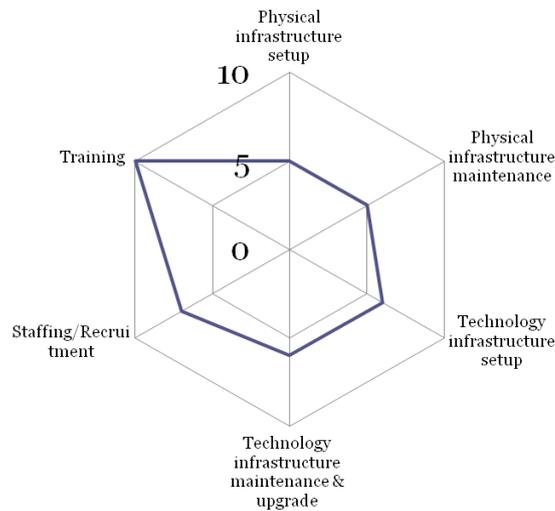
Physical infrastructure setup and maintenance is the biggest cost component for CARE. Despite the fact that physical space in the 'Anganwadi/School/Gram Panchayat' is provided by the local community for use by the VHC, setting up the hub requires considerable investment.

### Relative cost components\*



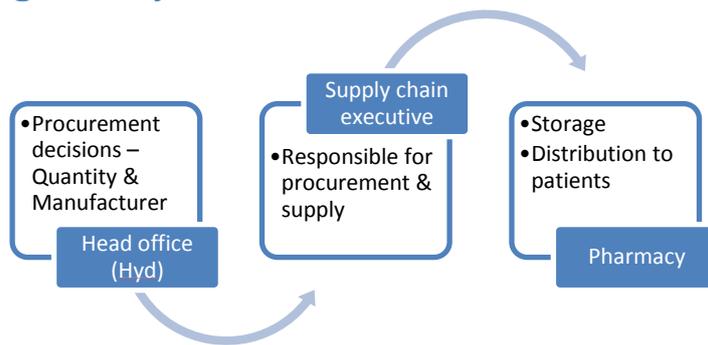
Since the CARE model is not very technology intensive, technology infrastructure setup and maintenance is not a major cost component.

### Relative time components\*



Recruitment and training of local staff is the most time-consuming element in the CARE delivery model. The organization makes considerable efforts in providing adequate training to its personnel, which is key to the success of healthcare delivery. CARE addresses the recruitment issue by involving the local communities in the decision-making processes. The local community helps identify contenders for the post of VHC. CARE officials then conduct interviews and shortlist 3-4 potentials, out of which a VHC is finally chosen. Training responsibilities are divided among various staff members to enable faster and more efficient training.

## Drug delivery model

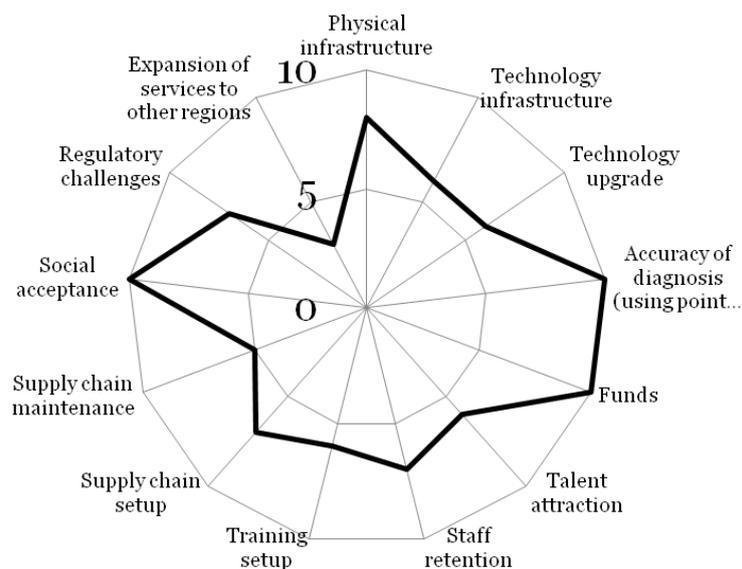


Procurement decisions related to costs, quantity and manufacturer are taken at the Hyderabad head office. The supply chain executive procures drugs from the manufacturer and distributes them to the village-level pharmacies, from where the drugs are distributed to VHCs and patients. The supply chain executive keeps track of drug stocks at each pharmacy. In case a drug stock gets over earlier than expected, the VHC or local pharmacist can also intimate the supply chain executive who then arranges for a stock replenishment.

Recently, responsibility of drug procurement and supply has been transitioned to cluster coordinator as well.

## Challenges

### Major challenges\*



CARE views social acceptance of its model as key to its success. It makes great efforts to obtain buy-in from the local community in the regions it serves. Many of CARE's on-the-ground staff have considerable social status in the village.

To improve its accuracy of diagnosis, CARE is piloting handheld devices that would make the diagnostic process easier for its VHCs. The handheld device would contain the questions a VHC is supposed to ask the patient, decision-support system and provision for digital data storage. The algorithms are developed by doctors at Care hospital who knows the local context and the way people understand and answer questions in the local language.

To address funding issues, CARE ties up with external donors in addition to the funds available from CARE foundation itself.

## Talent management

Talent management is key to the success of the CARE delivery model, since tele-health adoption is typically driven by the bond between between the VHC and local community. CARE recruits VHCs in consultation with heads of the local community, such as the panchayat.

The VHC is a married woman from the village and usually has the following qualifications:

- Minimum 7<sup>th</sup> grade pass
- Knows local language; can read, write and speak well
- Good communication skills
- No political ambitions

Once recruited, the VHC spends a month understanding the healthcare needs of the villagers and bonding with the local community. CARE also uses this time to gauge the commitment levels of the VHC. During this time, training is provided to the VHC in primary care, secondary care and technology. The VHC also develops an understanding of the micro-insurance model.

Once onboard, the VHC is entrusted with the following responsibilities:

- Primary care services
- Chronic care screening
- Home visits
- Enrolments
- Health education
- Reproductive health services
- Outreach program

A snapshot of the VHC training process is given below



In 'level 1', the VHC is given lessons on soft skills, how to interact with patients, overview of her responsibilities, expectations etc. During the level 1 training, the VHC is expected to make visits to various communities in the village, understand their health issues and further strengthen her social equity. This process typically lasts for one month following which the VHC moves on to medical trainings. This training is provided by existing in-house CARE staff.

Level 2 training lasts approximately six days, during which the VHC is trained on primary care – symptoms, disease identification, common drugs etc. and to identify conditions when advanced care would be needed. The VHC is also made familiar with the micro-insurance schemes in the CARE model and the technology/devices used.

Level 3 training consists of ongoing training modules, which happens once every 45 days. VHCs from all spokes gather at the hub to discuss issues, exchange lessons and learn more about the evolving healthcare needs of their communities.

For all the trainings, VHCs are expected to come to the hub located in Yavatmal town.

### **Future plans**

CRHM is shortly expanding to 70 more villages in East and West Godavari districts using its village health worker model. At present, it is covering more than 400 villages in Andhra Pradesh, Maharashtra and Odisha. It is also running a 180 village program in Kalahandi, Odisha since April 2012 which has been described by the CRHM management as a much leaner and efficient model. CRHM is now present in three Indian states - Andhra Pradesh, Maharashtra and Odisha.

## Model 2: World Health Partners (WHP)

### Network model & Scope

The various components of WHP's network model are:

- **SkyCare Providers**  
Local rural health providers who already live in the village are trained to act as WHP's direct local health agent. These local agents receive training in delivering basic diagnostic services, and also provide health products such as non-clinical contraceptives and over-the-counter products. Working locally, Sky Care Providers refer patients requiring more sophisticated or advanced treatment to other partners in the network and earn an incentive for each referral.
- **SkyHealth Centres**  
SkyHealth Centres bridge the gap between rural areas where clients reside and the quality health care they need which is only available in larger towns and cities. Using the latest advances in satellite and internet technologies, reliable power backup and customized software, SkyHealth Centres enable remote diagnosis and audio-visual communication between rural patients and qualified city doctors at a Central Medical Facility.  
Each SkyHealth Centre is established and run by a local woman entrepreneur in the village, working in close partnership with a male member of the family. WHP assists the SkyHealth Centre entrepreneurs by providing training, marketing, and technological support. A steady flow of paying patients is assured through referrals by Sky Care Providers in the surrounding villages. Providers are expected make a substantial investment and take entrepreneurial risks to encourage a high level of commitment.
- **Central Medical Facility**  
The Central Medical Facility houses a panel of experienced, qualified physicians who consult with clients in SKY Centres located in the villages of the WHP network. These doctors, many of them specialists, provide medical consultations to patients as well as training and education to local physicians.



- **Franchisee Clinics**  
Clients who require surgical or inpatient care involving specialized procedures and healthcare services that cannot be delivered via telemedicine are referred to the nearest Franchisee Clinic. Franchisee Clinic is existing qualified providers with inpatient care in project area.
- **Diagnostic Test Laboratories**  
Diagnostic facilities throughout the project area support SkyHealth centres and Franchisee Clinics. Representatives of these laboratories visit the SkyHealth centres on a pre-determined schedule to collect samples. Reports are delivered electronically to doctors at the Central Medical Facility.

- **Shops**

Rural shops, most of them pharmacies, ensure that clients have access to all the medicines and products they need. SKY Care Providers, SkyHealth Centres, and Franchisee Clinics also have stocks of medicines and contraceptives, including condoms and birth control pills.

	Functions	Personnel in-charge	Coverage	Fee determined by	Location (Town/Village)
<b>SKY Care Center (RHP)</b>	<ul style="list-style-type: none"> <li>•Disease case identification</li> <li>•Cellphone consultation</li> <li>•Patients counseling</li> <li>•Referrals to FCs &amp; TPCs</li> </ul>	Local female and male entrepreneur	One village	Local entrepreneur	Village
<b>SKY health center (TPC)</b>	<ul style="list-style-type: none"> <li>•Disease case identification</li> <li>•Patients counseling</li> <li>•Tele-consultation</li> <li>•Coordination &amp; oversight</li> <li>•Financial settlements</li> <li>•Training</li> </ul>	Local female and male entrepreneur	One TPC per 5-7 villages	Local women entrepreneur	Village
<b>Franchisee clinic</b>	<ul style="list-style-type: none"> <li>•In-person care from Sky network</li> <li>•Evaluation of cases with unclear diagnosis</li> <li>•Specialty services</li> </ul>	Qualified providers	One FC per 20-25 villages	Clinic doctors	Town
<b>Central medical facility</b>	<ul style="list-style-type: none"> <li>•Remote diagnosis</li> <li>•Specialist services</li> <li>•Patients counseling</li> </ul>	WHP management	2 CMFs – in New Delhi and Patna	Individual doctors	<ul style="list-style-type: none"> <li>• New Delhi</li> <li>• Patna</li> </ul>
<b>Diagnostic lab</b>	<ul style="list-style-type: none"> <li>•Testing of samples</li> <li>•Provide collection materials to TPCs</li> </ul>	Lab management	One lab per 20-25 villages	Lab management	Town
<b>Pharmacy</b>	<ul style="list-style-type: none"> <li>•Stock &amp; sell WHP-branded medicine</li> <li>•Counsel patients in medication use</li> </ul>	Local pharmacist	One village	WHP head office	Towns & Villages

## Reported impact

WHP serves 3 districts in the state of Uttar Pradesh, covering a population of 4 million in close to 1100 villages. Typically, each SkyHealth Center sees 4-5 patients per day.

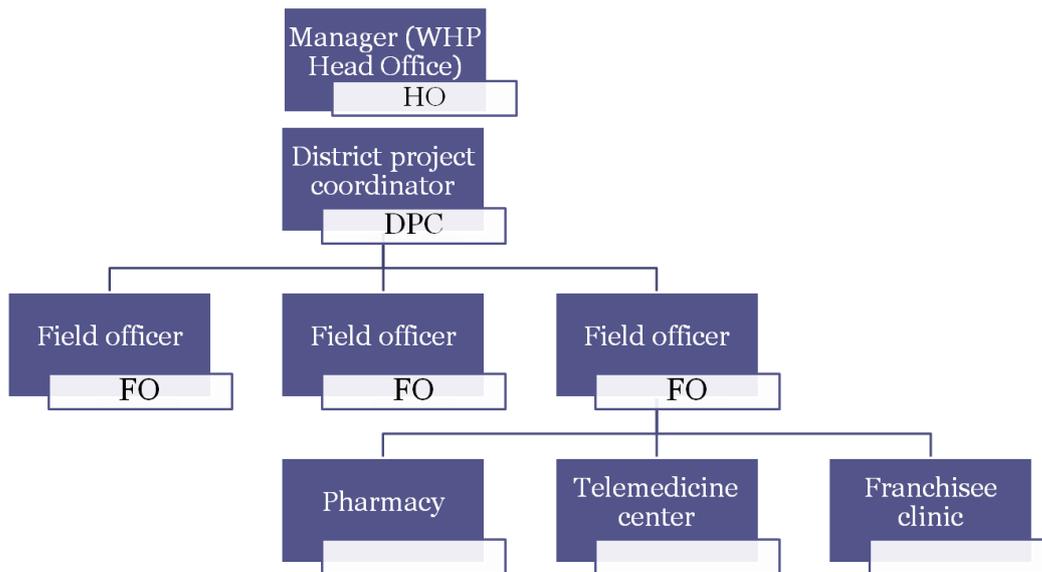
A brief snapshot of WHP’s performance in reproductive health is as below:

<b>Uttar Pradesh project achievement (18-month project period, Nov 2008-Apr 2010)</b>				
<b>Services</b>	<b>Project goal</b>	<b>Achievement</b>	<b>% achievement</b>	<b>CYP* achieved</b>
Sterilization (users)	10,164	10,011	98%	1,25,137
IUD (users)	4,029	5,864	145%	32,252
Injectables (doses)	22,120	19,240	87%	4,810
Pills (cycles)	164,400	170,712	104%	12,194
Condoms (pieces)	9,72,000	14,00,800	144%	14,008

\*Couple Years of Protection: estimated protection provided by contraceptive methods during a one-year period

In the first 18-month period, WHP’s Uttar Pradesh project provided over 25,000 tele-consultations with qualified physicians to rural villagers, in addition to 188,401 couple years of protection (CYP) averting an estimated 107,658 unwanted pregnancies. This increases couple protection in the area over time by 37%, from 28 to 38.3.

## Organizational hierarchy



Field officers manage the operations of the franchisee clinic, telemedicine centre and also oversee the pharmacy operations. The field officer reports to the district project coordinator who in turn reports to the WHP head office.

## Infrastructure

The local entrepreneur responsible for running the SkyCare centre is expected to make all infrastructure-related investments independently.

A typical SkyHealth centre has the following physical infrastructure:

- Waiting area
- Tele-consultation room with examination table
- Storage of essential products

Technology infrastructure components at the SkyHealth centre are:

- Stethoscope
- Computer with internet connection & Webcam
- Pulse rate monitor
- Blood pressure monitoring equipment
- Electro cardio gram
- Temperature monitor
-

	Diagnostic equipment	Point of care devices	Mobile application platform	Issues, if any
<b>SKY Care Center (RHP)</b>	Rapid basic tests equipment	None	Basic cell-phone	Only basic services provided. No decision-support systems for users.
<b>SKY health center (TPC)</b>	Rapid basic tests equipment - <ul style="list-style-type: none"> <li>• BP monitor</li> <li>• Family planning units</li> <li>• ECG units, etc.</li> </ul>	REMEDI devices Biometric devices Decision-support systems	None. SMS-based services used instead of complex mobile apps.	Connectivity issues may arise
<b>Franchisee clinic (FC)</b>	Exhaustive range of equipment	N/A. In-person referrals.	None. In-person referrals.	Patients have to travel to FC to avail services.
<b>Central medical facility</b>	Exhaustive range of equipment (Specialty hospital)	N/A	N/A	N/A

WHP uses SMS-based communication between SkyCare centers and SkyHealth centers, in order to simplify the overall process and to reduce dependency on technology. Mobile applications are typically not used by the village health workers. Numerical codes are assigned to each disease, drug, diagnostic test and referral hospital and information is exchanged via SMS between local health providers at the SkyCare Center and remote doctors. For instance, the local health worker connects to CMF through basic cell phone & doctors send a SMS based coded prescription which includes the diagnosis & treatment, such as ‘D3277’ & M 1234 to the SkyCare providers., where D refers to diagnosis and 3277 is the code for whooping cough, where M refers to medicine and 1234 is the code for a particular drug, such as *paracetamol*. There are similar codes for each pathology test (P) and Referral (R).The decoding is being done by the SkyCare providers with the help of decoding manual provided by WHP during training.

WHP’s technology infrastructure is more advanced compared to the other two models. WHP has a central medical facility from where the calls made by the Sky Network Center are routed to available doctors. The step-by-step process followed when a patient walks into a Sky Network Center is as follows

1. Entrepreneur at the SkyHealth Center captures basic patient information, including age, gender, vitals and symptoms in a digital form in-built in the ReMeDi software.
2. Entrepreneur makes a tele-conference / Mobile call to the central medical facility, where the call is answered by a CMF counselor who then captures further details regarding patient symptoms, if needed.
3. The call is then routed to an available doctor, who interacts with the patient and prescribes drugs and/or further tests. (Doctor-patient interaction happens using a webcam)
4. All EMR is getting stored in central server

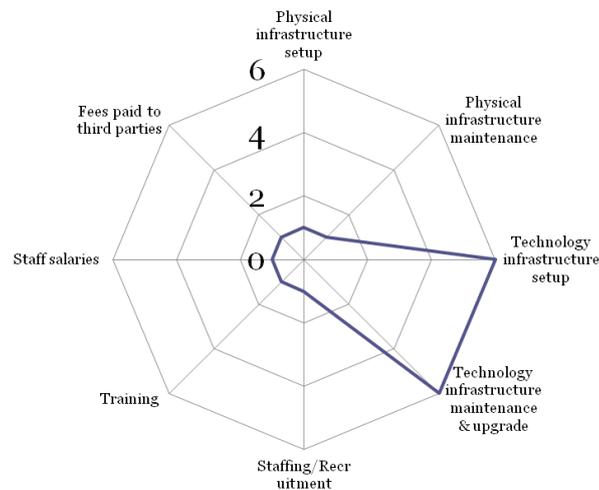
## Revenue model

WHP operates a market-based model, where the local entrepreneur is free to decide the consultation fees based on market needs. Similarly, the Specialist is free to decide his/her consultation charges. WHP gets a margin from the local entrepreneur for every consultation. The CMF doctors are paid a monthly salary based on the number of patients seen.

Initially, WHP funded 75% of the setup costs for the SkyHealth center with the remaining 25% coming from the local entrepreneur. In the current model, local entrepreneur makes 100% of the investment. This also helps to ensure commitment from the local entrepreneur and attract the right talent, in addition to reducing the cost burden on WHP.

## Cost & Time components

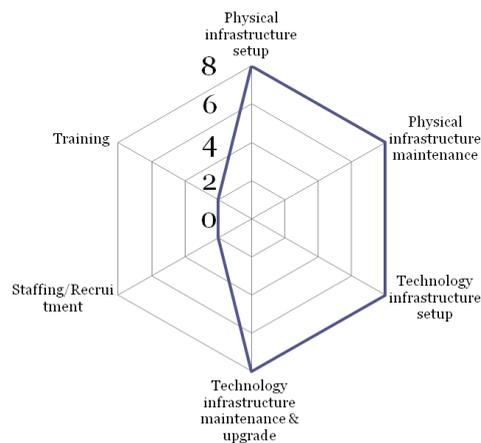
**Relative cost components\***



### Key points:

- The biggest cost component is setup and maintenance of technology infrastructure. Local entrepreneurs pay a refundable deposit of INR 25,000 to WHP for provision of technology infrastructure such as computers, broadband connection etc.
- Physical infrastructure setup & maintenance is the responsibility of local entrepreneurs running the SkyHealth Center, so WHP does not incur any direct costs in that aspect
- Training duration is kept short to minimize expenses.
- Local staff salaries are paid by outsourced agency, hence reducing the burden on WHP.

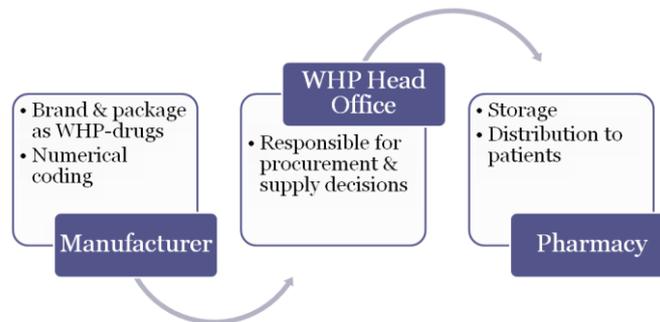
**Relative time components\***



Setup and maintenance of physical and technology infrastructure are the most time-consuming elements for WHP. To address these issues, WHP uses basic SMS-based services for communication

between doctor and network providers. Physical infrastructure setup & maintenance is the responsibility of the local entrepreneur and pre-existing facilities are used, wherever possible.

## Drug delivery model

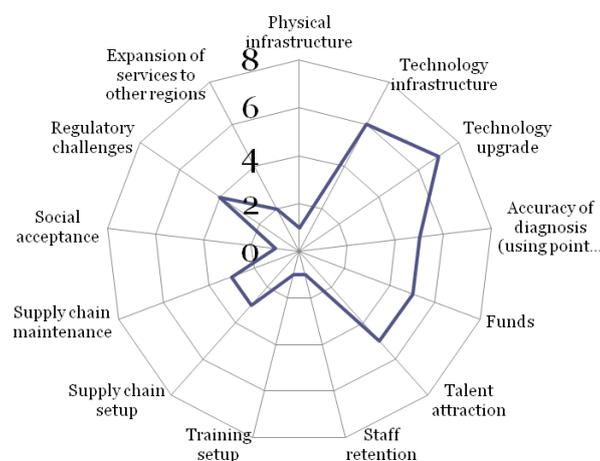


The pharmaceutical supply chain is managed by WHP. Manufacturer brands the generic drugs as 'SkyMeds' and packages them. Each drug is assigned a numerical code by WHP. The WHP head office decides the procurement quantities. Drugs are supplied to each pharmacy who then distributes them to the patients. WHP has planned to buy approximately 800 generic drugs in its procurement list, 100 of which will be procured as SkyMeds which are frequently used.

The pharmacist requests WHP head office for additional stock whenever a drug stock is running low. From time to time, the WHP head office also makes enquiries about drug sales and stocks.

## Challenges

### Major challenges\*



Technology infrastructure setup and upgrade poses a challenge to WHP operations in terms of the costs and expertise involved. However, over the years, WHP has been able to standardize the process and tools used to address this challenge. Funding is another aspect that requires considerable attention. WHP has recently received a grant of \$23.3 Million from Bill & Melinda Gates foundation that has addressed this concern for the projects in Bihar.

## Talent management

Local entrepreneur in-charge of running the SkyCare and SkyHealth units also plays a part in recruiting and managing talent at their respective levels. WHP administration provides training support to all levels, but no major financial support. Staff members are trained on cellphone consultation processes, technology usage, diagnostic tests, family planning, and referral processes etc. Staff is also given trainings on soft skills and motivation. The duration of a typical training module is 3 days.

	Curriculum	Duration of training
SKY CARE center	<ul style="list-style-type: none"> <li>•Cell-phone consultation process</li> <li>•Dipstic tests</li> <li>•Family planning</li> <li>•Motivational trainings</li> </ul>	3 days
SKY Health Center	<ul style="list-style-type: none"> <li>•Diagnostic tests</li> <li>•Disease identification</li> <li>•Technology usage</li> <li>•Referral processes</li> </ul>	3 days (Uttar Pradesh) 6 days (Bihar)

## Model 3: e-Health Point (eHP)

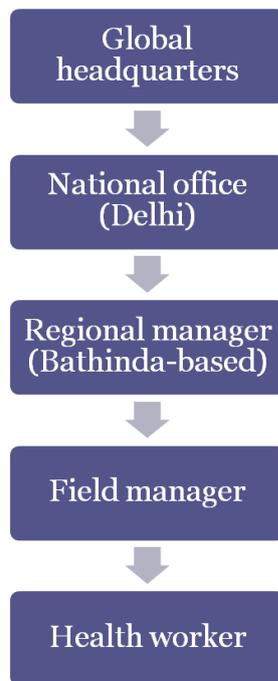
### Model & Scope

E-Health Point has a hub-and-spoke model for tele-health delivery. It operates a clinic or a primary care centre (central hub) in a town or large village that serves a number of smaller villages (spokes) in nearby areas. Each of the smaller villages has a water point provided by eHP that gives access to drinking water to villagers on a pre-paid basis.

eHP serves patients in seven districts across the state of Punjab. The primary care centres provide diagnostic services for basic ailments such as high blood pressure, diabetes, anaemia etc. In addition to clinical services, eHP also provides drugs to rural patients.

In a span of two years (2009-2011), eHP has provided close to 29,000 consultations, 15,000 Diagnostic Investigations and 35,000 prescriptions. It serves approximately 350,000 drinking water users daily.

### Reporting hierarchy



The health worker reports to a field manager, who manages operations, supply chain and cash collection activities. The field managers report to a regional manager based in the town of Bathinda. The regional manager oversees logistics, business acquisitions and opening of new units. The regional manager reports to the National office in Delhi. eHP has its global headquarters in the USA.

### Infrastructure

eHP has an understanding with the state government of Punjab, wherein the state government provides the following:

- Physical space for primary care center, typically on a 15-year lease
- Access to untreated water
- Assistance in hooking up with national grid for electricity supply

eHP funds the cost for the above in most cases, but state or district (or village communities) construct the buildings in some cases. The net result is that public-private partnership accounts for about 25% of eHP capital expenditures. eHP pays for the power itself, as well as for equipping waterpoints, clinics, diagnostic labs, and pharmacies. The eHPs typically do not have x-ray equipment, but they do have autoanalyzers and other equipment in the diagnostic lab. eHP arranges for backup power supply through generators.

A typical eHealthPoint has the following physical infrastructure:

- Front office
- Beds
- Pharmacy
- Administration space
- Storage capacity for 1 day's water

All waterpoints and eHPs are purpose-built with a common design, colour scheme and signage.

The staff members at a typical eHealthPoint are:

- Pharmacist (may also perform some administrative duties)
- Diagnostic technician
- Clinical assistants
- Water operator
- Village health worker

Technology infrastructure components at the eHealthPoint are:

- Video-conferencing facility
- ECG machine
- Laboratory
- Blood pressure monitoring equipment
- Autoanalyzers
- Digital stethoscope

eHP operates a doctor-to-patient model in real-time, where the patient and doctor can interact with each other through a video-conferencing facility using a large screen. Electronic medical records are used to enable remote doctors to do accurate diagnosis and treatment. Approximately 70 diagnostic tests can be administered by eHP professionals.

eHP is looking to pilot Android-based tablets in the near future with the following features:

- Decision-support system
- Bluetooth connectivity to transfer test results
- Display of test results to patient
- Appointment-booking system
- Patient-Health worker communication protocols
- Availability in local languages

## Revenue model

Fee is charged to users for all services, including:

- Consultations
- Diagnostic tests
- Drugs

eHP operates a cost-plus drug pricing model at village level, depending on affordability levels of local community. Cluster units (Water points + Clinic) typically become cash-flow positive in 1 year. Water-units turn profitable in less than 1 year, providing cross-subsidization to clinical units.

## Value-added services: Water-treatment units

eHP provides safe drinking water to villagers on a subscription basis. Water Treatment via advanced Reverse Osmosis units acts as a preventative measure against water-borne disease. The subscription fee for a household is INR 75 (\$ 1.5 approximately) per month and assures it of 20 litres of clean drinking water on a daily basis. This preventive model complements the clinical model, and helps in attracting a larger clientele to the clinics as well. It also enhances social equity and level of comfort with the local community, by providing social cover for patients with socially unacceptable issues. For instance, an unmarried girl might want to get a pregnancy test done without letting her parents know. In such a case, she can come to the clinic on the pretext of collecting water from the unit without raising any eyebrows in the society.

Water units typically become cash-flow positive earlier than clinical units, hence cross-subsidizing the clinics to a great extent in the initial phases. Close to 40-50 percent of each village's population uses the water treatment facility.

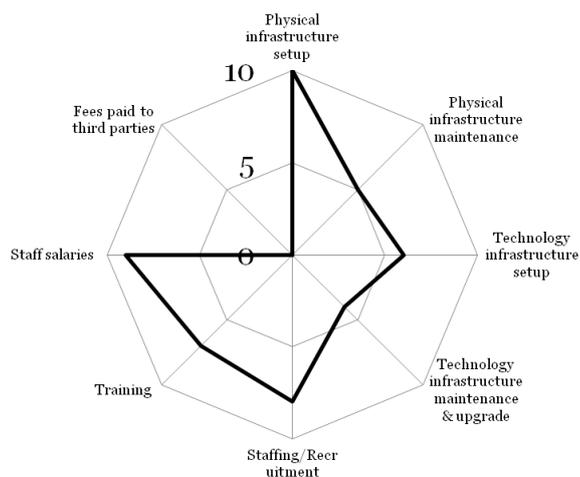
eHP also plans to supply micro-nutrients and food supplements to complement its existing services in the near future.

## Cost & Time components

Physical infrastructure setup is a major cost component for eHP. To decrease this burden, eHP has an understanding with the Punjab government wherein the government provides the physical infrastructure (building, access to raw water, electricity) to eHP on a 15-year lease basis.

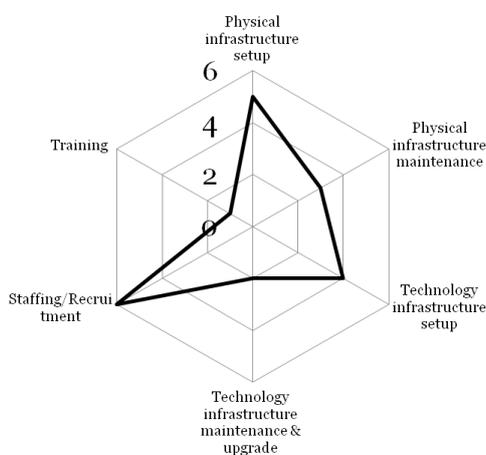
Staffing-related costs are another major component, since all staff salaries are paid by eHP itself.

### Relative cost components\*



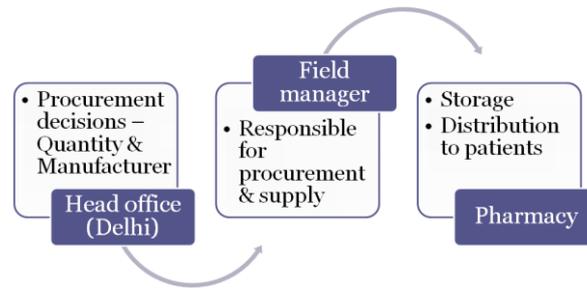
eHP has a robust training system for its staff at all levels; hence the training-related activities take a considerable amount of time & resources. However, the robust training pays rich dividends once the staff hits the ground and starts working with rural patients. Also, exhaustive training is necessary since most of the village population is not highly skilled.

### Relative time components\*



Physical infrastructure setup also takes some time initially since eHP has to add to the infrastructure provided by the government, eg. Setting up backup for electricity, pipelines from raw water sources, remote osmosis units etc.

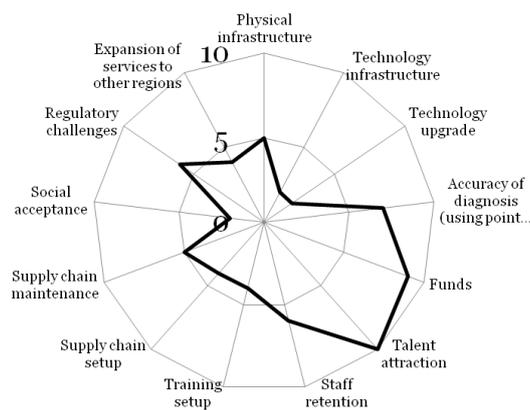
## Drug delivery model



Procurement decisions, such as the manufacturer and quantity of drugs, are taken by the eHP head office based in Delhi. The field manager oversees procurement and supply to local pharmacies, which then distribute the drugs to rural patients.

## Challenges

**Major challenges\***



eHP provides attractive compensation to local staff, especially encouraging women employees who have limited other sources of income in the villages. It also provides a safe & secure working environment that helps in talent attraction.

To overcome funding constraints, eHP reduces costs in certain aspects of its model, such as partnering with the government to gain access to physical infrastructure. It is also open to public-private partnership models.

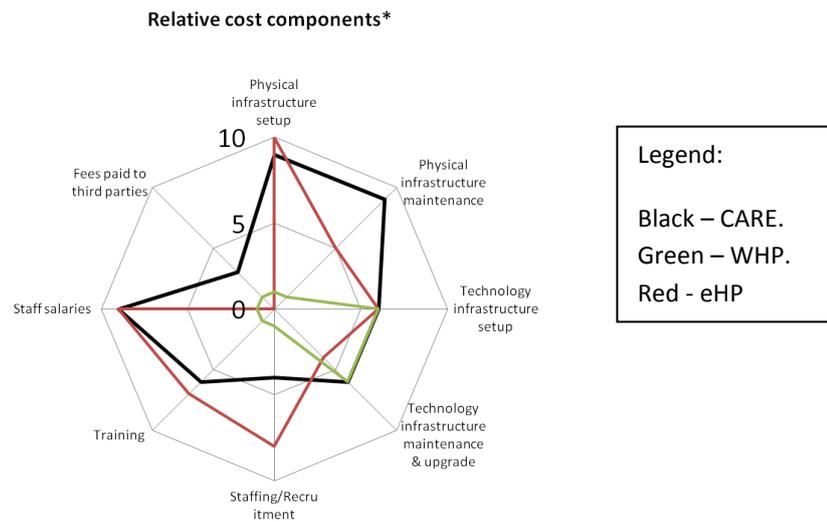
## Talent management

eHP prefers to recruit local staff from the village itself, enabling it to build social equity and trust quickly with the local communities. Training is provided to all recruits by eHP personnel. Sometimes, lab technicians and pharmacists need to be recruited from nearby areas due to unavailability of these skills in the villages itself.

Surveys have shown women employees in eHP to be the most satisfied, due to the following reasons:

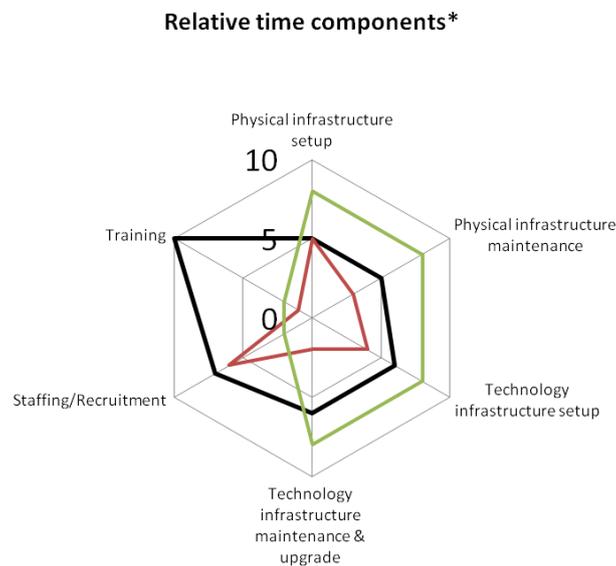
- Improved social status
- Good compensation structure
- Safe & secure working environment
- Unavailability of other good jobs for women
- Majority of patients are women, hence there is a heightened sense of involvement
- Families of staff are given access to facilities at half the cost.

## Comparison of the 3 models – A snapshot



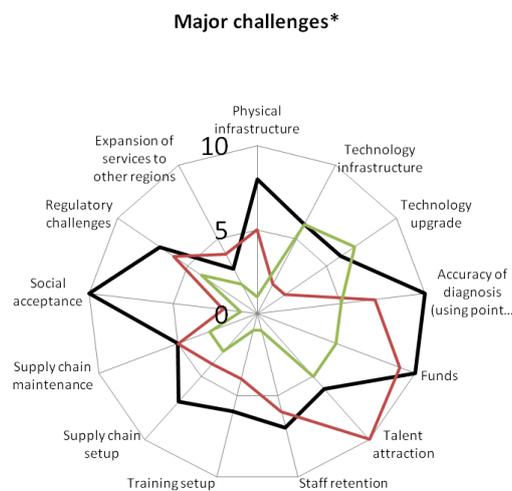
### Key points:

- Technology infrastructure setup & maintenance is a major cost component for all 3 organizations, primarily because there seems to be no standardized framework for evaluation of technologies available in the market, and also due to fragmented nature of technology expertise in the tele-health industry.
- Physical infrastructure setup is a major cost component for eHP and CARE.



Key points:

- Technology infrastructure setup is a time-consuming activity for all 3 organizations. The organizations have to manage this activity from scratch, and handle all aspects (technology evaluation, selection, costing, setup) themselves.
- Staffing & Recruitment take up considerable amounts of time for eHP and CARE. However, WHP looks out for established entrepreneurs in the region, hence lowering its initial staffing costs.
- Physical infrastructure setup & maintenance takes lesser time for eHP due to its partnership with the state government wherein the state government provides access to physical infrastructure.



Key points:

- Funding is a major challenge for most organizations. However, WHP recently received a grant from the Gates foundation, alleviating the challenges to a certain extent. Also, since in the WHP model, the entrepreneur puts his/her own funds, there is lesser need for centralized funding.
- CARE focuses more on social aspects and generally has a higher level of social acceptance. Its focus on social acceptance and cohesion is evident from the fact that it considers this area to be a challenge even though their model has proved to be quite successful in remote rural areas.
- WHP considers physical infrastructure setup to be less challenging, since the local entrepreneur usually has pre-existing facilities that can be used for tele-health consultations.

## Comparative heatmap/SWOT analysis

	WHP	CARE Rural	E-Health Point (TBD)
Scale of services	Successful on large-scale.	Currently operational in only 1 state.	Currently operational in only 1 state.
Scope of services	Scope larger than other two organizations.	Covers major diseases and preventive services.	Offers preventive as well as clinical services.
Physical infrastructure	Better compared to other two organizations.	Limited, but sufficient for current scale of operations. Self-reported scope to expand by 50 villages.	Sufficient for current operations, should consider scaling up now.
Technology infrastructure and usage	Two-way technology usage. Strong technology backbone. Should look to enhance technology use at ground level. Should look at introducing handheld devices.	Two-way technology usage. Limited, may pose challenge to effectiveness and scalability. Transition to android devices should result in increased efficiency.	Two-way technology usage. Strong technology backbone. Should look to enhance technology use at ground level.
Decision-support systems	None available at ground level. Should look to introduce and integrate decision-support systems with existing infrastructure.	Handheld devices include a decision-support system. Success of pilot will determine future course.	Android-based tablets to be introduced soon, to include decision-support systems.
Drug delivery model	Relationships with multiple manufacturers; Numerical coding to counter low alpha literacy.	Sufficiently mature for current operations, but scalability may be a challenge as responsibility is with single person (cluster coordinator).	Sufficiently mature for current operations, but may be a challenge in scalability.
Drug supply chain management	Ad-hoc communication from pharmacist. Two-way communication chain can be utilized more effectively.	Ad-hoc communication from pharmacist. Two-way communication chain can be utilized more effectively.	Ad-hoc communication from pharmacist. Two-way communication chain can be utilized more effectively.
Decision-making	Efficient (Lean organization. Small management team).	Efficient for current scale.	Seems to be dependent on senior management for major decisions.
Talent management	Mostly left to local entrepreneur.	Focus on trainings and skill development is encouraging.; should help in scaling up operations when needed.	Sourcing local talent helps in social acceptance, but local talent shortage may hinder expansion.
Training	An increase in training duration might be useful, particularly for new recruits.	Appropriate focus on nature, content and frequency of trainings.	Appropriate focus on nature, content and frequency of trainings.
Social acceptance	Mostly left to local entrepreneur.	Very focused on social connections. Strong connects with local communities.	Well-developed social connects. Focus on female health issues also enables strong connects.
Value-added services	N/A, except WHP branded drugs.	Micro-insurance model attracts patients. Should now look at other preventive services.	Water units complement clinical model very well. Could look to expand into reproductive health, eyecare etc.
Funding capabilities	Well-funded by large organizations.	Dependency on CARE foundation should be minimized.	Strong connections. with international donors.
Sustainability	Dependent on external funding. Need to work on reducing this dependency.	Dependent on funding from CARE Rural Health mission.	Water units turn profitable quickly. Clinical units also profitable over the long run.
Scalability	De-centralized processes; Multi-level provider n/w. Funds available for medium-term.	Funding and slow speed of technology pilots could hinder scaling up of operations.	Dependency on state governments could be a potential speed-bump.

### Legend:

Green – Is working well for the organization

Amber – Has scope for minor improvements

Red – Has scope for major improvements

## Conclusions

The study has encompassed three different operational models, each with its own advantages and limitations as described above. In addition to these, a key finding was that tele-medicine is still in its infancy in India. The main hindrances to larger scale adoption of tele-health solutions in India are:

1. Cost constraints – In discussions with personnel from various organizations, it was evident that the cost of adopting tele-health solutions was prohibitive in most cases.
2. Lack of clarity on ROI calculations – Due to unavailability of standardized technologies, it is difficult for organizations to evaluate whether the adoption of tele-health solutions would be worthwhile from a financial perspective. As a result, the adoption decision is often driven by a philanthropic desire rather than financial considerations.
3. Lack of standardized technology platforms – Due to lack of standardized technology platforms and solutions in the marketplace, each organization has to perform due diligence and feasibility assessment of technology solutions independently. This consumes a lot of effort and resources and also poses challenges to large-scale adoption. Lack of proven assessment frameworks and standardized technology platforms, particularly for diagnostic devices, are a major reason for slow adoption of tele-health solutions in India.
4. Unavailability of a best-practices repository – Most tele-health organizations in India seem to be operating in silos, with very little or no opportunity for cross-learning and knowledge exchange. As a result, organizations are unable to learn from each others' experiences resulting in slow growth and adoption.

## Recommendations and next steps

The field of tele-health is still in its infancy in India. Technology adoption is limited both in scale and scope. Based on the findings of this study, ACCESS recommends the following measures to enhance the adoption of tele-health in the country:

1. Creation of standardized technology platforms – Availability of standardized devices and platforms, particularly for handheld devices, would tremendously increase the reach of healthcare in India. A key finding in this study was the lack of support for local health workers and manual effort required in data-gather and decision-making. Availability of standardized, proven platforms would increase the adoption of tele-health devices, while reducing adoption costs simultaneously.
2. Establishment of best-practices repository and knowledge-exchange platforms – As described earlier, most organizations in India work in silos with very little information exchange. This increases costs and effort at each stage of the process. Creation of a nationwide best-practices repository would encourage speedier adoption and would also aid in standardization of practices in this field.
3. Enhancements to existing legal frameworks – With increasing adoption of tele-health systems, decision-making would pass into the hands of village health workers. Under the current legal framework, these workers are not authorized to prescribe medicines thereby limiting their scope of services. Archaic legal frameworks should be revisited to include increased use of technology in healthcare delivery.
4. Public-private partnerships – There are natural synergies to be harnessed in the field of tele-health in India. Public institutions have underutilized infrastructure that can be shared with private providers to alleviate cost constrains. Public institutions, with their large scale and scope, can also aid in creating collaboration opportunities and knowledge-sharing. Private institutions can provide efficient management and state-of-the-art technology solutions to complement the physical infrastructure and reach of public healthcare institutions.

## About ACCESS

ACCESS Health International, a non-profit organization, aims to improve access to high quality and affordable healthcare services. We identify and document best healthcare practices and health financing mechanisms from around the world and help transfer this knowledge to new markets. We also work with governments and private healthcare providers to design programs that will help improve access to high quality care.

## About the author

Manavendra Davar is a management consultant focusing on healthcare technologies and healthcare financing. He is a graduate in Finance and Strategy from the Indian School of Business, Hyderabad and also holds an Engineering degree (Electronics and Communications) from the National Institute of Technology, Kurukshetra, India. Manavendra has served marquee clients across the globe in Healthcare, Public Services and Financial Services industries. His areas of expertise include growth strategy development, market research and analysis, performance improvement and operational assessments. He can be reached at [manavdavar@gmail.com](mailto:manavdavar@gmail.com)

## Disclaimer

The case study has been compiled after primary and secondary research on the three organizations - *CARE Rural Health Mission, World Health Partners and eHealth Point*, and has been published after due approval from the organizations. The case has been compiled after field visit(s) to the organizations through Nov 2011 – Feb 2012. The author of the case or ACCESS Health International are not obliged or responsible for incorporating any changes occurred in the organization after receiving the due permission from the organization to publish the case. The case study has been developed with a specific focus to highlight some key practices/interventions of the organization and does not cover the organization in its entirety.

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