

VIVUS MOBILE SOLUTIONS

MOBILE CARDIAC CATHETERIZATION LABORATORY SERVICES

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Acknowledgment

This case study on **Vivus Mobile Solutions – Mobile Cardiac Catheterization Laboratory Services** has been compiled after thorough primary and secondary research on the organization. Information has been assimilated from several individuals who have made significant contribution in the development of this case study.

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Health care experts as well as providers in the country are increasingly concerned about the growing incidence of significant health inequalities between rural and urban areas and also between different social groups. Vivus group with its unique healthcare delivery system is on the mission to bridge this gap through Vivus Mobile Solutions that has redefined and provided cardiac care at an affordable price. The solution is an effort to offer cardiac care nearer to the patient's door steps in rural Karnataka through a network of Heart clinics and Mobile cath lab services, The group believes that through this endeavour it has been able to address the issues of access and affordability of speciality cardiac care and in turn has brought hope to the lives of many people in rural Karnataka.

Vivus Mobile Solutions offers a unique service of Mobile Cardiac Catheterization Laboratory for cardiac patients in semi urban and rural Karnataka. The sophisticated cardiac cath lab is housed in a 40 feet trailer, which is bacteria free, air conditioned and can be taken to any part of the state, on regular roads. The cardiac catheterization is done inside the trailer and recovery of the patient occurs in the heart clinics that have been initiated by Vivus group in association with the local hospital or nursing home with modest facilities.

Introduction

Heart diseases are on the rise in India. It is estimated that 10 percent of urban adult population and 5 percent of rural adult population suffer from some form of heart diseases and 20-30 percent of them require specialized investigation and treatment to prevent deaths due to heart ailments and coronary vascular diseases (CVD)¹.

With the epidemiologic transition the CVD burden continues to rise in developing countries including India. The projected rise in disease burden due to CVD is expected to make it the prime contributor of total mortality and morbidity. Almost 2.6 million Indians are predicted to die due to coronary heart disease (CHD), which constitutes 54.1 percent of all CVD deaths in India by 2020.² Additionally, CHD in Indians has been shown to occur prematurely, that is, at least a decade or two earlier than their counterparts in developed countries and this is causing an increase in the overall prevalence rates.

Intervention and prevention programs are being sought to curb this rise in cardiovascular disease burden and save as many people as possible in the developing countries. In India,

¹ WHO/NMH/ Lancet series - Surveillance of mortality and cardiovascular disease (CVD) related morbidity in India

² WHO int/nmh/media/lancet series "Chronic diseases and development

infectious and communicable diseases coexist in an epidemiological mosaic. This is due to India's limited capacity to implement programmes on prevention and control of chronic diseases. It is therefore important to think about alternative strategies to curb the rising epidemic of cardiovascular disease. The need of the hour is to develop technical, management and innovative approaches involving new partnerships, new ways to involve different stakeholders in the process, new methods and tools, ways to overcome resource restrictions and to improve effectiveness of monitoring techniques.

TOP TEN CAUSES OF DEATH IN INDIA				
(Age 25 to 69 as percentage)				
RANK	CAUSE OF DEATH	MALE	FEMALE	TOTAL
1	Cardio Vascular Diseases	26.3	22.5	24.8
2	Respiratory Diseases	10.1	10.4	10.2
3	Tuberculosis	11.4	8.3	10.1
4	Malignant and other tumours'	7.8	11.8	9.4
5	Ill-defined conditions	4.8	6.0	5.3
6	Digestive diseases	6.1	3.5	5.1
7	Diarrhoeal Diseases	4.0	6.6	5.0
8	Unintentional injuries	5.0	4.1	4.6
9	Intentional self harm	3.3	2.6	3.0
10	Malaria	2.4	3.4	2.8
(All ages as percentage)				
RANK	CAUSE OF DEATH	MALE	FEMALE	TOTAL
1	Cardio Vascular Diseases	20.3	16.9	18.8
2	Respiratory Diseases	9.0	8.3	8.7
3	Diarrhoeal Diseases	6.7	9.9	8.1
4	Perinatal diseases	6.4	6.2	6.3
5	Respiratory infections	5.4	7.1	6.2
6	Tuberculosis	7.1	4.7	6.0
7	Malignant and other tumours'	5.4	6.0	5.7
8	Senility	4.0	6.5	5.1
9	Unintentional Injuries	5.2	4.5	4.9
10	Ill defined conditions	4.6	5.0	4.8

Table 1: Top Ten Causes of Death in India
Source: India today .in, Apr 12 2010

It has been a paradox that though 80 percent of Indian population lives in semi urban and rural areas, almost all the advanced healthcare facilities are established in urban areas. Heart disease is not an emerging problem anymore. It has already emerged as a major cause of death in rural areas³. Indian government and healthcare providers have not recognized this and don't have adequate programmes to deal with it. For instance, for tuberculosis we have Revised National Tuberculosis Control Programme (RNTCP) clinics.

³ India Today Article India's No1 Killer: Heart Disease by Dinesh C. Sharma | New Delhi, April 12, 2010

For malaria, we have the malaria control programme. For cardiovascular diseases and acute heart attacks in rural areas we have nothing so far, for example, there are nearly ten advanced cardiac care centres in Bangalore, Karnataka which has a population of seven million, whereas no such centre is present in the districts of Mandya, Kolar, Hassan and Tumkur, which have a combined population of nearly 10 million.

As pointed out by Dr. S.S Ramesh “The patients with heart disease in semi-urban or rural areas have to travel long distances from their villages and towns along with an escort to

For estimated 1,00,000 people in Mandya district requiring advanced heart care, only about 1000 people seek such treatment every year

- Dr. S. S Ramesh

CMD, Vivus Group

reach Bangalore for their cardiac care”. Many times these patients doesn’t seek proper medical treatment due to deterring factors like the cost of travelling and staying in Bangalore which adds to the cost of treatment itself. This results in an increase in the morbidity and mortality of the population and a long term drain on resources. According to Dr. Ramesh, “ For an

estimated 1,00,000 people in Mandya district requiring advanced heart care, only about 1000 people seek such treatment every year”.

Vivus Group

Vivus Group is promoted by the Srinivasa Cardiology Centre Private Limited (SCCPL) which is an acknowledged pioneer in Cardiac health care services in India. SCCPL has been founded by Dr. S. S. Ramesh with a vision to promote excellent health care services at affordable cost. He as the Chairman and Managing Director of the group, is assisted by a team of Medical, Operations, Nursing & Finance Directors, who are authorities in their chosen profession and have come together to work for extending the best medical aid to the patients. Vivus Group strongly believes in providing affordable and quality healthcare to patients, and is committed to providing cardiac health services for all segment of the community through a balanced curative and preventive medical practice. It opened its first 50 bedded

Heart Care Centre in Bhagwan Mahaveer Jain Hospital in 2000 in Bangalore and has today grown as a multi-location cardiac centric group, with a presence in central Bangalore, Madikeri and Goa. Vivus BMJ Heart Centre is the first cardiac center to get ISO 9001:2000 certifications in the industry.

Vision

To be the industry leader and first choice for health care in the markets Vivus group operates in; providing its clients with leading edge, quality and value solutions.

Mission

Vivus group is committed to resolving, reviving and ensuring the total WELL BEING of the communities they operate in.

To this end the group intends to provide comprehensive and quality health care services at value prices through a team of dedicated professionals operating in an environment of excellence.

Vivus, through its leading edge services and ethical practices, intends to attain a position of industry leadership. It shares the vision of the illustrious Ex-President of India, Sri APJ Abdul Kalam, to take technology to the doorstep of the people and believes this can be done through innovative efforts. This has led Vivus to redefine the provision of cardiac care at an affordable price by establishing the

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Vivus Mobile solutions. The group, with a mission to provide quality health care to all the strata of the community, has launched the Mobile Cardiac Catheterization Laboratory⁴ (Mobile Cath Lab) as part of its mobile solutions. With the aid of modern technology and the expertise and commitment of its doctors, the Mobile Cath Lab reaches most parts of the Karnataka state by regular roads to provide Cardiac Catheterization services for the early detection of heart ailments.

Vivus Mobile Solutions

Mobile Cardiac Catheterization Laboratory (Mobile Cath Lab)

Vivus group has realized this trend and started thinking about alternate strategies to take cardiac care to the door steps of the rural & semi urban communities. It has partnered with Klenszids and GE OEC Medical Systems to start the mobile cath lab, a first of its kind in Asia. The concept is practiced in developing nations which has proved to be successful in

⁴ A catheterization laboratory or cath lab is an examination room in a hospital or clinic with diagnostic imaging equipment used to support the catheterization procedure. A catheter is inserted into a large artery, and various wires and devices can be inserted through the body via the catheter which is inside the artery.

provision of cardiac care to the door steps of the rural communities. Klenzids, a pioneer in Micro Flora Management and Contamination Control of enclosed spaces, has supported the initiative by providing the prime mover (40 ft Trailer) on a rental basis; GE OEC Medical Systems, a global leader in cost-effective digital imaging solutions, has donated the 9800TM Cardiovascular Digital Mobile Imaging System as an effort to strengthen the cardiac care services for the rural population of Karnataka. This idea was conceptualized by Vivus group as its first step in taking quality cardiac care to the doorstep of the suffering people. The mobile solution was tested for the first time in Mysore, Karnataka (120 Kms from Bangalore) in 2005 to check not only the suitability of the mobile van and equipment to Indian road conditions, but also the acceptance of the innovative concept by the community. The test has been successful, with the mobile unit conducting 30– 40 angiogram procedures in two days in association with a local hospital.

Vivus group, convinced with their concept after successfully testing the solution in Mysore, officially launched the Mobile Cath Lab services in August 2005 in Kolar District (67 kms from Bangalore) and extended them to other nearby districts in a phased manner. According to Dr. S. S Ramesh, the mobile van currently covers five districts, namely, Mandya, Hassan, Kolar,

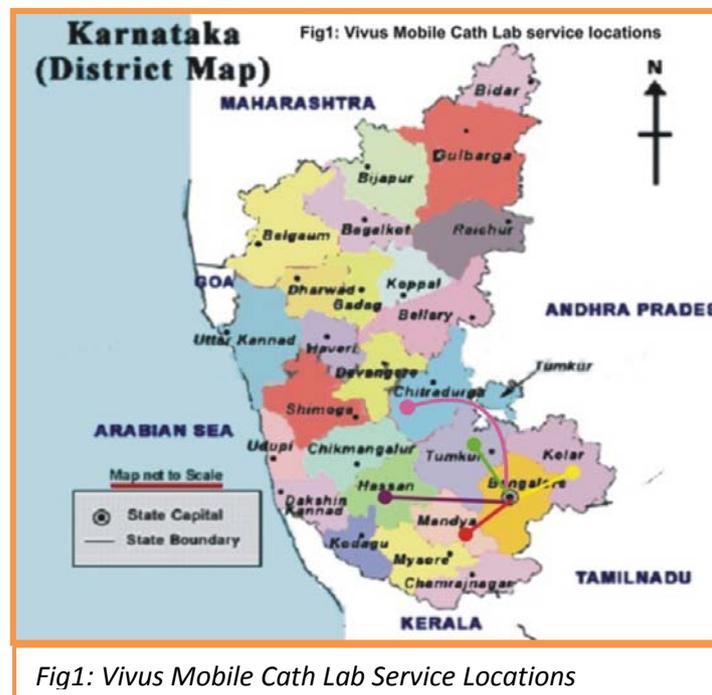


Fig1: Vivus Mobile Cath Lab Service Locations

Tumkur (Kunigal) and Chitradurga (recent inclusion). to meet the growing demand, Vivus group is soon coming up with a new hospital at Hubli, and a similar facility in Uttara Kannada district also. The Mobile Cath Lab services are currently being provided in Kolar, Mandya, Tumukur Hassan and Chitradurga, which are around 100 kms from their base hospital in Bangalore. These districts have been chosen because of a lack of advanced cardiac facilities in these locations and poor connectivity and access to good and wider road network. Although there is a growing demand to extend the services to other regions within the state also, Vivus has currently not done so primarily due to logistical reasons (the prime

mover which is 40 feet long cannot move freely on narrow roads) but has not totally ruled out the demand either and is considering an alternative model to address this demand in the near future.

The Vivus mobile cath lab facility is recognized by the Karnataka state government which given permission to park the 40 feet Mobile Cath Lab at the parking lots of the district government hospitals (a circular has been issued to all the District Health officers in this regard). The district hospitals also admit the patients for observation, after the procedure is done in the cath lab for patient recovery. In Kolar, Tumkur, and Chitradurga, Vivus has tied up with local medical colleges for admitting patients and in Mandya and Hassan Vivus stations the prime mover in the district hospitals. The local hospitals with modest facilities act as nodal centers in these districts and the cardiologist from Vivus Group visits these centers on every Friday of the week to screen patients identified with heart problems to confirm the need of undergoing a coronary catheterization and fix a specific date for the procedure that coincides with the arrival of the mobile van. The nodal center has a revenue sharing agreement with Vivus on a per case basis for taking care of the recovery aspects and non-invasive diagnostic services for the patient who has undergone the procedure.

Mobile cath Lab – Design & Construction



Fig 2: Mobile Cardiac Catheterization Laboratory Design

The equipment is housed in a 40 feet trailer, which is bacteria free and air conditioned, and consists of sophisticated cardiac catheterization lab on wheels. Presently, the cardiac

catheterization laboratories are expensive, require considerable infrastructure and are fixed to major hospitals. This Mobile Cardiac Cath Lab used by Vivus resolves the issues of high cost and lack of proper infrastructure. The equipment consisting of 400 square ft area is portable, less expensive and requires very little infrastructure (with 15 amps plug point and minimal air-conditioning).

The 1k x 1k imaging resolution technology coupled with its significantly reduced cost and mobility, make it the perfect choice for a Mobile Cath lab setting

Vivus has acquired an indigenously manufactured trailer which can house the cath lab. The trailer is designed in such a way that cardiac catheterization can be performed within the trailer. The interior of the trailer is sterile and has built-in infrastructure. Even coronary angioplasty and other interventional procedures can be performed within the trailer. The cardiac catheterization can be literally performed at the doorstep of the patient. The trailer is designed for Indian road conditions". The Cath lab equipment offers the only real-time, 1k x 1k imaging resolution technology available in a mobile system. Additionally it is a cost-effective technology that is designed to capitalize on the ever-increasing range of cardiovascular procedures requiring advanced imaging capabilities. Vivus mobile Cath lab has the GE OEC Series 9800 C-arm system which is used for diagnosis and intervention, allowing physicians to evaluate cardiac conditions and have better visual acuity for undertaking interventional therapy in a variety of healthcare settings.

The 1k x 1k imaging resolution technology coupled with its significantly reduced cost and mobility, make it the perfect choice for a Mobile Cath lab setting. Another breakthrough design feature of the mobile cath lab is the AutoTrak™, which automatically tracks the subject anatomy anywhere within the imaging field for true point-and-shoot ease of use. It also includes an intuitive touch screen control system, which allows even new or inexperienced users to be experts at system operations.

Operating Model

The mobile cath lab has a four member team consisting of a Cardiologist, a junior registrar, a cathlab nurse technician and a housekeeping person along with the driver and the helper for the prime mover. The Mobile Cath Lab Unit (prime mover) travels to the specific locations and is stationed at the district hospitals, medical colleges in the head quarters of the five districts, currently being covered once in a month. Initially patients are screened by their family doctor for the evaluation of their heart problem. If patients are detected to

have heart disease, then they are referred to the nodal centre, where a cardiologist from Vivus group travels at the end of the week (on Friday) for further examination of the patient. He examines and decides the need for Coronary catheterization, and allocates a designated date for the same. Once a month, usually on a weekend (Saturday morning), the Mobile Cath Lab goes to the nodal center and a consulting cardiologist and the team of the Vivus group in association with the family doctor conducts the test. Patients requiring more sophisticated and advance treatment are asked to come to the Bhagavan Mahaveer Jain hospital which is the base hospital of Vivus group in Bangalore.

The cardiac Catheterization is done inside the prime mover and a majority of the procedures are done through the radial route. The Mobile cath lab follows strict procedures and protocols (similar to a regular cath lab facility with slight modification) with a limitation of not conducting the procedure on identified high risk cases. The recovery of the patient occurs in any hospital or nursing home with modest facilities and the patients are discharged on the same day or the following day, based on the observation by the local physician in consultation with the cardiologist. This enables the patients to receive excellent cardiac care at their door step, in familiar surroundings and in the presence of their family doctor. This also results in a cost reduction in the initial procedures as the equipment housed in the trailer, though sophisticated, has lower infrastructure and establishment costs.

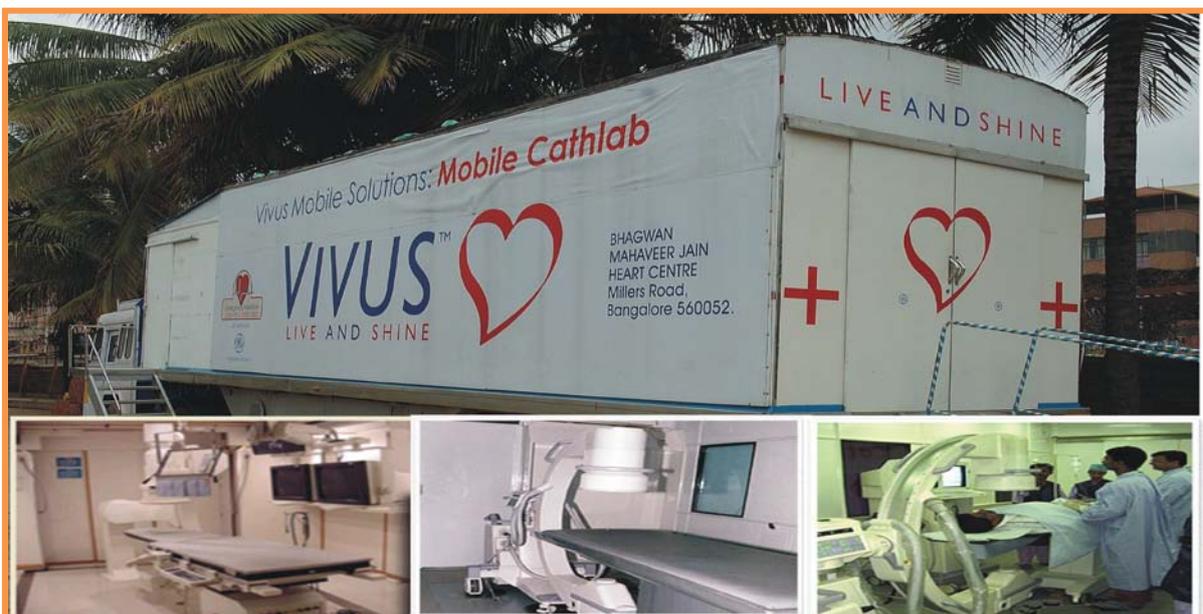


Fig 3: Vivus Mobile Solutions – Mobile Cathlab

According to Dr. S.S Ramesh, it takes around INR 4 crore (USD 0.9 million) to setup a regular cath lab, whereas a mobile unit can be set up at one- fourth of that cost. This helps in significantly reducing 50 percent of the cost per procedure as compared to the regular setup. An angiogram procedure in Bangalore normally costs INR 10, 000 to 15,000 (USD 230 – USD 340). Vivus group has however priced their Mobile Cath Lab services between INR5000- INR7500 (USD115 - USD170) per procedure. It feels that the price is not only affordable but also cost effective in two ways for the patients- one is the reduced cost of the procedure itself and two is the reduced fringe costs that the patient spends on transportation for him and his family and other expenses he incurs during his hospital stay.

Not all patients who have heart problem require bypass surgery or angioplasty; hardly one in a thousand patients may require some form of intervention. Vivus aims to increase the number of non-invasive coronary catheterization (angiogram) procedures performed as a preventive strategy, to decrease the morbidity and mortality rates, caused due to cardio

vascular diseases (CVD). The angiogram can clearly tell us the severity and extent of the heart problem. Patients with milder diseases can be managed medically in their home town itself. Only patients with severe diseases are advised to come to the base center for advanced cardiac treatment like angioplasty or bypass surgery. This kind of screening further simplifies and reduces the cost of health care. Once the patient undergoes the suggested treatment, the follow ups are carried out at the nodal centers and the mobile cath lab.

“It costs around INR 4 crore (USD 0.9 million) to setup a regular cath lab where as a mobile unit can be set up at one- fourth of that cost there by significantly reducing 50 percent of the cost per procedure when compared to the regular setup”

- Dr.S.S.Ramesh
- CMD- Vivus Group

Financing Model

The Vivus mobile solutions is part of the Vivus group a for profit organization. The Mobile Cath Lab was established with the support of Klenzaid's & GE OEC Medical systems: the prime mover is rented out from Klenzaid's and the Mobile Cath Lab equipment has been donated by GE. The total investment towards establishing the Mobile Cath lab is close to INR1.5 Crore (USD 0.35 million). Vivus has incurred minimal capital costs and has been able to provide the services at subsidized rates. Currently the existing staff of the hospital is being utilized to run the unit on a rotation basis and it is expected that the patient revenue generated would cover the operational costs of the Mobile Cath Lab. Even though the

Mobile cath lab doesn't generate any profits currently, Dr. Ramesh is confident that increased awareness levels in the community and support from local physicians on educating patients and their families to rule out any misconceptions about the procedure, will draw more number of patients to avail the services, thus achieving the economy of scale to make it profitable.

Vivus group is considering revising its pricing. It currently charges INR5000 – INR7500 (USD 115-USD 170) per procedure, of which the nodal centers are paid INR1000 (USD22) towards the non-invasive tests and other services; a certain share is paid towards the prime movers rent and maintenance.

Growth Plans

Vivus group has stationed the mobile van in a single location for an extended duration (currently the mobile cath lab is stationed at Mandya for two months continuously) as an attempt to pilot the effect of the extended availability of the cath lab and test whether this results in an increase in the number of patients utilizing the services. The group plans to scale the services to cover northern Karnataka districts and is actively looking for funding to go ahead with its plans. Instead of renting a prime mover it now wants to own one in the future and include non-invasive diagnostic tests and lab tests for generating additional revenue.

Vivus Heart Centre is recognized for cardiac care by the CGHS & ESI schemes. Efforts are also on to get the procedure covered under various health insurance schemes (Yeshasvini Health Insurance Scheme, Suvarna Arogya Chaitanya Scheme, Vajpayee Arogyasri yojana etc) within the Karnataka state.

Apart from the above efforts, the group aims to continue helping the needy patients by raising funds from various donors to ensure that they receive the necessary treatment and care

Performance

The mobile cath lab currently travels to Mandya, Hassan, Tumkur, Kolar and Kunigal. At the end of FY 2008-09', over 1000 patients had been screened by the Mobile cath lab across

these districts (see Table 2). According to Dr. S.S Ramesh, by November 2010 a total number of 2130 patients had been screened.

Financial year					
Centre	2005-06	2006-07	2007-08	2008-09	Total
Hassan	45	57	55	50	207
Kolar	176	53	58	58	345
Kunigal			2		2
Mandya	74	52	92	128	346
Tumkur	93	37	19	7	156
Total	388	199	226	243	1056

Table 2: No. of Angiograms done in the mobile cath lab till 2009

Conclusion

Heart diseases have emerged as the number one killer in both urban and rural India. In the rural parts of the country, the severity of the problem is aggravated by poor infrastructure, inadequate testing facilities and the increasing disease burden. Rural people with cardiovascular diseases face unique health care challenges, which include inadequate technological support for early diagnosis, lack of critical care specialists, and inconsistent or variable levels of 24-hour patient care services (requiring patients to travel to distant tertiary centres for advanced cardiac care). Although cardiovascular diseases have emerged as a major problem in all states, a majority of the advanced cardiac care centres are located in the urban areas, giving rise to a rural-urban divide in terms of availability of treatment centres. It is thus important to bridge this gap and to provide quality cardiac care even to the rural parts of the state, as early detection of such life-threatening diseases is imperative to curb mortality rate in the developing world.

Vivus Mobile solutions have been successful in addressing these rural health care challenges in five southern Karnataka districts living through its Mobile Cath Lab. A unique and first of its kind of approach in Asia, the Mobile Cath Lab has integrated diagnostics, treatment and triage protocols as well as specialist cardiology support (through the network of heart clinics) and offers timely access to quality cardiac diagnostics and expert diagnosis and treatment advice. It also eliminated the need for the patient to travel long distances for seeking treatment.

Thus, Vivus's innovative approach not only reduces the delay in cardiovascular disease detection and diagnosis, but also aids in timely and appropriate management of cardiovascular diseases in the rural settings. It also offers the services at an affordable cost (fifty percent less than their urban counterparts).

Most importantly, Vivus group through its mobile solutions has been continuing its efforts to redefine cardiac care by offering the cardiac catheterisation procedures at the doorsteps of the rural communities since 2005. With all the experience gained through these years, the group now needs to design a strong business model to make the services sustainable and scalable to other regions of rural India.

As early diagnosis and clinical monitoring hasten investigation and abridge treatment costs, health care providers can take inspiration from the example of the Vivus Group and concentrate their efforts on providing affordable healthcare to the masses and reducing the incidence of cardiac deaths in geographically distant areas by adopting such alternate strategies.

References

¹WHO/NMH/ Lancet series - Surveillance of mortality and cardiovascular disease (CVD) related morbidity in India

²WHO int/nmh/media/lancet series "Chronic diseases and development"

³India Today Article India's No1 Killer: Heart Disease by Dinesh C. Sharma | New Delhi, April 12, 2010

Disclaimer

The case study has been compiled after primary and secondary research on the organization and has been published after due approval from the organization. The case has been compiled after field visit(s) to the organization in November 2010. 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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