

## DIAL 108 IN AN EMERGENCY

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*In early-2010, GVK Emergency Management and Research Institute (GVK EMRI) was reviewing one year of its operations in Goa, India. The case study examines the organisation's working methods and the operation of its '1-0-8' service. Recent initiatives like the Emergency Room services and the Automatic Vehicle Location Tracking system as well as certain issues facing the Goa operations are also discussed.*

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Dr Gautam Cormoli, Head of Emergency Medicine Learning and Care (EMLC), GVK EMRI, Goa, was rather pensive as he reviewed the first year of their operations. Despite having exceeded the set targets and a 'response time' which was the best in India, his staff had often encountered hostility at the site of emergency as people's expectations were very high. In early-2010, there was a need to assess the awareness and effectiveness of this service over the previous year.

In addition, GVK EMRI was in the process of extending its activities into emergency room services, which were being offered on a pilot basis in five government health centres, a first-of-its-kind initiative in the country.

## BACKGROUND

### The Organisation

EMRI was established in 2004 by B. Ramalinga Raju, Chairman of Satyam Computer Services Limited.<sup>1</sup> He was keen on creating greater social equity and providing opportunities for the underprivileged through the Satyam Foundation, the company's Corporate Social Responsibility (CSR) arm, and setting up EMRI, the equivalent of America's 911 in India. In April 2005, EMRI was registered under the Societies of India Act as a non-profit organisation dedicated to improving emergency care for people in India. EMRI initially had 17 members and most of them belonged to Ramalinga Raju's family. Initial financing came from the personal funds of Ramalinga Raju with Satyam Technologies providing technical support.

EMRI built information and communications technology infrastructure with the latest telecommunication, computing, medical and transportation technologies to provide an affordable emergency service in tribal, rural and urban areas.<sup>2</sup>

The primary objectives of this service were in:

- excellence in pre-hospital care
- management of critical illness and injury

On 15 August 2005, the EMRI emergency response

service was launched in Hyderabad with a workforce of 2,500 people and 30 ambulances serving 50 towns in the state of Andhra Pradesh. By 2009, the organisation had a fleet of 2,600 ambulances and handled emergencies in 10 states: Gujarat, Uttarakhand, Tamil Nadu, Rajasthan, Karnataka, Assam, Madhya Pradesh, Andhra Pradesh, Meghalaya and Goa.<sup>3</sup>

Memorandums of Understanding (MOU) had been signed with over 6,800 hospitals (to stabilise the patient and provide free treatment for the first 24 hours) and 2,000 police and fire stations.

In May 2009, GV Krishna Reddy, founder and Chairman of GVK, a private infrastructure company involved in major infrastructure development projects all over India, took over as Chairman of EMRI and the organisation was renamed GVK EMRI.

### The Service Product

In the past, there did not exist a nodal (single centrally-located coordinating agency) medical, police and fire emergency service. In most developing countries, including India, pre-hospital care was the weakest link in the event of life-threatening emergencies. The EMRI service was started to assist people who needed pre-hospital care and it had been successful in proving that pre-hospital care was critical, not only in terms of quality of intervention in the ambulance, but also in ensuring better sensing and quick access to emergency sites through high-end technology like the automatic vehicle location tracking (AVLT) system.<sup>4</sup>

In 2010, GVK EMRI was the first and only professional emergency response provider in India and it operated based on a Public Private Partnership (PPP) model. The rationale was that most hospitals as well as police and firefighting services were owned by the Government of India whose support was important in educating people. It was felt that the PPP model could provide the necessary expertise, and by means of robust performance-based evaluation, the service provider would ensure a certain level of quality. Besides, this model could avoid sub-optimal operations and the poor sustainability of many government ventures in this field.

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1. Satyam Computer Services Limited was founded in 1987 by B. Ramalinga Raju. In 2009, the company was taken over by Mahindra Group, one of the top 10 industrial groups in India, and renamed Mahindra Satyam.  
 2. Prahalad, C. K., Mashelkar R. A. (2010, July-Aug 3). Innovation's Holy Grail. *Harvard Business Review*.  
 3. GVK EMRI - GVK Emergency Management and Research Institute. Retrieved February 21, 2011, from [www.emri.in](http://www.emri.in)  
 4. Biranchi, Jena. (2008). Impact of EMRI Services on the Public Healthcare System Delivery. *Indian Emergency Journal*.

## Funding

The proportion of funding that the organisation received from government sources depended on individual state governments. GVK EMRI financed the cost of leadership, salaries of higher management, innovation, research, training and technology. This was essential, given the ceiling on salaries that could be paid to individual staff from government funds. GVK EMRI also funded the salaries of the National Expansion Team.<sup>5</sup>

In addition, the National Rural Health Mission (Ministry of Health and Family Welfare) provided funds as part of healthcare provision to rural areas; these focused on maternal and child health, especially in reducing maternal mortality. In Goa, the state government funded 100 percent of GVK EMRI's operating expenses including staff salaries (excluding the Chief Operating Officer), training costs, administrative costs and all capital expenditure (call centre, hardware, ambulances, equipment and office). The final ownership, upkeep and renewal of capital equipment rested with the government.

Despite receiving government funding, GVK EMRI operated as a private company. All decisions were taken by the Board of Governing Members, who were selected entirely at the discretion of GVK EMRI. Governing Members were usually prominent personalities from the industry. Officially, there was no government representative on the Governing Board. However, government representatives conducted regular review meetings of the organisation's operations in every state. Human resource rules and regulations were framed by the organisation and were standardised for all the states. Concessions were made in the recruitment of local candidates who had knowledge of the language and/or topography and geography.

## Partnerships

A pioneer in emergency management services in India, GVK EMRI also signed private partnerships with several international agencies such as Stanford University (USA) and Satyam Computer Services Ltd, to cooperate in the areas of technology, medical services, training and research.

GVK EMRI launched a two-year Advanced Postgraduate Diploma in Emergency Care at Secunderabad in association with Stanford University

which conducted medical, system and operations, and analytics research. The paramedic course curriculum was developed by the Stanford School of Medicine and taught by Emergency Physicians from Stanford University in Hyderabad, affiliated to Osmania University. On completion of the two-year programme, the paramedics would be certified in Basic Life Support, Advanced Cardiac and Life Support, International Trauma and Life Support and Pediatric Advanced and Life Support. They would also be proficient in the use of the latest equipment like defibrillators and ventilators.

## WHAT IS 1-0-8?

1-0-8 referred to the emergency response service of GVK EMRI. The number 1-0-8 was used as it was the toll-free call number for ambulances, police and/or firefighting services. As a free service accessible from a landline, mobile or fixed line without a prefix/suffix, the choice of 1-0-8 was made as it had mythological, scientific and religious significance.

## Process

GVK EMRI emergency operations were standardised throughout India and included:

*Emergency Response Centres (ERC):* These state of the art automated call response centres were staffed by trained communications and medical personnel for timely response in case of emergencies. They were available 24/7 on a three shift basis and call handling as well as ambulance dispatch were managed under one roof. The centre was also in contact with the police control room for dispatch of police and fire brigades in case of crime and fire emergencies. ERC operations were based on coordinating the three functions of *sense*, *reach* and *care*.

## Sense

The 'Sense' paradigm of emergency management comprised the capture of information regarding the emergency situation. Technology played an important role, providing advanced Computer Telephony Integration solutions in order to receive 1-0-8 emergency calls, gather information related to the calls and maintain records of caller data.

When 1-0-8 was dialed, the call was immediately picked up and connected to the ERC. A trained

5. The National Expansion Team oversaw the setting up of EMRI operations in a new state with the local Chief Operations Officer and business heads.

Communication Officer (CO) asked for a description of the emergency situation, ascertained and recorded the facts (i.e. location, type and nature of emergency) and contact details. The CO then assessed and authenticated the emergency event. The information was then transferred to the Dispatch Officer (DO) who assigned an incident ID and the necessary emergency personnel via the closest located vehicle. The CO and DO were under constant supervision and were monitored by a team leader who intervened in case of any delays in response.

The standard for call pick-up was within two rings; the CO and DO had about 90 seconds each. Within three minutes of receiving the call, help would be on the way. Each call was recorded, and in the event of any grievances or criticism, the records could be retrieved and scrutinised.

### Reach

Getting to the victim within the "golden hour" (i.e. the first 60 minutes) was crucial for an emergency medical service provider. The ERC operators, using dynamic optimisation algorithms, routed ambulances to reach the victim at the earliest possible time based on the nature of the emergency, its severity and ambulance locations. These strategically located advanced ambulances were customised and their equipment modified to ensure compatibility with operating conditions in India, to suit weather conditions as well as areas of difficult access such as villages and crowded buildings. Besides extrication tools and medication, state-of-the-art medical emergency equipment in these ambulances included automated external defibrillators, suction apparatus, ventilators, pulse oximeters and glucometers. In case of police or fire emergencies, the local State Police Station or Fire Department was immediately notified and full details were provided.

The average time for an ambulance to reach the emergency site from the base station was between 15 to 20 minutes; the standard being 12 minutes for an urban centre and 16 minutes for rural areas. The ambulance performance was also evaluated based on 'ambulance busy' and 'unavailed cases' (i.e. patient had left the site prior to the arrival of the ambulance) and respective targets of less than 2 percent and 6 percent were set for such events. (See **Exhibit 1** for sequence of events at the ERC.)

### Care (Pre-Hospital Care)

Each ambulance was manned by a Pilot and a well-qualified Emergency Medical Technician (EMT) who had been intensively trained in pre-hospital care in collaboration with Stanford University. The EMT was trained to operate the equipment, handle emergencies, provide cardiopulmonary resuscitation and be responsible for pre-hospital care while transporting the patient to a hospital for stabilisation. The pilots were trained in first aid and extrication in order to provide adequate support to the EMT. The pilots were put through a one-week training period while the EMT's training period was around eight weeks.

The EMT could, as and when required, communicate via cell phone with the in-house Emergency Response Centre Physician (ERCP) or tap the 24-hour call service of qualified medical practitioners on stand-by to support him. As soon as the patient was picked up, doctor-supervised paramedical assistance commenced so that there was no delay in treatment while transporting the victim to a hospital.

It was essential that the vital parameters of the patient did not deteriorate during transportation. One measure used was that if a critically injured/diseased patient availing EMRI services and being transported to a hospital with appropriate pre-hospital care interventions, survived for at least the next 48 hours from the time of incident, he or she was considered a 'Life Saved'. The case should be critical/life-threatening and should fit within the framework of predefined criteria based on clinical parameters (e.g. pulse, blood pressure, oxygen saturation).

There was a list of specified critical cases, but conditions other than those mentioned which met the predefined criteria/parameters were also considered as critical cases. For the case to be considered as a 'Life Saved' statistic, it was also essential that the Patient Care Record (PCR) document was completed and the EMT had adequately assessed the victim and provided appropriate pre-hospital care based on stringent predetermined protocols, .

The EMT maintained a record of every case attended to, and completed PCR forms were passed to the hospital authorities. The records were also used for further research and analysis.

## GOA SCENARIO

On 14 June 2008, an MOU was signed between the Government of Goa and EMRI, and the 1-0-8 service was launched in September 2008. (See **Exhibit 2** for the map of Goa). The ERC was located at Goa Medical College (GMC). The Goa office of GVK EMRI had complete independence in management and resolution of all internal issues. There was no Governing Board instituted for Goa operations.

GVK EMRI Goa's vision was to become a role model for Emergency Management Systems in the world by 2014. The targeted performance benchmarks were:

- Attend to 22 emergencies per 100,000 population per day;
- Respond to '108' thousand emergencies per annum; and
- Reach out to 8 percent of the population annually.

By March 2010, GVK EMRI Goa had 18 ambulances and 184 employees (including 7 doctors, 113 field staff, 30 EMT-Advanced, 21 ERCs and 13 support staff); 44 percent of EMTs in Goa were women.

In 2010, GVK EMRI Goa was headed by the Chief Operating Officer (COO) whose costs were borne by GVK while salaries of all medical and paramedical staff were borne by the Government of Goa with public funding from the Directorate of Health Services.

From September 2009 to March 2010, GVK EMRI Goa handled over 39,000 medical emergencies (averaging 93 medical, police and fire emergencies per day) and saved 250 lives per month (over 3,000 lives annually). Over 500 calls were received (7 emergencies/100,000 population) and approximately 80 trips were made every day. 86 of the daily emergencies were medical – road accidents (35 percent), other trauma (10 percent), cardiac related (10 percent), pregnancy (8 percent), acute abdomen (5 percent) and respiratory (4 percent).

### Recent Initiative

In 2009, GVK EMRI Goa decided to set up ER services at five Primary Health Centres (PHCs) and Community Health Centres in the peripheral areas of Goa to validate the concept of institutional care within the "golden hour" and stabilise seriously injured patients. This was a pioneering life-saving initiative

by Goa's Ministry of Health, so that patients would be managed at the peripheral level in the event of an emergency that required further treatment (after the initial first aid).

These Centres were run jointly by the Directorate of Health Services and GVK EMRI Goa and the goal was to utilise and upgrade the existing infrastructure, integrate services and make up for the lack of adequate staffing in health centres. The unit would have ventilators, cardiac monitors, defibrillators, multi-parameter monitors and other essential equipment and medicines required to handle all types of emergencies. It would be manned by advanced paramedics under the guidance of medical officers whose decisions would be final. The paramedics would assist in managing critically ill patients, and being qualified as trainers, help in teaching the paramedic staff of these peripheral government hospitals.

An AVL system with the primary objective of keeping track of ambulance activity in real time was implemented in all ambulances and was the latest technological upgrade at GVK EMRI Goa. The system, developed by Mahindra Satyam specifically for GVK EMRI, was based on the Global Positioning System (GPS) and donated as part of its CSR programme. A terminal fitted in the ambulance would constantly transmit its location to the control room. The same terminal was used by the driver to update his status like 'leaving for pickup', 'en route to hospital', 'returning from hospital' and 'breakdown'.

Once ambulance co-ordinates were received by the control room, the AVL system would automatically plot them on a map of Goa. Ambulance DOs had the details on their terminals like map views in various layers like taluka<sup>6</sup> view, village view, views with medical and emergency services, ambulances in use (marked red) and idle (marked green). In addition, the map indicated alerts for speeding, unauthorised movement of ambulances, ambulances idle for more than 60 minutes and breakdowns. Incident identification of ambulances in use (to understand what they were being used for) and reports on ambulance use ratios and distribution were also highlighted.

Eminent personalities whose values were similar to GVK EMRI (i.e. selfless commitment) were appointed 'Brand Ambassadors'. Remo Fernandes, a Goan singer of international repute, was appointed the 1-0-8 'Brand Ambassador' in August 2009 to spread the message to call 1-0-8 and avail the service in an emergency.

6. A subdivision of a district or a group of several villages in India.

Nine more ambulances were requisitioned in the second quarter of 2009, despite Goa having an impressive ratio of one ambulance per 74,666 population – the best coverage in the country. It was also targeted to cut down response time to just eight minutes, in line with international emergency services. Ambulance stations equipped to base the ambulance and provide restrooms for the Pilot and EMT would be provided for each ambulance. The government would also provide land to the management of GVK EMRI Goa to set up an institute that would train paramedics and emergency service personnel.

### Issues Faced by GVK EMRI Goa

In early-2010, there was some adverse publicity about GVK EMRI Goa in the local media – the service was labeled ‘irresponsible’ and the personnel ‘indifferent’, after 1-0-8 could not be reached when a person had a heart attack. The COO clarified that the incident occurred on account of technical failure of the Bharat Sanchar Nigam Limited (BSNL)<sup>7</sup> PRI line when a fiber optic cable was cut. This resulted in the failure of all incoming calls to the service. Two earlier reported incidents in which the victims succumbed before the ambulance arrived had also maligned the 1-0-8 service. In such cases, the factual findings of the incidents were investigated from the records and explanations provided. In case of lapses on the part of GVK EMRI Goa, an apology was rendered and the appropriate corrective action taken. However, such incidents indicated that there were consumers who were not satisfied with the service.

In addition to occasional prank or rude calls, the ERC also received calls to clear beggars from footpaths, manage drunk individuals or to verify deaths. These were not services that the ERC was set up to deal with. Furthermore, on arrival at the site, ambulance staff were at times confronted by abusive relatives and bystanders who demanded that the staff pick up homeless people or transport patients not regarded as the type of ‘critical’ conditions handled by the ERC. In such ‘social’ emergencies, the EMT and Pilot were often in a dilemma over what to do. To address this, an extensive publicity campaign to communicate the types of emergencies handled by 1-0-8 had been planned.

Another concern was the abuse of the Inter-Facility Transfer (IFT) system. While it was designed to shift critically-ill cases to a higher centre, it was often misused to overcome gaps in the existing healthcare system. The medical officers at the health centres, when faced with anxious relatives and inadequate government ambulances and staff, utilised the 1-0-8 service to shift patients whom they were not able to manage at the periphery. Certain private hospitals were also chronic defaulters in this regard and misused the service to transfer terminally-ill patients or critical cases. In the above instances, resources like manpower and time were unnecessarily expended. This reduced the efficiency of the service and led to absence of the service during dire emergencies. In such situations, the transfer was left to the discretion of the ERCP who interacted with the medical officers of the referring healthcare facility.

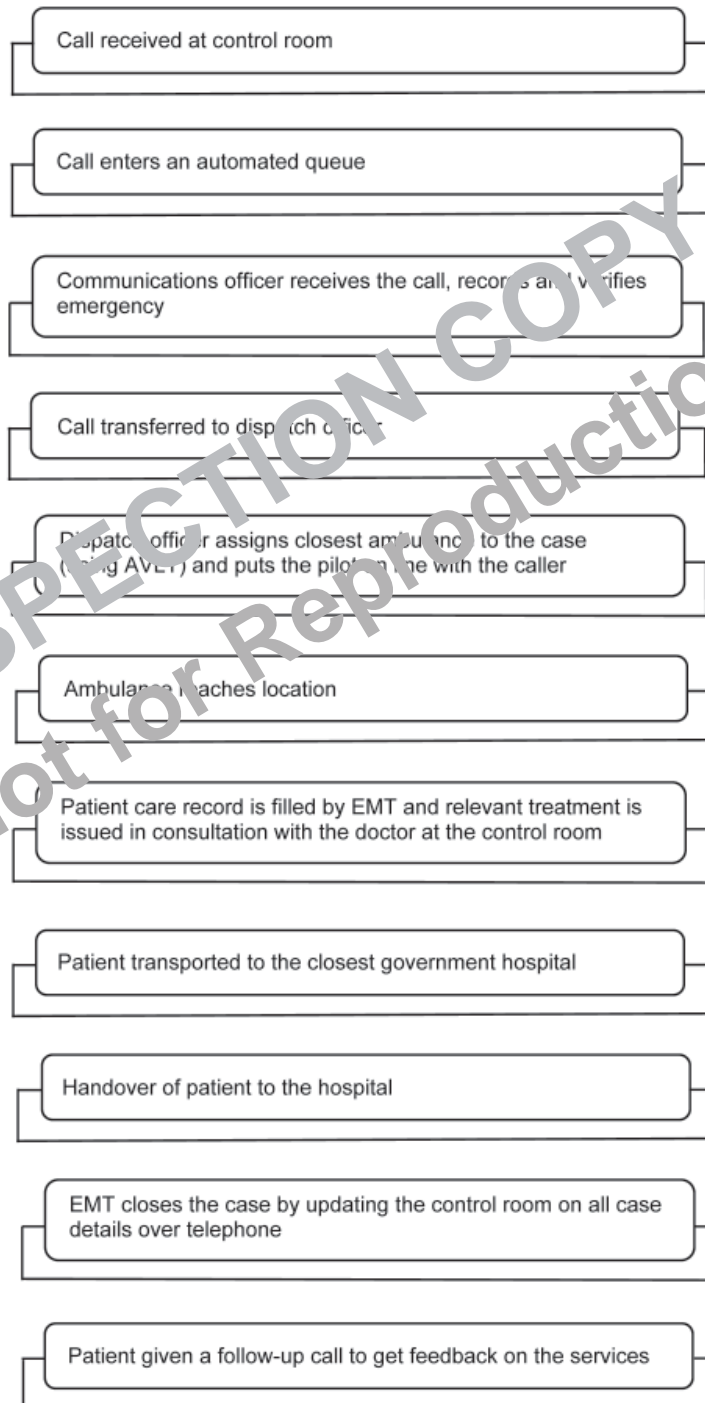
Gautam had to oversee the expansion of 1-0-8 services to provide ‘Emergency Room Service’ in the existing government health setups at Sanquelim, Candolim, Chicalim, Canacona and Curchorem regions in Goa. For the first phase in September 2009, two Peripheral Health Centres were commissioned while another was commissioned a month later. However, this resulted in GVK EMRI Goa having less autonomy over its employees as the paramedics were now directly working in the field under qualified government medical practitioners rather than EMRI-employed ERCPs.

Another area of concern was the high attrition rate among employees. This was attributed to the long work hours and mental stress at emergency sites. Remuneration was also an issue for the paramedics who felt it was not commensurate with their output. Some medical personnel took up positions with the organisation as stop-gap arrangements and left for further studies or better career prospects. EMRI’s executive board structure was unfavourably affected on account of the resignation of founder Ramalinga Raju as a result of the crisis<sup>8</sup> that hit his software company Satyam. This also affected the credit worthiness and liquidity of EMRI. Furthermore, following the 2008 global recession and ensuing uncertainty in GVK EMRI’s financial standing, some potential recruits were deterred from joining the organisation.

<sup>7</sup> Telecommunications company.

<sup>8</sup> In December 2008, Satyam Computer Services, the fourth-largest Indian IT company, was hit by a crisis when the founder and Chairman, Ramalinga Raju, made the announcement that Satyam was to take over Maytas Infra Ltd and Maytas Properties Ltd, both promoted by Ramalinga Raju’s sons. This raised concerns among investors. Satyam’s share price fell by 55 percent and the board of directors lost credibility. The World Bank also imposed an eight-year ban on Satyam’s services. Satyam dropped the acquisition plans within 12 hours after its announcement.

EXHIBIT 1  
SEQUENCE OF EVENTS AT THE ERC



Source: Ashwin Furtardo. (2010). Marian Institute of Healthcare Management.

EXHIBIT 2  
MAP OF GOA



Source: EMRI – Goa Reports.