A Study of Referral System for EmOC in Gujarat

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Abstract

Referral System for Emergency Obstetric Care in Gujarat State

Background: *An effective referral system is an essential prerequisite for a well functioning Emergency Obstetric Care (EmOC) service. It is the link between the home of the mother and a well equipped facility. The study attempts to explore the crucial link of referral system between the primary and higher level facilities.*

Objective: *To study the existing referral system for emergency obstetric care in the state of Gujarat, evaluate its strengths and weaknesses, and suggest ways of improvement for providing better referral service.*

Methodology: *Based on the RCH (Reproductive and Child Health) status and geographical location, 2 districts each were chosen from good, medium and poor districts. Primary data was collected through visits to facilities and through interviews of key informants at state, division, and district level. The recent Public Private Partnership (PPP) with Emergency Management Research Institute (EMRI) and its impact on the existing referral system was also studied. Secondary data was collected through state and district health management information system. A desk review of available research literature on studies on referral system was also carried out.*

Results: *The study revealed a rudimentary government referral transport system. The focus of the system is more on number of ambulance and drivers, and less on the number of referrals provided. Most of the PHCs do not have proper ambulances. The lack of standard procedure and referral protocols in the government facilities were aggravated by absence of records related to referrals. The availability of vehicle for transport is improving with the advent of EMRI; however there is a greater need for transparency in its processes and data.*

Conclusion: *By giving due importance to EmOC referral system and treating it as an integral part of maternal health, many more lives of mothers can be saved. The referral system and transport should focus on the requirements of the patients. Public Private Partnership can be one of the options for providing transport but ultimate responsibility of providing quality services rests with the government.*

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List of Abbreviations

ADHO	Additional District Health Officer
ANM	Auxiliary Nurse Midwife
ASHA	Accredited Social Health Activist
CDHO	Chief District Health Officer
CHC	Community Health Center
DPC	District Program Coordinator
DPHN	District Public Health Nurse
EMA	Emergency Management Act
EmOC	Emergency Obstetric care
EMRI	Emergency Management Research Institute
EMT	Emergency Medical Technician
ETS	Emergency Transport Scheme
FRU	First Referral Unit
GOI	Government of India
IIHMR	Indian Institute of Health Management Research
JSY	Janani Suraksha Yojana
MIS	Management Information System
MMR	Maternal Mortality Rate
NRHM	National Rural Health Mission
PATH	Program for Appropriate Technology in Health
PHC	Primary Health Center
PIP	Program Implementation Plan
RCH	Reproductive & Child Health
RCHO	Reproductive & Child Health Officer
RDD	Regional Deputy Director
RKS	Rogi Kalyan Samiti
SBA	Skilled Birth Attendants
TBAs	Traditional Birth Attendants

I   Introduction

Almost 59% of maternal deaths in India is due to obstetric complications (SRS 2003). It is widely accepted that reduction of Maternal Mortality Rate (MMR) needs easy accessibility to Emergency Obstetric Care (EmOC) facilities for all women having obstetric complications which requires a well functioning referral transport system. However, in most developing countries the lack of proper transport facility severely affects the access to EmOC services.

Delay in reaching a health facility is one of "the three delays" (1). Indirectly, transportation affects other two delays that is decision to seek care and delay in receiving adequate care also. The decision to seek care on the part of the individual, the family, or both is delayed due to long distance, lack of transportation, lack of money, poor roads, cost of transportation and some other factors such as gender, social considerations etc. In identifying a health facility, geographical barriers (like difficult terrain), distance from the facility (especially if the facilities in the region are not evenly distributed) and cost of ambulance facility play an important role. The delay in receiving adequate and appropriate care is many a time due to unavailability of inter-institutional referral transport facility. Lack of proper communication between facilities and follow-up further aggravates the situation (2).

In the Indian context the referral system assumes much more importance because of poor quality roads in rural, tribal and remote areas, lack of proper public transport facility and associated high cost for private transport.

II   Literature Review

Many studies on EmOC have stressed on the importance of referral transport and how distance proves to be a significant factor in delay in seeking medical care (3-8). However there are very few studies exclusively on referral transport for EmOC in India.

A study of maternal mortality in Anantapur district (Andhra Pradesh) in 1985 (9) brought out the need for timely availability of transport for taking patients to hospitals. Out of 140 women who were taken to the hospital in a serious condition, 96(68.5%) were transported by public bus, 27(19.2%) by bullock cart, 5 (3.5%) by manually driven rickshaw and only 12(8.6%) of the remaining women were taken to the hospital in motor driven vehicle or ambulance. This resulted in considerable delay and consequently 24(17%) women died on the way to the health facility and another 54(39%) died immediately after reaching the hospital.

Referral to proper EmOC facility is very important as precious time is wasted in moving from one facility to another resulting in loss of lives and increased complications. Another study conducted in Andhra Pradesh showed that among the 98 women who used hospital facilities nearly sixty percent went to two or more hospitals. One woman had visited as many as nine hospitals and finally died at home (10).

Studies from other countries also provide similar evidence. An enquiry into causes of delay and death "Mothers Brought Dead" in Jinnah Post Graduate Medical Centre Karachi found that out of 118 pregnant or recently delivered women in 10 years period (1981-1990) who were brought dead, 29 couldn't reach because of unavailability of transport, in 14 cases the reason was time lost in transfer from one place to another and for 10 patients the delay was due to delay in referral by maternity homes (11).

Arrangement of vehicle for referral transport is not enough. Readiness of facility is essential for a referral to succeed. A study on maternal deaths in rural Gambia states that availability of

doctors, blood transfusion facilities etc. are equally important. It identifies substandard care for obstetric referrals as a contributing factor for majority of the deaths (12).

Human resources handling referrals play a major part in its success. In a study in Ghana it was found that many TBAs trained in safe delivery were performing the high risk deliveries that they have been taught to refer. When they do refer, their patients may not go. Major barriers reported by TBAs are financial limitations, lack of transportation and the expectation of disrespectful or painful treatment from hospital personnel (13).

A study entitled 'Delivering Women-Centered maternity care with limited resources: Greneda' shows that good maternity care system is made possible by a well functioning referral system. In Greneda (a Caribbean island), virtually all the births are attended by qualified midwives. There are clear protocols for managing serious complications which are known, understood and utilized by majority of midwives. The essential features of the referral system are the use of a maternity record card that is kept by the woman, effective communication among primary care providers and between the primary and secondary care levels, an efficient emergency transport system, and referral back to primary level as soon as possible (14).

It should also be borne in mind that effective referral also means accountability for assuring continuity of care for women. In absence of accountability officials and providers seek scapegoats to blame instead of finding a solution (15).

Establishing proper referral protocols and ensuring their adherence is also important. A study on "Effectiveness of referral system for antenatal and intra partum problems in Gutu district, Zimbabwe" stresses on proper antenatal identification of appropriate risk factor, referrals and its compliance to decrease intra-partum emergency referrals. It suggests that referral criteria need to be reviewed constantly in order to reduce unnecessary referrals (16).

Another interesting finding is regarding compliance to referral decision. It is generally found to be low. In a study done in Nepal covering 1323 pregnancies, the referral advice was followed only in 32% cases. In another study in Kosango (in Eastern Zaire) where 5060 pregnancies were monitored, referral compliance was 33%. In some cases the medical staff wasn't even aware of non-compliance.

It is suggested that minimum guidelines for emergency medical care needs to be developed on a priority basis in low income countries. There is also a need to implement pilot programme which would determine the degree to which emergency medical care systems save lives and at what cost (19).The pilot programme can then be scaled up as per need.

The requirements of an effective referral system including the points discussed above have been well summarized by Murray et al from various studies (Given in exhibit I).

Exhibit I

Requirements of an Effective Referral System*
• An adequately resourced referral Center (meaning adequate staff, equipments, supplies, budget, managers etc.)
• Communications and feedback systems
• Designated transport
• Agreed setting –specific protocols for the identification of complications
• Personnel trained in their use
• Teamwork between referral levels
• Unified records system
• Mechanism to ensure that patients do not bypass a level of the referral system
* as mentioned by Murray et al,2001 (20)

Though published material on referral system in health is limited many initiatives and innovations in referral transport worldwide, have been well documented. Some of the successful innovations in developing countries are listed in exhibit II. It is to be noted that published material on innovations in types of referral transport in India is negligible.

Exhibit II

Initiatives and Innovations in Referral Transport in Developing Countries
Motorcycle Ambulances-At Dowa district in Central Malawi, the district hospital is as far as 96 Kms, from the farthest rural clinic which meant delay in reaching and high mortality. In July '05 the district health office started transport facility through ten e-ranger motorbike ambulances for EmOC referrals. After this intervention in the first 12 months Dowa's maternal mortality rate dropped by almost half. In a similar intervention in Jigawa State, Nigeria the state Ministry of Women's Affairs and Social Development in collaboration with PATHS resolved to address the situation and introduce the Emergency Transport Scheme (ETS) of *Achaba (*Motorcycles with trailers).The intervention has brought together partners like Road Safety Commission, Union of Road transport Workers, Commercial Motor cycle Riders Association who ordinarily do not have any direct role in safe delivery (21-22).
Bicycle Ambulance-In Uganda, East Africa the distance to the nearest Health Centre can be up to 20 Kms and 85% of the population is below poverty line an appropriate technology has been developed where bicycles have carrier for patients. Over 300 bicycles have been distributed (23).
Non-motorized Intermediate Means of Transport-In Dhading and Siraha districts of Nepal *tuins* and bicycle ambulances are being used for transportation of sick (24).
Community based transport interventions-In one community of Muhoraro district, Rwanda, emergency transport team is organized. Families that participate in the scheme pay half of the cost of transportation while the health committee pays the other half. The scheme has helped poor families that could not afford to organize emergency transport on time (6).
Edhi's Ambulances in Pakistan (known as poor man's van) has a fleet of 400 field ambulances and its air ambulance service has 2 aero planes and one helicopter. It is an initiative started by Abdul Sattar Edhi and most of its funds come from donations.

In India, very few exclusive studies on referral transport in EmOC are available. A working paper on emergency care through the provision of ambulance in public health facilities (26)Bhatt 1999) pointed out that capital cost and operating expenses for provision of ambulance was high and discussed the options of leasing or hiring of vehicles. It had

recommended user fees with exemption for poor and contingency funds at panchayats. In 2003 UNICEF commenced an evaluation of referral transport scheme under RCH-I in Rajasthan through IIHMR. The scheme was started to prevent the delay in reaching the health facility where in funds were given to Gram Panchayat to hire vehicles to bring the pregnant women to referral health facility. The evaluation was with specific reference to utilization of funds and factors affecting utilization. The scheme was allocated Rs.70.18 lakh but only Rs.12.52 lakh were spent for 3101 beneficiaries during 1999-2004. The study found that there was lack of clarity about the guidelines of the scheme. There was a requirement of verifying 10% of the beneficiaries which was not fulfilled. Due to lack of intersectoral coordination with Panchayati Raj Institution (local self Government Institutions) which had the central role in the scheme, it could not be implemented properly (26). However this study was an evaluation of a particular scheme and not the referral transport system. Hence to gain an insight into the problems of the referral system with specific reference to EmOC the current study was planned.

III   Objectives of the study

The current study has been taken up as a management study to analyze current referral policies and guidelines (if any) and problems with the system and implementation.

The main objectives of the study are

- To study the existing referral transport for emergency obstetric care arrangements at state, district and block level
- To study the strengths and weaknesses of the existing system
- To compare Emergency Management Research Institute (EMRI), 108 the new emergency transport through PPP with the older system.
- To recommend steps for improvement of the referral system for EmOC

Study Setting and Methodology

To understand the present situation of referral system in Gujarat with specific focus on maternal care and emergency obstetric care, desk review, interviews with stakeholders esp. key informants from health department and field trips were undertaken. Based on the RCH and socio-economic status (SES) two districts each from good (Navsari, Rajkot) medium (Ahmedabad, Gandhinagar) and poor performing (Panchmahal, Patan) districts were chosen. (RCH and SES status as calculated by Population Research Centre (PRC), Baroda 2007 (for details see appendix I).

Desk review

The desk review of available literature on referral system was primarily conducted through searches on internet and IIMA library. Besides internet, government and non government documents on guidelines, training modules, project implementation plans, evaluation reports and grey literature too were referred. Secondary data was also collected from national and state health management information system and form 9(RCH form filled by districts and sent to the state). Books, periodicals and journals were also referred. An effort was made to find out innovations for improvement in referral system for maternal health world wide.

Major problem faced in the desk review was limited number of reports and publications on referral transport for EmOC especially in Indian context.

Interviews with key informants

In order to understand the issues at each level (State, district and facility), semi structured interviews were conducted. At the state level Additional director, In charge Transport officer, consultant Maternal Health and RDD were interviewed. At district level in each of the six districts, CDHO/ADHO, RCHO and DPC were interviewed. At facility level in FRU/CHC/PHC, superintendent, Gynecologist /Medical officer, staff nurse, driver and beneficiary /patients /their attendants were interviewed. In total 66 interviews were conducted. At the facility level log book of ambulance, delivery register and indoor register were examined to get primary data. Effect of training of health functionaries such as medical officers and staff nurses along with Auxiliary Nurse Midwives (ANMs) were also taken into consideration. Some of the initial interviews were recorded with permission but researchers felt that respondents became relatively less communicative during the taped interviews so recording was discontinued.

Recent initiatives by state government such as partnership with Emergency Management Research Institute (EMRI) were also studied. EMRI officials were interviewed to know about the new initiative in detail.

Efforts were made to triangulate the data available from various sources such as state government reports, Form 9, Government of India reports, Facility survey conducted by third parties, field observation and responses of key respondents. Data on referral services for EmOC were collected in the year 2008. One of the limitations faced in data collection was unavailability of accurate data especially from the state.

IV   Findings

National Scenario of referral system

Referral system is an integral part of maternal heath and EmOC services. CSSM, RCH I and five year plans talked about it as a means of support to EmOC Services, but nothing much was done except giving funds of Rs. 5000 to selected village Panchayats for transporting pregnant women to health facilities under RCH I. Since coming of NRHM the emergency referral transport has taken off in many states for e.g. Uttranchal, Rajasthan etc.

The National Rural Health Mission (NRHM) (2005-2012) stresses on improving health system and one of its major focus areas is maternal health. To provide comprehensive and basic EmOC services the strategy is to establish First Referral Units and 24/7 primary health centers with good referral linkages. Schemes such as Janani Suraksha Yojana, health workers such as Accredited Social Health Activist (ASHA) and trainings such as EmOC for medical officers and SBA for staff nurses and ANMs also have given importance to the referral component.

The policies on referral as emerging from various plans, guidelines and training manuals are summarized in Annexure-I. The study of major policy and plan documents of last five decades show that the importance of referral system for EmOC has been recognized time and again. Almost all the recent documents recommend a good referral system however, effective implementation of these recommendations was lacking. There has been no systematic study of the referral system in the past.

The GOI MIS reporting formats under NRHM talk about mobile medical units but not about availability of regular ambulance services. The facility Survey reports do have the number of

ambulances available in CHCs and PHCs but these facility surveys are conducted after an interval of almost 5 years.

Findings at State level (Gujarat)

Need for referral:

Since risks for a pregnant woman cannot be predicted, each case is to be treated as a potential emergency and arrangements for referral transport is to be made. For Gujarat it means catering to approximately .78 million pregnant women in rural areas and .42 million women in the urban area per year. Besides this there are other emergency needs such as road accidents, burns cases, heart attacks and other health problems

Management Structure for Referral

State Level

This need of referral transport at the state level is being catered to under leadership of Additional director, rural health who reports to Commissioner Health. Additional Director heads the entire Rural Health Department. For transport, Additional Director is assisted by a "Transport Officer", who has an "Administrative Officer", an "Office Superintendent" and three "Clerks" (figure-1). Thus the State Transport Unit has total staff of 6 with only one officer who has to look after other charges too. Since 1985, there is no State Transport Officer (STO). The current incumbent is holding the post of STO as "additional charge". The qualification of a transport officer is of an automobile engineer where as since 1985 the post has been held by a doctor as additional charge.

District Level

At district level there is no Transport Manager. The Chief District Health Officer (CDHO) looks after the referral system and transport with the help of Reproductive and Child Health Officer (RCHO) and District Programme Coordinator (DPC). However the referrals of the CHCs are looked after by the Regional Deputy Directors (RDD) and Regional Programme Coordinators (RPC).

Vehicles for referral transport

All the district hospitals, sub district hospitals and CHCs have been allotted an ambulance. In some of the facilities there is more than one vehicle. The data on number of vehicles is available at the state level. Other details such as age of vehicles; their condition etc are not available. During the interviews the respondents told that there was a transport wing which was closed down in 2004 and very few new ambulances have been bought in last 5 years (table 1).

Petrol Oil Lubricant (POL)

The state transport wing of Health Department asserted that the Government hospitals are given budget on the basis of the number of beds. The budget for POL (Petrol, Oil, and Lubricant) is not given separately. It is included in the "office expenses".

All these show that referral system has long remained at the fringes of government's priorities. Only after with advent of EMRI 108 services it has been gained some sudden priority.

Table 1: Details of Purchase of Vehicles by DoHFW since 2002				
Sr. No.	Year	Vehicles	Total stock	No. of Vehicles condemned
1	2002	20	Data not readily available at state level	Data not readily available at state level
2	2003	123		
3	2004	5		
4	2005	3		
5	2006	0		
6	2007	6		
Total		157		

Purchase of health vehicles from transport officer, DoHFW, Gujarat

Figure 1
Organization structure of Gujarat Health Department Showing Transport Office
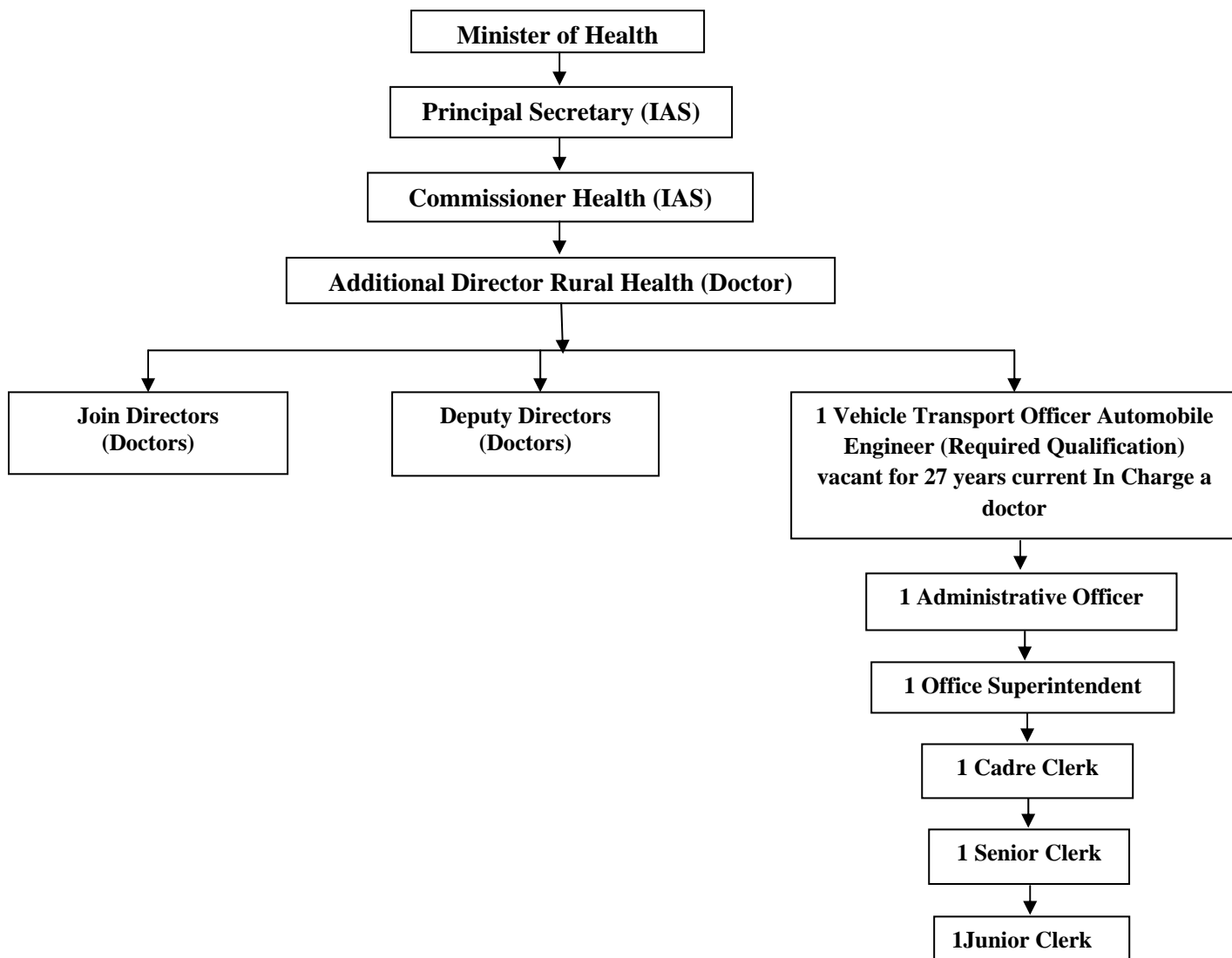
Referral Transport at district level

Table-2 presents the number of ambulances and position of drivers filled. Though the number of permanent drivers is less than the total no of ambulances in the district/sub district hospital, in order to utilize all the ambulances the drivers are transferred/ rotated between facilities where there is no ambulance or the ambulance is out of order.

There seems to be no relation between the population and the area of the district to the number of ambulances present in the district or sub district hospital.

		Ambulance			Drivers	
Sr.No.	**District**	**Total vehicle**	**Working Condition**	**%Working**	**Sanctioned**	**Filled**
1	Amreli	1	1	100	3	1
2	Petlad Anand	3	2	66.6	2	1
3	Banaskantha	3	1	33.3	3	1
4	Bharuch	4	4	100	3	3
5	Bhavnagar	1	0	0	2	2
6	Dangs	3	3	100	3	3
7	Gandhinagar	9	6	66.6	7	7
8	Junagadh	3	3	100	3	2
9	Veraval	2	1	50	1	1
10	Kachchh	5	5	100	4	4
11	Gandhidham	2	1	50	2	2
12	Mandvi	2	2	100	2	2
13	Kheda	1	1	100	2	1
14	Nadiad	6	6	100	3	3
15	Mehsana	4	3	75	3	3
16	Visnagar	3	2	66.6	1	1
17	Navsari	3	3	100	3	2
18	Panchmahal	5	4	80	2	1
19	Santarampur	3	3	100	2	2
20	Lunavada	1	1	100	2	2
21	Rajkot	1	1	100	2	2
22	Limbdi	4	4	100	3	2
23	Gondal	3	2	66.6	2	2
24	Sabarkantha	6	6	100	2	1
25	Surendranagar	1	1	100	2	2
26	Savarkundla	2	0	0	2	1
27	ID Vadodara	2	1	50	1	1
	Total	**83**	**67**	**80.72**	**67**	**55**
	*Details of ambulances from form no-9 (March 2008)					

Table 2: Details of ambulances & drivers available in District/Sub-district Hospitals of Gujarat

Findings at FRU/CHC level

Delivery and EmOC services

The following table (Table- 3) gives a glimpse of delivery and EmOC services being provided in Gujarat. The institutional deliveries have steadily increased to 74% in 2007-08 (both public and private). Approx 35% of deliveries are being conducted in public facilities, out of which less than 3% deliveries take place in CHCs functioning as FRUs or 24 x 7 PHCs. Out of the total deliveries being conducted in the state approximately 8 % are through Caesarean sections (CS), but in CHCs only 0.15 % deliveries being conducted are through caesarian sections. (Analysis of State report Gujarat, MoHFW, 2008)

The data indicates that the FRUs/CHCs /24 x 7 PHCs are not being utilized effectively as referral facilities for EmOC. Firstly, the delivery load is too less and secondly, the low CS rate indicates that complicated deliveries are not being handled in the FRUs for which they are meant. It is putting additional pressure on the referral transport system which has to arrange for patients' referral either to private sector or to higher facilities i.e. district hospitals or medical colleges. Moreover the cases which could be handled in 24 x7 PHCs, CHCs and FRUs are crowding the district and medical college hospitals putting undue pressure on their systems. Low usage of CHC/FRU facilities also means less effective utilization of manpower and other resources.

Referral Services

According to India facility Survey 2003, 69.4% of the CHCs of Gujarat had functional vehicles where as 86.5% PHCs of Gujarat had functional vehicles (not necessarily ambulances).The findings of Facility survey of 1999 which covered only 6 FRUs and 6 CHCs showed that 69% of the FRUs had working ambulances where as the corresponding figures for CHCs was 74%. However it is not a comprehensive survey and other necessary details such as availability of drivers etc. is not given.

Referral arrangement in CHCs as emerging from the MIS report and the data obtained from the state office for the year 2007-08 has been summarized in table-4. Out of 266 ambulances available, 8 ambulances i.e. approximately 3% are off the road. Most common reason for the ambulances being off the road is major repairs. Some ambulances are beyond repair, but they have not been replaced by new ones.

Table-3 Delivery Services in Gujarat April 2007 to March 2008

Indicators	April	May	June	July	August	September	October	November	December	January	February	March
Total no of deliveries reported (Home+ Public+ Private) (cumulative)	83532	164458*	255626*	346080*	451878*	563015*	656852*	750686*	844524*	938359*	1032194*	1126030*
% of Institutional deliveries (Public+ Private) to the total reported deliveries	68.50	71.18	72.67	73.26	74.34	75.05	75.05	75.05	75.05	75.05	75.05	75.05
% of reported Institutional deliveries from Public facilities to total Institutional deliveries	38.36	37.82	36.52	36.19	35.71	34.81	34.81	34.81	34.81	34.81	34.81	34.81
% of deliveries conducted in CHCs functioning as FRUs/24×7 PHCs to total reported deliveries	3.12	3.07	3.01	2.99	2.92	2.93	2.93	2.93	2.93	2.93	2.93	2.93
Caesarean (C-Section) Deliveries % of C-Section to total reported deliveries	7.84	7.47	7.84	7.45	8.12	8.02	8.02	8.02	8.02	8.02	8.02	8.02
Performance of CHCs upgraded as FRUs-% of C-section deliveries to total deliveries reported at CHCs functioning as FRU	0.19	0.13	0.19	0.16	0.14	0.15	0.15	0.15	0.15	0.15	0.15	0.15

(Source: Analysis of Monthly Data, Gujarat, MoHFW, 2008) available at www.mohfw.nic.in accessed on 31st October'08)
 *Cumulative

\multicolumn{12}{c}{Table-4 Details of Ambulance and their functioning in the CHCs in Gujarat Jan - Sept 2008}
Sl.No.	District	Population in lacs	Area (km2)	No of CHCs	Total vehicles available	In working condition	%	Total calls	Total km covered	Km/call	Avg km/day/vehicle
1	Ahmedabad	64.6	8,707	9	9	8	88.89	652	88295	135.42	40.88
2	Amreli	14	6,760	11	8	8	100	734	86529	117.89	40.06
3	Anand	19.3	2,942	10	10	10	100	520	62910	120.98	23.3
4	Banaskantha	27.7	12,703	12	11	11	100	754	134087	177.83	45.15
5	Bharuch	14.7	6,524	7	8	8	100	406	48524	119.52	22.46
6	Bhavnagar	26.5	11,155	14	13	13	100	1691	126946	75.07	36.17
7	Dahod	18.3	3,642	11	10	10	100	653	63066	96.58	23.36
8	Dangs	2.1	1,764	1	1	1	100	51	5579	109.39	20.66
9	Gandhinagar	14.6	649	6	6	6	100	436	35147	80.61	21.7
10	Jamnagar	21.3	14,125	11	12	12	100	1079	165387	153.28	51.05
11	Junagardh	26	8,839	15	17	16	94.12	1822	160977	88.35	37.26
12	Kachchh	17.4	45,652	11	12	9	75	363	52188	143.77	21.48
13	Kheda	21.1	4,215	11	11	10	90.91	776	79984	103.07	29.62
14	Mehsana	19	4,386	11	10	10	100	769	68752	89.4	25.46
15	Narmada	5.39	2,749	4	4	4	100	1465	74087	50.57	68.6
16	Navsari	12.8	2,211	9	10	10	100	463	34211	73.89	12.67
17	Panchmahal	21.8	5,219	11	12	12	100	1340	131543	98.17	40.6
18	Patan	12.3	5,738	7	9	9	100	522	92483	177.17	38.06
19	Porbandar	56.3	2,294	3	3	3	100	174	15550	89.37	19.2
20	Rajkot	35.1	11,203	13	14	14	100	1013	143669	141.83	38.01
21	Sabarkantha	22.2	7,390	17	16	16	100	1174	134168	114.28	31.06
22	Surat	60.2	7,657	17	21	20	95.24	1701	218273	128.32	40.42
23	Surendranagar	16.7	10,489	9	11	11	100	927	127674	137.73	42.99
24	Vadodara	39.2	7,794	16	19	18	94.74	1593	161377	101.3	33.21
25	Valsad	15.8	3,034	9	9	9	100	435	50328	115.7	20.71
	Total			255	266	258	96.99	21513	2361734	109.78	33.9

*No of calls & kilometers – CHC MIS Quarterly Report Jan-Sep 2008
*Details of ambulances collated from transport office, DoHFW, Gujarat
* Mid year population of districts of Gujarat year 2006 from annual statistical report Government of Gujarat
* Area covered by districts from Wikipedia, the free encyclopedia

The data in the above table (table -4) shows that average utilization of ambulances varies from 0.22 calls per day (in the Dangs) to 8.13 calls per day (in Junagarh). The number of Kilometres covered per call (to and fro) also varies from 50 Kms (Narmada) to 177 Kms in (Patan and Banaskantha).It means that a patient has to be referred to a facility 25 Kms away in Narmada but approximately 88 Kms in Patan & Banaskantha. Even for Ahmedabad district the distance covered per call is 135 Kms (to and fro).

Sr.NO	District	No.of CHC	Permanent drivers			Contractual Drivers	
			**Required	Sanctioned	Filled	Sanctioned	% Filled
1	Gandhinagar	6	18	11	10 (90.9 %)	1	1 (100 %)
2	Mehsana	11	33	7	6 (85.7 %)	5	2 (40 %)
3	Patan	7	21	9	7 (77.7 %)	1	1 (0 %)
4	Banaskantha	12	36	10	8 (80 %)	4	1 (25 %)
5	Sabarkantha	17	51	16	15 (93.7 %)	2	1 (50 %)
6	Ahmedabad	9	27	21	19 (90.4 %)	2	1 (50 %)
7	Kheda	11	33	10	7 (70 %)	3	3 (100 %)
8	Anand	10	30	8	5 (62.5 %)	2	2 (100 %)
9	Surendranagar	9	27	13	10 (76.9%)	-	-
10	Rajkot	13	39	22	19 (86.3 %)	-	-
11	Jamnagar	11	33	17	14 (82.3 %)	1	0 (0 %)
12	Bhuj	11	33	13	10 (76.9 %)	-	-
13	Bhavnagar	14	42	19	12 (63.1 %)	-	-
14	Amreli	11	33	12	9 (75 %)	2	0 (0 %)
15	Junagadh	15	45	18	12 (66.6 %)	3	3 (100 %)
16	Porbandar	3	9	3	3 (100 %)	-	-
17	Vadodara	16	48	28	22 (78.5 %)	3	1 (33.3 %)
18	Bharuch	7	21	9	7 (77.7 %)	2	1 (50 %)
19	Narmada	4	12	5	4 (80 %)	1	1 (100 %)
20	Panchmahal	11	33	12	7 (58.3 %)	4	3 (75 %)
21	Dahod	11	33	11	8 (72.7 %)	4	4 (100 %)
22	Surat	11	33	27	21 (77.7 %)	3	0 (0 %)
23	Tapi	6	18	6	5 (83.3 %)	-	-
24	Valsad	9	27	11	9 (81.8 %)	2	0 (0 %)
25	Navsari	9	27	11	8 (72.7 %)	3	2 (66.6 %)
26	Dang	1	3	2	1 (50 %)	1	1 (100%)
	Total	**255**	**765**	**331**	**258 (77.9 %)**	**49**	**27 (55.1 %)**

Table-5 Details of Posts of Drivers in CHCs in Gujarat (updated on 1st Oct 2008)

*Details of post of drivers from transport office updated on 1st October 2000** required driver calculated @ 3 per vehicle

As shown in the table above, 78 % of the posts of permanent drivers in CHCs are filled where as for contractual drivers only 55 % of the posts are filled. On probing for the reasons the researchers came to know that contractual drivers were being taken up on per day basis. This meant that if the facility referred any patient on a particular day, the driver would be paid; otherwise there would be no payment for that day though the driver might keep waiting the entire day for a patient to be referred. However, this has been changed from April 08 and now the contractual drivers are being given a consolidated salary (Rs 2500/month).The salary being paid to the drivers is less than the minimum wages[4]. As the salary is quite low and there are no other benefits associated, the drivers are not keen to join on contract. The gap between the required drivers and available drivers is approximately double. There is no disaggregated data for drivers who drive ambulances and drivers driving vehicles for officials hence the number of ambulances not working due to paucity of drivers (if any) cannot be calculated.

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[4] The minimum wage for employment in automobile for semi-skilled is Rs. 134.00 to Rs.132.60 per day. Available at http://www.paycheck.in/main/officialminimumwages/gujarat Accessed on 17th April 2009

Summary of Findings on referral system at CHCs visited (based on Murray et al)

Readiness of the referral facility
102 of the 273 CHCs are designated as FRUs but till March 2009 only 22 FRUs are functional. Rest are non functional primarily due to unavailability of specialists (Surgeon, Anesthetist, Gynaecologist and Pediatrician are necessary for a fully functional FRU) and non-functional blood banks/blood storage facility. However in most of the CHCs one or sometimes two specialists are posted, but non-pairing of Gynaecologist and anesthetist has led to inefficiency and wastage of precious specialist human resources. Out of the six CHCs visited only one CHC (Dholka) provided regular EmOC services which had MD gynecology and Anesthetist (Trained in life saving anesthetic skills).Though the CHC Halol also has a duo of Gynaecologist and anesthetist, the newly trained doctor in Life saving Anesthesia is not confident, the gynecologist is not comfortable working as a pair and hence the number of CS sections, there is very low. Most of the cases requiring EmOC services are referred to the district hospital. Thus the patient coming from a PHC has to cover not only the distance till the CHC but to the district hospital. The BPL families have the benefit of Chiranjivi and can go to a Private doctor enrolled in Chiranjivi Scheme. But at times Chiranjeevi doctors also refer rendering the amount of Rs.250 given for transportation too less for the longer distances to be covered by the patient to reach the appropriate facility.

Communications and Feedback Systems
Telephone facilities are available in all the CHCs visited and all were in working condition. Most of the Superintendent and medical officers have been given mobile facilities with CUG (Closed User Group) facility where by they can talk to each other free of cost. Though, its use for referral purpose, as told by the respondents is nominal. There is no protocol for use of telephone for referral. Out of 6 CHCs visited, only one CHC sometimes calls up to communicate about referral.

Designated transport
All the CHCs have ambulances. Out of the six facilities visited the ambulance in one of the facilities was out of order at the time of visit for last 2 months. There is only one driver per ambulance hence its availability for round the clock services are questionable. Though on probing the superintendent asserted that driver is available 24 hours as they stay in the quarters near the CHC and can be called at any hour. The arrangement for driver when the regular driver is on leave is in most cases ad hoc. There is lack of clarity about the user fee to be charged from the patients, extent of exemption and which patients are exempted from paying the charges. Each of the CHC seems to be working with its own set of rules.

Referral protocols and rules
The state government has not prepared any referral guidelines or standard protocols so no uniform protocols are followed by CHCs. The Emergency Obstetric Care (EmOC) training enumerates the referral protocols but these protocols are not known to all as EmOC training is yet to be imparted to all the medical officers and staff nurses. Some doctors contested that there cannot be a standard protocol for referral as it depends upon the emergency condition and the skills and confidence of the doctor handling the case.

There is no set referral system in the state in practice. There is no effort to make the patients go through the referral levels. Though in theory and for the planning purposes sub centres, PHCs, CHCs, district hospitals and medical colleges are treated as referral levels, in practice patients can go to any of the facility as per their choice.

Training and Teamwork

There is no training on referral or emergency management for doctors or nurses. Only EmOC training for medical officers has included the referral protocols. The drivers are not trained in handling of any medical emergency. Besides the driver, there is no hospital attendant or nurse to accompany the patient. Only in very serious cases a nurse accompanies. There is no teamwork between the referral facilities as there is minimal communication among them. Moreover the CHCs are answerable to RDDs where as the PHCs report to Block Health Officer and CDHO. This dichotomy has led to a divide between these two levels and they do not see themselves as a team.

Record Keeping

There are referral slips in CHC. The records of out -referral are maintained in the form of counterfoils of the referral slips given to the patients. However there is no set system for recording the in- referrals. There is a log book in the ambulance wherein the Kms covered and the reasons of referral are mentioned. There is no analysis of the referral done.

The summary of the major findings about the referral system in the CHCs visited is summarized in the table below.

Sl .N	Facilities	Rajkot (Paddhari)	Navsari (Chikhali)	Ahmeda bad (Dholka)	Gandhinagar (Mansa)	Patan (Harij)	Panchmahal (Halol)	No. of yes/Total (yes %)
1	Availability of Referral slips	Yes	Yes	Yes	Yes	Yes	Yes	6/6 (100%)
2	Ambulance	1	1	1	1	0	2	5/6 (83.3%)
3	Log book maintained	Yes	Yes	Yes	Yes	-	Yes	5/6 (83.3%)
4	Drivers permanent	Yes	Yes	Yes	Yes	Yes	Yes	6/6 (100%)
5	Availability of phone	Yes	Yes	Yes	Yes	Yes	Yes	6/6 (100%)
6	BmOC training	No	No	Yes	Yes	Yes	No	3/6 (50%)
7	CUG mobile	Yes	No	Yes	Yes	Yes	No	4/6 (66.6%)
8	Referral Protocols	No	No	No	No	No	No	0/6 (0%)
9	Availability of BEmOC services	No	No	Yes	No	No	No	1/6 (16.6%)

Table title: **Table-6 Summary of the major findings of referral system in the CHCs Visited**

The above observations show that in most of the cases the basic infrastructure of referral transport is present or available (though human resources or the drivers are limited) but due to non-availability of referral protocols, proper training and BEmOC facilities in the referral facilities, the available referral facilities are not being utilized properly.

Findings at PHC level

Out of 1080 PHCs in the state of Gujarat only 218 PHCs have ambulances which are sometimes shared with other PHCs. Though there are other vehicles (jeep or Sumo) but they are primarily meant for administrative work i.e. staff movement, transport of supplies, dropping and picking of FP clients. They are used to transfer patients only in dire need. 30 out of 218(13%) ambulances are off the road and out of total no. of vehicles (Jeeps, sumo and ambulances) 22% are off the road. Out of 1074 sanctioned posts of drivers of PHCs only 34% are filled and 66% are vacant. (Table-7)

The number of calls and the distance covered by the ambulance at PHC level were not available at the district headquarters which shows that use of vehicles/ambulances is not measured or monitored.

It was observed that most of the times at PHCs, mere mechanics/logistics i.e. number of ambulances, number of drivers, budgets etc. are monitored and the actual services provided i.e. the number of referrals is not recorded or analyzed in any way.

IV Findings at PHCs visited

The PHCs refer to the nearest best equipped hospital available and in most of the cases it is the district hospital. In the six of the PHCs visited it was found that though telephone and cell phone facilities were present, they were not used for referrals. Two of the PHCs have ambulances, but rest four has jeeps which are generally used for administrative purposes such as supervision and not for referring patients. There are no set protocols for referral. The staff is not aware of such protocols neither have they received any training for emergency handling. There is minimal teamwork between the referring levels and as PHC and CHC report to different officials the team work is further reduced. Record system for referral is very poor. There are no referral slips and referrals are made by the medical officer by writing on plain paper and no copy is kept. There is no attempt to follow up or to ensure patients adherence to referral levels. This is unsuited.

The referral system at the PHC level lacks both infrastructure and system. They do not have ambulances and drivers. The existing staff lacks requisite training and knowledge of protocols for a functioning referral system. The lack of ambulances for referral transport is now being met by the EMRI but inter-institutional transfers (here PHC to CHC /district hospital/Medical colleges/Private hospital) is not a priority for EMRI ambulances as a patient in an institution does not come in the category of an emergency for EMRI.

Sr.No.	District	No of PHCs in each districts	Mid year Population of districts 2006 (in Lacs)	Area(km2)	Jeep/Sumo			Ambulance			Total			Drivers		
					Total Vehicle	Working Condition	Off Road	Total Vehicle	Working Condition	Off Road	Total Vehicle	Working Condition	Off Road	Sanctioned	Filled	vacant
1	Ahmedabad	43	6463843	8,707	15	12	3	1	1	0	16	13(81 %)	3(19 %)	43	10	33
2	Amreli	36	1405395	6,760	35	18	17	8	5	3	43	23(53 %)	20(47 %)	36	11	25
3	Anand	44	1935521	2,942	34	25	9	10	9	1	44	34(77 %)	10(23 %)	43	2	41
4	Banaskantha	63	2777912	12,703	44	40	4	24	24	0	68	64(94 %)	4(6 %)	64	31	33
5	Bharuch	38	1472782	6,524	35	25	10	7	4	3	42	29(69 %)	13(31 %)	38	7	31
6	Bhavnagar	44	2652889	11,155	38	28	10	10	8	2	48	36(75 %)	12(25 %)	43	20	23
7	Dahod	60	1831682	3,642	54	42	12	4	4	0	58	46(80 %)	12(20 %)	60	5	55
8	Dangs	7	210055	1,764	0	0	0	0	0	0	0	0(0 %)	0 (0 %)	7	3	4
9	Gandhinagar	24	1463728	649	5	5	0	3	3	0	8	8(100 %)	0 (0 %)	24	8	16
10	Jamnagar	36	2130638	14,125	15	8	7	0	0	0	15	8(53 %)	7(47 %)	36	15	21
11	Junagadh	54	2602208	8,839	30	30	0	15	15	0	45	45(100 %)	0(0 %)	54	27	27
12	Kachchh	37	1748653	45,652	69	27	42	16	7	9	85	34 (40 %)	51(60 %)	37	27	10
13	Kheda	50	2112493	4,215	41	34	7	7	7	0	48	41 (85 %)	7(15 %)	50	7	43
14	Mehsana	48	1906317	4,386		0	0	0			0	0 (0 %)	0(0 %)	48	14	34
15	Narmada	24	539959	2,749	15	10	5	5	5	0	20	15 (75 %)	5(25 %)	21	3	18
16	Navsari	36	1282794	2,211	24	16	8	8	8	0	32	24 (75 %)	8(25 %)	36	5	31
17	Panchmahal	64	2186495	5,219	58	53	5	15	15	0	73	68 (93 %)	5(7 %)	64	15	49
18	Patan	29	1239576	5,738	25	22	3	14	12	2	39	34 (87 %)	5(13 %)	29	22	7
19	Porbandar	10	563169	2,294	7	7	0	4	4	0	11	11(100 %)	0(0 %)	10	5	5
20	Rajkot	43	3511672	11,203	33	30	3	10	10	0	43	40 (93 %)	3 (7 %)	43	33	10
21	Sabarkantha	62	2225997	7,390	73	64	9	12	9	3	85	73 (86 %)	12 (14 %)	62	31	31
22	Surat	78	6028801	7,657	63	63	0	9	9	0	72	72(100 %)	0 (0 %)	78	25	53
23	Surendranagar	31	1672959	10,489	41	25	16	0	0	0	41	25 (61 %)	16 (39 %)	31	8	23
24	Vadodara	76	3922305	7,794	34	26	8	33	28	5	67	54 (81 %)	13 (19 %)	76	24	52
25	Valsad	43	1587153	3,034	27	10	17	3	1	2	30	11 (37 %)	19(63 %)	41	6	35
	Total	**1080**	**55474996**		**815**	**620**	**195**	**218**	**188**	**30**	**1033**	**808(78 %)**	**225(22 %)**	**1074**	**364(34 %)**	**710 (66 %)**

* Details of ambulances & Jeep collated from form no- 9
* Mid year population of districts of Gujarat year 2006 from annual statistical report Government of Gujarat
* Area covered by districts from Wikipedia, the free encyclopedia
* Drivers posts in PHCs from Rural health department updated on October 2008

The summary of the major findings at the PHCs visited is summarized in Table below.

Table-8 Major findings of referral system at the PHCs Visited							
Facilities	Rajkot (Kuvadva)	Navsari (Alipur)	Ahmedabad (Kasindra)	Gandhinagar (Adalaj)	Patan (Shankhesver)	Panchmahal (Delol)	No. of Yes (Yes %)
Availability of Referral slips	No	No	No	No	No	No	0/6 (0%)
Ambulance	1 (Off road)	1	0	1	1 (Off road)	1	3/6 (50%)
Log book maintained	NA	Yes	NA	Yes	NA	Yes	3/6 (50%)
Drivers permanent or on contract	Transferred	Permanent	0	Permanent	Transferred	Contract	3/6 (50%)
Availability of Telephone	Yes	Yes	Yes	Yes	Yes	No	5/6 (83.3%)
BmOC training for MO	No	No	No	Yes	No	No	1/6 (16.6%)
CUG mobile	Yes	Yes	Yes	Yes	Yes	Yes	6/6 (100%)
Referral protocols	No	No	No	No	No	No	0/6 (0%)

IV   EMRI (Emergency Management Research Institute)

EMRI was started in 2005 in Andhra Pradesh (AP) to have an integrated system for emergency management for police, medical and fire departments. The 108 concept is to provide pre-hospital care, emergency care and transportation to an appropriate health facility.

Impressed by the success of 108 in Andhra Pradesh (AP), reported in a magazine the Chief Secretary of Gujarat sent a team of technical officials and administrators to Hyderabad for studying the possibility of such a system in Gujarat. He sent a team of technical officers and administrators to Hyderabad to look at the set up and study the possibility of having a similar set up in Gujarat. The team came back and gave positive response and a meeting was set up with Chief Minister (CM). EMRI CEO made a presentation to the CM and officers from Gujarat. CM approved of the initiative and the decision was made to implement the EMRI initiative from August, 2007. Gujarat is one of the five states where EMRI is currently operating the others being Andhra Pradesh (AP), Madhya Pradesh (MP), Uttaranchal, Rajasthan and Maharastra barring Mumbai. The First Common Review Mission on NRHM (Nov 2007) has lauded the EMRI in AP as "an excellent example of PPP". EMRI in Gujarat too is doing commendable job for the

public. Prior to EMRI ,the emergency ambulance services existed only for the paying class and that also predominantly in the urban area

As per MoU, government of Gujarat bears capital and operational expenditure of the initiative which constitutes 95% of the total expenditure. EMRI bears the expenses of training, promotional activities and travel cost of executives to Hyderabad which constitutes 5% of the total expenditure. Annual operational cost is estimated to be 65 crores. Government has also given land of 10 acres at Kathwada near Ahmedabad for setting up an Emergency call center and Emergency Management Research Institute.

How EMRI/108 operates?

108 is a toll free number and the victim or relative/bystander can dial the number and give information of the nature of emergency. The way the EMRI functions has been depicted in the flow chart (Figure-2).

EMRI receives about 2000-2500 emergency calls per day from whole state, out of which 98.7% are medical emergencies and rest are police or fire related emergencies. EMRI monitors its operations by reviewing Pre-hospital Care Records (PCR) submitted by Emergency Medical Technicians (EMTs) and follow up phone interviews with relatives. This data is used for research and improvement in the management.

Ambulances and its personnel

EMRI has kept one ambulance for an area of 20 Kms radius. In rural area one ambulance covers a population of one lakh where as in urban area it covers a population of 2 lakh due to difference in the density of population and area to be covered. There are two types of ambulances. Basic Life Support (BLS) Ambulances which have all basic equipments like AC, oxygen cylinder, stretcher and Advanced Life Support (ALS) ambulances which have defibrillator and ventilator for cardiac and serious patients. They also have telemedicine where the ECG of patient can be transmitted to the emergency response physician who in turn guides the EMT on how to manage the case. With a total of 400 ambulances (100 ALS and 300 BLS), EMRI has covered the whole of Gujarat. The District wise allocation of EMRI ambulances is given in Annexure-VI. Details of Cases Attended by EMRI till 31 October 2008 are given in Annexure-V.

An ambulance is manned by a pilot (the driver) and an EMT. Each EMT and pilot works in 12 hours shift. The ratio of 2.5 EMT and 2.5 pilots per ambulance is maintained to cover round the clock duty and also leaves taken by EMTs and Pilots. There is a careful selection process for EMTs who are recruited in three rounds: technical, human resource and management round. EMRI reported that they make sure that people recruited understand ethical behavior and do not accept any payment from the victim/relatives or hospitals. The basic qualification for an EMT is Bachelors Degree in Life Sciences.
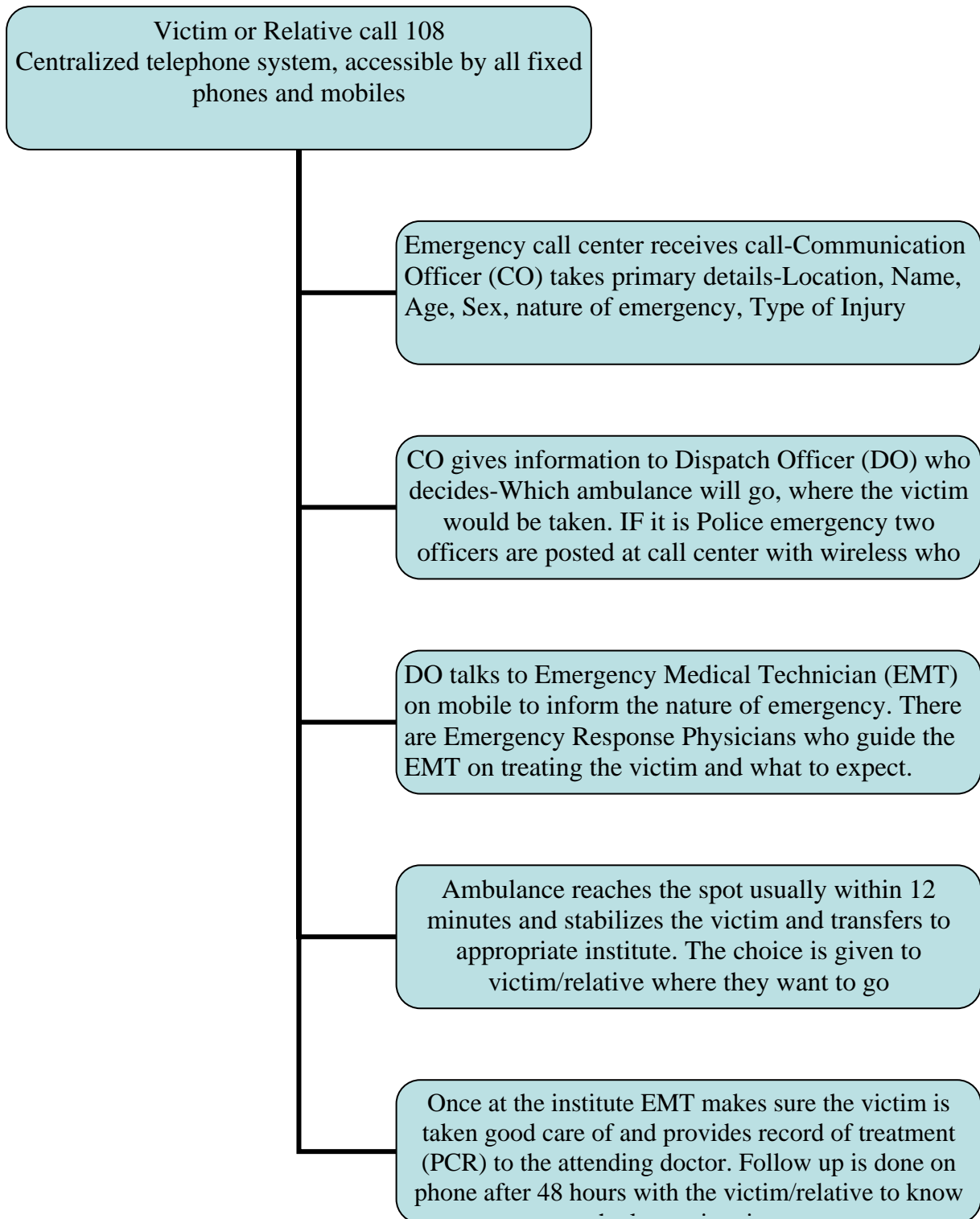
Victim or Relative call 108
Centralized telephone system, accessible by all fixed phones and mobiles

Emergency call center receives call-Communication Officer (CO) takes primary details-Location, Name, Age, Sex, nature of emergency, Type of Injury

CO gives information to Dispatch Officer (DO) who decides-Which ambulance will go, where the victim would be taken. IF it is Police emergency two officers are posted at call center with wireless who

DO talks to Emergency Medical Technician (EMT) on mobile to inform the nature of emergency. There are Emergency Response Physicians who guide the EMT on treating the victim and what to expect.

Ambulance reaches the spot usually within 12 minutes and stabilizes the victim and transfers to appropriate institute. The choice is given to victim/relative where they want to go

Once at the institute EMT makes sure the victim is taken good care of and provides record of treatment (PCR) to the attending doctor. Follow up is done on phone after 48 hours with the victim/relative to know

Figure-2 Flow-Chart depicting EMRI's functioning

Training of EMTs and Pilots

EMRI has set up Emergency Medical Learning Centre (EMLC) to train Emergency Medical Technicians (EMT) and Pilots (drivers).The training of EMTs is for 42 days which includes 20 days practical training. Practical training includes posting at emergency room and wards. EMRI has collaboration with Standford University for academic courses. Generally two batches of 40-50 EMT candidates are taken at a time. There are 8 trainers who were trained at Hyderabad who provide training. Every 15 days a new batch is taken. The training has included module for obstetrics (delivery related) emergencies too from last year. For the EMTs who were trained before obstetric training was started, distance learning methods and on site refresher course is being used to give training on obstetric emergencies. EMTs who are working in rural areas are given preferences for the training. Pilot training is for 10 days.

Connecting with Community through VoICE

EMRI has Volunteers In Case of Emergency (VoICE). They are people from community who are trained in first respondent training. First respondent traning is imparted to make people aware of emergencies and importance of emergency care. It trains them to become the first person to report emergency. VoICE makes sure that emergencies are managed on the spot and are attended by EMRI at the earliest. EMRI has involved government field level workers ASHA, FHWs and AWWs for this purpose. These volunteers have been attending various health department meetings at district and local levels since November, 2007. They accompany FHW for the Mamta day at sub center level and give demonstration of kind of facilities EMRI have in their ambulances.

For child birth care EMRI has started a new initiative. In each district VoICE is asked to collect data on Expected Date of Delivery (EDD) of pregnant women in the community. EMRI has requested them to contact women one month prior to EDD and educate them on birth preparedness. VoICE reminds the pregnant women and her family about 108 services. Dais /Traditional Birth Attendants (TBAs) are also involved in this initiative. Chiranjeevi doctors have also been contacted for collaboration. From September, 2007 number of delivery related transfers have increased. Till 30th September 2008, with the help of EMTs, 606 deliveries have been conducted either in their ambulances or at home.

Organizational structure

EMRI has three main departments: Operations, Maintenance and emergency response center. They call it Full Life Cycle Business (FLCB) and they have Full Life Cycle Leader (FLCL). EMRI has operations manager, maintenance manager and emergency center manager. At state level they have also have finance, HR, quality assurance, systems management and hospital relations departments. These are support departments for ensuring smooth operations. Hospital relations does facility surveys and competency surveys before entering into MoU with any hospital. EMRI also maps the facilities. EMRI has tie-ups with 2050 private hospitals and 1381 government health facilities

hospitals in Gujarat. Under the MOU the hospital provides free stabilization services for the first 24 hours to the patient.

There are four regional managers in Gujarat who look after the districts falling in their regions. In each district, EMRI has district manager, fleet supervisor and operations executives. There is one operations executive for every twelve ambulances

Table-9 Comparison of EMRI and Government Ambulance System

Parameter	Government Referral System	EMRI
Ambulances	513 working ambulances in the whole of state over last several years) Equipped only with an oxygen cylinder, first aid box and a stretcher. No mobile phones given to drivers hence no communication with facility.	402 Ambulances introduced in one year Equipped with AC, oxygen cylinder, stretcher, rescue equipments, first aid box etc. Ambulance always remains in contact with the control room through mobiles.
Cost of Ambulance	Low Rs.3,00,000-4,00,000 per ambulance	High Rs.11,00,000 per ambulance
Personnel in Ambulance	Only driver. In few cases of nurse may accompany	EMT always accompanies. Hand holding through telephone by Emergency Response Physicians
Managerial set up	No separate managers. The additional director and Transport officer at state level and CDHO/RCH officers look after referral system along with other responsibilities	One Operational Manager for every 12 ambulances. Each district has a district coordinator and there are four regional managers. Eight managers at state level
Monitoring	No system of regular monitoring. No system of data collation and analysis	Each call, trip and patient monitored. Data collated and analyzed at state level
Training	No training of drivers or paramedic. Doctors trained in EmOC given some orientation to referral protocols	Drivers trained for 10 days and EMTs trained for 42 days
Community Orientation	No attempts made to orient the community about the referral system	There is Volunteers In Case of Emergency (VoICE).
Budget	Separate expenses for referral system for whole state not available. At PHC Rs.24,000 is paid for POL annually	Operating cost approx. 65 crores per year. The cost per ambulance including POL, salary of Pilots and EMTs is currently Rs.90, 000 per month. Total operating cost per ambulance (annualized) for 1st year is Rs 1.13 million(Rs. 11.37 lacs)
Cost per emergency	Adequate data not available. Cost per emergency not calculated.*(projected cost calculated for an ideal emergency system in Appendix-VIII	Cost per emergency Rs.563 (Feb 2009) as given by EMRI. Details of calculation unclear

Other Emergency Transport Services

There are a few other Emergency transport systems working in some of the districts and blocks of Gujarat. For e.g. Deepak Charitable Trust and Mission Life in Vadodara, Life line ambulances which operate on the highways. However the geographic area covered by such services is limited. In order to streamline the emergency services and pre-hospital care an Emergency Medical Act has been passed in Gujarat.

Gujarat Emergency Medical Act (EMA) 2007

The Gujarat Emergency Medical Act (EMA) 2007 came after a few large scale emergencies struck Gujarat in succession, namely earthquake, post –Godhra Riots and Akshardham terrorist attacks. It was advocacy by the trauma specialists, professors in teaching and practicing trauma management who were engaged in handling these emergencies, which precipitated the passing of this Act. The Act is an effort to standardize every thing in pre-hospital care right from the ambulances to the facilities and the training of the EMTs. The objective of EMA is to provide for emergency medical services in the state and establish Gujarat Emergency Medical Services (EMS) authority and EMS councils in city and district.

The Emergency Medical Services (EMS) authority has Secretary Health and Family Welfare Department as the ex-officio chairperson and seventeen members. Among the members there is Secretary legal Department. Secretary Home, Commissioner of Health, a physician or surgeon having experience in trauma/ emergency care, President IMA Gujarat, representative of Academy of Traumatology(India) and other stakeholders.
The director of EMS is the ex-officio member secretary.

Since 2007, two executive body meetings of EMS authority have taken place. In order to translate the Act into implementation rules and regulations are to be formed. The rules which are to be passed by the government have been formulated and have been sent to the legal department. After the legal department gives its consent, the rules will remain in the public domain for 3-6 months which would then be ratified by the government. Gujarat is the only state in India, which has such an Emergency Medical Services Act. However having an act alone is not enough and steps should be taken to implement the act speedily.

V   Discussion

The discussion is primarily based on the requirements of an effective referral system as mentioned by Murray et. al (2001) (discussed in section II) is given below.

1. An adequately equipped referral Center

An effective referral system requires adequately equipped referral centre where needs of referred patients can be met. The state has provision in the perspective plan of NRHM for 24x7 PHCs providing Basic EmOC services and District hospitals and FRUs providing

Comprehensive Emergency Obstetric care. Currently, only 22 FRUs are fully functional mainly because of unavailability of specialists and non functional blood banks or blood storage units. To overcome this problem, the chiranjeevi scheme was brought in so that private sector doctors who are many in numbers can provide delivery services to the poor. A good referral transport then has to ensure that patient is taken to the appropriate facility.

2. Communications and feedback systems

Communication and effective feedback systems are backbones of a good referral system. The government of Gujarat has provided CUG mobile phones to all health functionaries (doctors to ANMs). Most of the facilities have land lines too. However, use of these means of communication for referral purposes is negligible. The medical teams in district or medical college hospitals are big. The doctors from referring hospitals do not know who would treat the patient there and hence hesitate to call up. There is no communication protocol set up for emergency referral. Many a times there is no separate telephone line/extension for the labor room. If it is there, it is not known to the peripheral units. There is no thought, design or effort to improve communication between health units.

3. Designated transport

With the advent of EMRI 108 services the ambulances from the government facilities are now used only for inter–institutional referrals, generally PHC to CHC/District hospital/Medical College (Depending upon the distance /condition of the roads it takes half an hour to two hours). At PHCs there are no ambulances but jeeps which are used as ambulances in extreme emergencies. The jeeps are generally meant for supervision visits by the medical officer. It is also used by ANMs for immunization campaigns. Jeeps are also used for transporting patients after operation during family planning camps. It also carries medicines, vaccines etc. As told by the respondents, general usages of jeeps are more for transportation of staff and medicines rather than patients.

4. Agreed setting –specific protocols

The Interviews with state level officials involved in referral system revealed lack of standard procedures (such as use of referral slips etc.), specific protocols or agreed guidelines for referral. Even in the field visits we did not find any referral or transport protocol.

5. Training of Personnel

The staff is not trained specifically for emergency, referral and transport handling. There are trainings such as SBA or EmOC trainings which specify the conditions which of referral but their use in day to day work are negligible. Practical efforts to make the health functionaries aware of such conditions are also minimal as is clear by the absence of their display in health facilities. But EMRI has trainings for both for driver and EMT.

6. Teamwork between referral levels

The teamwork between referral facilities is poor. Generally there are many doctors at the referred facility, who are on rotation basis. A strange reason was given by the doctors for not calling up the referral facilities. They said that as they do not know the doctors at referral facility personally they do not call or share information. This shows that our health facilities are still working on personal contact basis not as a part of a well organized system.

7. Unified records system

The record-keeping related to referral issues is skeletal. In CHC the counterfoil of referral slips are preserved. There is no separate register or record of in or out- referrals. The OPD patients referred to higher facilities are mentioned in the OPD register of the lower level facilities. Thus there is some record of out -referral but no record of in- referral. There is no analysis of referral data and no action is based on referral patterns.

8. Mechanism to ensure no bypass

There is no mechanism that can ensure that patients do not bypass a level of referral systems. The government cannot stick to this or make a rule as it is not sure that doctors /drugs would be available at the referral so the patient is generally referred to the nearest highest referral. E.g. If an FRU is 30 Kms and a Medical College is 40 Kms, patients prefer to go to medical college because FRUs are generally not functional consistently. The self referral results in overflowing higher facilities esp. Medical colleges who have come for minor ailments jostling with the patients who can only be treated at a super specialty /medical college hospital.

9. Other Important Issues

Government over time dismantled the management structures for referral transport. The post of Transport Officer was not filled for 26 years. Gujarat never appointed adequate number of qualified mangers in transport section. The repair and maintenance workshop for repair of health vehicles was closed down. This is the root cause of failure to develop its own Emergency Transport System.

Is PPP an easy way out?

The State Government which was not paying any attention to referral services for last 40 years, not purchasing adequate vehicle for last several years, very readily agreed to fund the PPP initiative of EMRI to transform the emergency transport system in the state. It seems that the government doesn't want to take up the responsibilities and execute it; rather it is happy to provide large amount of funds to a private party to implement. The same amount and resources could be used to set up its own emergency management system or strengthen the existing one. But it was not done.

Even when a private party is implementing the emergency transport management the accountability rests with the government. There is greater need of transparency in the PPP initiatives and such projects of public interest. Data related to such projects including the financial data should be made available in the public domain. The government needs to play the role of an aware facilitator and a just regulator. In the long run, there is a need of an independent body to monitor EMRI. Though the post of Director Emergency Management Services has been created under the Gujarat Emergency Management Act 2007 but it needs to be given real power /authority (including financial powers) to make it an independent body.

Special emphasis has to be given to the tribal and difficult to reach areas. Even with EMRI these areas remain cut off after darkness.

VI   Major Findings and Recommendations:

A. Absence of proper referral system in government health facilities

Referral system (a system to refer patients to appropriate facility) in government facilities is non-existent. It is assumed that sub-centres would refer to PHCs, PHCs to CHCs and CHCs to sub-divisional hospitals and District hospitals. District hospitals if needed would refer the cases to the medical colleges. But in practice a patient is free to go to any OPD which leads to overcrowding of higher facilities with general OPD cases. These cases could be well handled at lower levels. This leads to under-utilization of lower-level / primary health facilities which are evident from their delivery load. The FRUs too have low caesarean section rates indicating its less than desirable level of functioning.

There is no systematic referral from the lower level facilities to the high level facility. A referral is neither given its due importance by the higher facilities nor is it followed up by the referring facility. There is no system to monitor patients' adherence to referral instructions. It is also observed by the district officials that the cases which could be handled at the PHC level are unnecessarily referred to the district level hospital. Low usage of block level (PHC) or sub-district level facilities also means additional pressure on referral transport facility which has to arrange for transferring the patient to higher and in most of the cases farther facility. The referral slips are used only by CHCs. The PHCs and Sub-Centers refer the patients without a proper referral slip.

Figure No. 3 Pictorial representation of Referral Chain
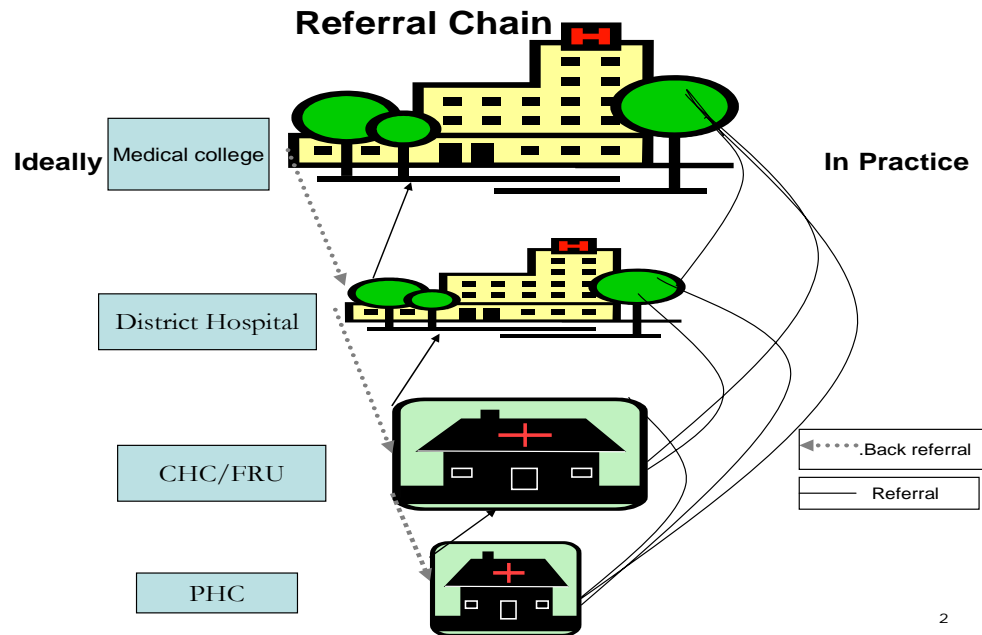
The Chiranjeevi scheme of the state has brought private doctors and facilities into government's fold and most of the delivery cases are referred to these facilities. It is a good measure for facilities not having proper EmOC and delivery arrangements. But the scheme has led to referring of patients to Chiranjeevi doctors without an attempt to utilize the available resources at PHC/CHC level. PHCs which should be the feeder units for CHCs/FRUs are not performing their roles. The field observations showed that 24x7 and fully equipped CHCs which could handle normal delivery cases were referring all the cases to the private clinics under Chiranjeevi.

The State needs to strengthen its referral system. This would include developing referral protocols, designing a referral cards and incentives or disincentives for following and skipping the referral chain and educating the community. The RCHO and the district Public Health Nurse should develop the protocols taking into account all the facilities available.

The protocols should be printed in posters and laminated protocols should be mounted on walls for all to read so that even a newly appointed health staff can easily follow the same.

Attempts should be made to ensure adherence from patients as well as the facilities to the referral protocols. In some of the states (e.g. Rajasthan) it is being done through coloured referral cards (different referral levels having different colors). Properly designed referral cards or slips needs to be used which should have all the key information about the patient and the treatment given. (Annexure-VII recommended format of referral card).The community and pregnant women needs to be educated during ANC for

identifying complications and referral. This is also a part of Birth Preparedness and Complications Readiness (BPCR).

The referral centre should be ready to provide emergency care on 24 x7 basis. Referral cases should be treated as priority cases. This would motivate patients to follow the referral chain. In emergency cases the normal referral chain could be bypassed to reach a comprehensive facility. Non-monetary incentives for following the referral chain should be designed to ensure adherence to referral chain. For e.g. separate queue and fast services for referral cases. Facilities at key locations within two hours of driving time should be identified and developed especially by ensuring presence of specialists who should be pooled in from less utilized facilities. This would lessen the time and distance of referral and consequent delays in treatment.

B. Inadequate human resources for referral system

 The Department of Health is full of doctors and hence there is much less realization and appreciation of engineering oriented health support system. It is assumed that doctors can look after such support system without any additional training. Even the responsibilities which should be looked after by other professionals are supervised by the doctors. We see such an example in Gujarat Health Department where there is no exclusive officer for referral transport, and the referral transport at state as well as the district level is being looked after by doctors in the health department. The post of State Transport Officer, to be filled by an engineer, is lying vacant for last 24 years and is looked after by a doctor as an additional charge.

 Almost 41 % of the total sanctioned the posts of drivers are vacant. Even for the contract drivers the vacancy is as high as 45%.The prima facie reason is very low salary of Rs.2500 which is even lower than the minimum wages. The personnel available (doctors, paramedics and drivers) have not received any in-service training for handling emergency and referral. Out of the total 567 ambulances available in the government health facilities in Gujarat 9.57 % of ambulances are off the road because of major or minor repair requirements. This is a small percent which is good but the vacancy of drivers and limited POL budget may make the vehicles not available for service. Moreover most of the PHCs do not have ambulances and many ambulances are also used for other work.

There should be a state transport officer (post already exists) in exclusive charge with the recommended qualification of an automobile engineer. At the district level, though the overall supervision should lie with the CDHO, another officer should be given the responsibility of referral transport as CDHO is already overburdened. This post of transport coordinator should have a degree or diploma in transportation and logistics.

 The vacant posts of the drivers should be filled in. The system of recruitment and deployment of the drivers should be modified so that such a situation does not arise again. For example there could be a waiting list prepared for the drivers possibly through the Employment Exchange. The state should consider revising the salary of the contractual drivers and make them at par or more than the regular drivers as they do not

have any other benefits. All the personnel handling emergencies should be provided training on referral and emergency management. Each ambulance should have an Emergency Medical Technician (EMT). Referral protocols and planning for referrals should be part of all EmOC and SBA trainings and adequate stress should be laid on its adherence.

C. Absence of role clarity and coordination between Government Health system and EMRI

The roles of government ambulances and EMRI 108 system have not been clearly defined. The working arrangement at the ground level has emerged where 108 ambulances cater to patient calls and take them from home or road side to the nearest facility (Private or public) restricted to a radius of 25 Kms. The inter-institutional transfers (PHC to CHC and CHC to District hospital etc.) are catered to by government ambulance. But there are overlapping roles and problems. During the field observations the researchers' came across incidents where a patient was not transferred to higher facility as the ambulance had gone for routine servicing and 108 refused inter-institutional transfer. The 25kms radius clause leads to patient ending up in wrong facility. For e.g. road traffic accident cases/ trauma cases being left at PHCs without adequate facilities, resulting in patients being rushed off to higher facilities in government ambulances soon after. These delays in many cases lead to aggravation of cases and even in death of the patients.

The role of the government ambulances and 108 Ambulances should be clarified through written communication. The practice of EMRI ambulance of leaving the patient at the nearest government facility irrespective of availability of adequate medical facility because of 25 kms radius clause needs to be changed. . Only taking a patient to the nearest facility is not enough. The goal should be to get the patient to an appropriate facility where he/she can be treated properly. EMRI needs to decide such things (especially mapping and categorization of appropriate facilities for referring different types of cases) in consultation with the doctors from public facilities and not single handedly. The EMS authority would play an important role in such a categorization once the Emergency Management Rules are framed and are applicable in the state. Co-ordination with the government system will also facilitate better utilization of ambulances during rush-time (need to cater to many patients) or down time (when one of the ambulance is out of order or has been given for routine servicing). Bimonthly meeting of EMRI at local levels and regular detailed reporting of referral numbers, type of medical problems, details of the facilities where the patients were referred to district, and any problem encountered during referral especially in the facility to CHC and PHC would keep the government officials informed about the problems.

The government also needs to decide about role and future of government ambulances as most of the task has now been taken over by EMRI and existing dual-overlapping systems could lead to waste of resources and under utilization of government resources.

The government should do a systematic study of roles of both EMRI and government transport System.

There is also policy conflict /dichotomy where a poorly functional ambulance service is charging money from the people while a well functioning system is completely free and subsidized by the government for everybody .This may be one of the reasons of rapid success of 108 services

D. Poor Communication and team work between referral levels

There is perceptive gap in the understanding of referral issues between the officials at state level and that of field level (CHC/PHC) especially regarding the user charges to be collected for ambulance usage. The government orders which are cited by state officials are not available at facilities. Sometimes the instructions or programmes are known to the superintendent or in charge but not to the doctors or staff. Key points of the GOs should be made into a poster and put in all PHCs /CHCs and in ambulances so that there is awareness about the changing policies. Making the GOs available on the Department's website would ensure wider awareness. Few minutes should be set aside in internal meetings of facility to share such details.

The mobile phone and land line telephone facilities are present in almost all CHCs and PHCs but the field observations show that their uses in referrals are negligible. The referring facility should routinely call-up the referral facility to notify them in advance about the referral case so that they are prepared. Timely communication can lead to better teamwork between the referral levels. The idea of sending an SMS with the main details of the patient referred, to the facility -in -charge can be explored. The doctors have been given CUG mobiles but the drivers do not have any means of communication while they are on the roads. A staff in the ambulance helper or Emergency Medical Technician (EMT) should be given a mobile phone so that they can be in touch with facility at all the times.

The field observations indicated lack of team work between the PHCs and CHCs which has been aggravated by the fact that administratively they report to different heads (Rural Health Director Vs Medical Services Director)**.** The CHCs in Gujarat are supervised by RDDs where as PHCs by CDHO. This has led to artificial bifurcation and PHCs which should be feeder facilities for CHC and act in synergy are competing with one another, resulting in sub optimal performance. A combined meeting of CHC and nearby PHC doctors with BHO, CDHO and RDD once a quarter would encourage acquaintance, teamwork and discuss issues of referral up and down. To foster further team spirit best performing division and best performing district should be named every quarter which would encourage CHCs and PHCs to work as a team.

E. Weak Referral reporting system /MIS

The current monthly reporting forms sent from facilities to district and district to state doesn't contain enough information on referral. Prior to April 2008, the monthly MIS format had a column for the number of pregnant women referred, which has now been removed. Correct and timely information is necessary for planning and making strategies for optimum use of referral system.

The monthly format sent from the facilities to the districts should have information about the total number of referrals, No. of in-referrals, no. of out referrals, no of delivery cases referred, Total Kms covered by ambulance in referral cases. The quarterly format should columns for no. of ambulances, no. of drivers, and quarterly figures of total no. of kms covered, total no. of referrals and amount spent on POL. The yearly format should have total no. of ambulances sanctioned, model or year of the vehicle, Kms run till date, No. of ambulances on road, expenditure on maintenance and repair, and total expenditure on POL.

Accuracy and timely reporting should be ensured by giving this responsibility to one person (the head of the facility at the facility level), DPC at the district level, RPC (Regional Programme Coordinators) at the regional level and State transport officer at the state level. Simple calculations such as no. of Kms per referral and cost per referral can provide valuable insights into the effectiveness and efficiency of the referral system. Such an analysis of the data, sent by the facilities needs to be presented before higher authorities so that corrective action (if needed) can be taken. The District Programme Coordinators (DPCs) could be given this responsibility for collating all the information on the referral transport from district hospital, CHCs and PHCs. The data collected should be validated during the visits to the field and facilities. There should be referral registers at all the facilities which should be analyzed monthly and fed into HMIS.

Over the years the state government has neglected the referral and transport services within the health department and hence there are series of problems in terms of service quality with the government ambulances. But with contracting of EMRI and starting of 108 services the community to health centre transfer has improved substantially even though this is at a high cost. The government has to now focus on improving its own referral transport services to ensure rapid and smooth transfer of cases from one level of the health service to another. The government should also develop and upgrade its own referral system based on the patterns of 108 services. The Emergency Medical Council may look into the issue of integrating and harmonizing various ambulance services, referral protocols and emergency response within the hospitals.

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Appendix I

Classification of districts on the basis of RCH status index, Gujarat, 2007			
RCH Status	**Districts**	**Number of Districts**	**Study Districts**
Poor (score 0-3)	Kachchh		
	Banaskantha		Patan
	Patan		
	Sabarkantha	**8**	
	Surendranagar		
	Panchmahal		Panchmahal
	Dahod		
	Dang		
Medium (score 4-6)	Mahesana		
	Gandhinagar		Gandhinagar
	Ahmedabad		
	Anand		
	Jamnagar	**9**	
	Bhavnagar		Ahmedabad
	Valsad		
	Junagadh		
	Narmada		
Good (score 7-9)	Rajkot		
	Porbandar		Rajkot
	Kheda		
	Vadodara	**8**	
	Surat		
	Bharuch		
	Navsari		Navsari
	Amreli		

Appendix–II Guidelines and Policies about Referral in various Government Documents

Sl No.	Documents/ Framework/Plans/ Training guidelines	Policies/Guidelines about referral
1	3rd five year plan (1961-66) (44)	It is proposed to link up the maternity and child health services associated with the primary health units with extended facilities in referral and district hospitals.
2	6th five year plan (1980-85) (43)	Facilities for treatment in basic specialties would be provided at community health centres at the block level for a population of 1 lakh with a 30 bedded hospital attached and a system of referral of cases from the community health centre to the district hospital/medical college hospital's will be introduced.
3	7th five year plan (1985-90) (42)	Organized referral services are almost non existent. To optimally use the existing scare specialist facilities, all institutions providing specialized services should be declared as referral institutions so that they attend only to case referred from the first and second levels of referral services. It is further recommended that any individual seeking the services of specialized institutions directly should be made to pay the full cost for such services.
4	CSSM (1992-97) (41)	Acknowledges that limited availability and poor maintenance of vehicles because of budget constraints limits performance at all levels of the system. For example, in a total fleet of about 2,000 vehicles in a state, at any one time over 60% are out –of-service. Steps to decentralize financial responsibility for vehicle maintenance ease restrictions on the use of private sector repair facilities, and more systematic procedures for allocating vehicles, would lead to significant improvements in the efficiency of the available fleet in the states. The CSSM report points out that during field visits, evidence of a functioning referral system was lacking. ANMs, having identified pregnancies requiring secondary level care, leave to the family the option of where they should seek such care. Access to transport for moving patients to or from FRUs was not provided to any significant extent (stressed more on UIP then maternal health)

Sl No.	Framework/Plans/ Training guidelines	Policies/Guidelines about referral
5	8th five year plan (1992-97) (40)	The medical college hospitals and specialized hospitals have to be used exclusively as tertiary care centers and for health manpower development. Important prerequisites for this would be improvement in the facilities and standards of care available at secondary care level and development of strong referral system. The entire chain of CHC, PHC and sub-centres will be equipped to deliver general health and MCH services in an integrated manner with a strong referral support and linkage at the district level.
6	9th five year plan (1997-2002) (39)	Majority of the health care needs of the population is taken care of by the trained health personnel at the primary health care level. Those requiring specialized care are referred to secondary or tertiary care. Thus, the three-tier system consisting of Primary, Secondary and Tertiary care facilities with adequate referral linkages will provide essential health and family welfare services to the entire population.
7	RCH I (1997-2002) (38) Annual report 2002-03,MoHFW,GoI	Under the RCH programme, provision had been made to assist women from indigent families in 25% of the sub-centres in selected states to provide a lump sum corpus fund to panchayat through district family welfare offices. Since 2000-2001, the scheme has been extended to all the states and UTs.
8	RCH II PIP guidelines by GOI (1998) (37)	Stresses that referral systems are vital. As it requires communication between households, birth attendants, providers of transport and with a network of functioning EmOC facilities, it recommends telecommunication systems.
9	National Population Policy (2000)	The policy talks about the need to streamline referral system and linkages between primary, secondary and tertiary levels. It stresses the need to make the TBAs aware about the emergency and referral procedures. It recommends that local entrepreneurs at village levels be provided soft loans and encouraged to run ambulance services to supplement the existing arrangements for referral transportation
10	National health policy (2002) (36)	Establishment of a well-worked out referral system to ensure that patient load at the higher levels of the hierarchy is not needlessly burdened by those who can be treated at the decentralized level.
11	10th five year plan (2002-2007) (35)	Focus on development of appropriate two-way referral systems utilizing information technology (IT) tools to improve communication, consultation and referral right from primary care to tertiary care level.
12	ASHA Guidelines (2005) (34)	Accompanying a pregnant woman to facility is one of the responsibilities of Accredited Social Health Activist (ASHA).

Sl No.	Framework/Plans/ Training guidelines	Policies/Guidelines about referral
13	FRU guidelines (2005) (33)	The availability of emergency services at FRUs to be disseminated in villages, provision of proper referral transport facility to bring patients from periphery to FRUs and also to refer patients from FRUs to district hospitals or tertiary care (if needed). Government vehicle not the only option, in charge to have financial and administrative powers to arrange for transport locally if needed.
14	NRHM Framework (2005) (32)	Enumerates assured referral transport communication system to reach the health facilities as one of the outcomes at community level.
15	EmOC training guidelines (2006) (31)	Mentions the conditions in which a patient needs to be referred to an FRU. It also spells out the conditions / danger signs which the family of the pregnant women must understand and take her to an FRU or a PHC.
16	24x7 PHC guidelines (2006) (30)	Referral for emergencies features in essential service package to be provided by 24 hour functional PHC. It talks about planning, training and predetermined appropriate referral centres. It mentions awareness about referral, both in public and private sector and also in community. It recommends financial autonomy for arranging local referral transport. It gives a sample referral slip.
17	SBA training guidelines (2007) (29)	Talks about ready availability of referral transport and help of community /organizations- panchayats etc. arranging transport. It also enumerates conditions for referral and preparations and precautions before referring a patient. It also mentions about including TBAs in referral system to seek their help in reducing maternal mortality.
18	IPHS for PHC (2007) (28)	Apart from providing referral transport (may be out sourced), ensure appropriate care to stabilize patient requiring specialist care, provide appropriate support during transport. Transport facility for referral i.e. ambulance and transport for supervision and outreach have been enumerated separately.
19	IPHS for CHC (2007) (27)	Referral transport is one of the assured services. It recommends Haryana model of ambulance service in which the hospital ambulance is given to a driver (preferably defense personnel) contracted through a newspaper advertisement. Patients pay Rs.5/Km and the driver deposits Rs.0.50 per Km which is used for major repairs. Out of Rs.4.50 salary, petrol, minor repair is met. After 5 years driver owns the ambulance.

Appendix III

Interview Guide for Semi structured Interview
For
A Study of Referral System for EmOC

Ambulance

- Do you have an ambulance? Driver? How many? Is the driver trained in emergency mgt? If yes, for how many days and what was the curriculum?

- Do you have a Logbook for ambulance? How many times was it used in last 3 months/6months? What is the yearly budget for maintenance /POL for ambulance? What is the budget for minor/ major repairs?

- What is the role of 108 ambulance services in your area and on your ambulance services?

Telephone:

- Do you have a telephone connection? Is it in working condition? What is the usual down time? Is it displayed at the center's sign board and on the body of the ambulance?

- Do you send information about referral to the referral centre beforehand? Is there any follow up of referred patient?

Referral Protocols:

- Are there protocols for referral?

- Are the doctors and paramedics aware/ trained of the protocols?

- Have decision makers been using referral protocols reference?

- Is there a Rogi Kalyan Samiti (RKS)? Does it help in providing referral services?
- How the community is made aware about the referral services?

Details of Referral

Reasons of referral

- Who takes the decision to refer?

- Where do you refer the patients? Do they charge any fee?

- How far is it? What is the mode of transport?

- How do you ensure that the patients follow your referral advice?

Referral unit/centre

- Is the referral centre able to handle all the cases referred at all the times? Do they have adequate doctors, paramedics, blood bank? Are they available round the clock?

- Do you/your team know the doctors and paramedics who would handle the referred cases? How is your relation with the team in the referral centre?

- Do they communicate to you referred patients' condition and the findings as feed back?

- If a Female Health Worker (FHW) sends a patient to your center do you give feedback to her?

Records

- What records are maintained for referrals in your institutions? Referrals register? Referral slips?

- Do you have referral slips? What are the columns given? Is there a mention of medication already given?

- Do you know if the center where you are referring the cases is also maintaining a separate register of referrals?

Data on referral to be collected for last six months

- Number of deliveries conducted (normal and complicated separately)
- Number of in-referrals (how many resulted in complicated delivery)
- Number of out referrals
- Any deaths during referrals

Constraints and suggestions

Appendix IV
(Translated version of the referral slip in use in CHCs)

C.M. 121G.

Counter foil   **Referral Form**

Referred: Referred from
                                 in charge Medical Officer   }

                                                             Hospital

To,   To in charge Medical Officer }

Patient's Name: Please admit following patient-   Hospital

Age & Sex: Patient's Name:

Diagnosis: Age & sex:

History: Diagnosis:

Date: History:

                                Date: Signature:

Signature:

Note: While the patient is being admitted the concerned medical officer should inform the medical officer from whom case has been referred.

Appendix V

Details of Cases Attended by EMRI in Gujarat (Since launch till 31 October 2008)			
Categories	**Types of Cases**	**No. of Cases**	**Percentage %**
MEDICAL EMERGENCIES	Acute Abdomen	6906	3
	Allergic Reactions	151	0
	Animal Bites	5431	2
	Assault	6631	3
	Behavioral	88	0
	Cardiac/Cardio Vascular	13785	6
	Diabetes	2148	1
	Disasters due to Natural elements	13	0
	Environmental	31	0
	Epilepsy	7134	3
	Fevers (Infections)	6345	3
	Fire/Burns	2303	1
	Hazmat (Hazardous Material)	10	0
	Industrial	105	0
	Intentional Self harm (Suicide)	2075	1
	Neonatal(up to 1 month)	2008	1
	Others	21376	9
	Pediatric(1-12years)	890	0
	Poisoning/Drug Overdose	2833	1
	Pregnancy related	61974	27
	Respiratory	12368	5
	Stroke/Cerebro-Vascular Accidents	2697	1
	Trauma (non Vehicular)	13833	6
	Trauma (Vehicular)	52761	23
	Unconscious	8425	4
	TOTAL	**2,32,323**	**100**
POLICE EMERGENCIES	BODILY OFFENCES	417	12
	PROPERTY OFFENCES	69	2
	SUICIDE	67	2
	OTHER OFFENCES	2877	84
	TOTAL	**3430**	**100**

Appendix VI: District wise EMRI (108) ambulances

DISTRICT	AMBULANCES
AHMEDABAD	35
GANDHINAGAR	12
MEHSANA	14
PATAN	9
SABARKANTHA	16
BANASKANTHA	16
ANAND	13
KHEDA	16
VADODARA	26
PANCHMAHAL	19
DAHOD	18
BHARUCH	11
NARMADA	6
SURAT	25
TAPI	6
THE DANGS	4
NAVSARI	10
VALSAD	10
BHAVNAGAR	19
AMRELI	13
JAMNAGAR	13
JUNAGADH	19
PORBANDAR	4
RAJKOT	21
SURENDRANAGAR	11
KUTCH	14
Back up for service & Repair	20
TOTAL	400

Appendix-VII

Form No.	**Recommended Referral Form**	Date & Time of referral
From(Name of referring doctor/health personnel)		
Address of the Health Facility (with telephone no.)		
To(Name of Health facility to which patient is referred to)		
Telephonic information provided - (Yes / No) (telephone number)		
Patient's Name Age Sex		
Prescription number or identity no.		
Patient's Address		
History		
Findings		
Pathological tests		
Treatment given		
Reasons for referral		
On completion of treatment, please fill in the form below and send it through patient or post		
From(name of the person replying))		
Address		
To (the person who had referred the patient)		
Patient's Name & Prescription/identity number Date & Time of receiving the patient		
Patient's address		
Name of the doctor attending the patient		
Patient's history in brief		
Physical findings		
Investigations/tests		
Diagnosis		
Medicines prescribed		
Treatment to be continued		
Referred back to on Date: Signature		

Appendix-VIII

Projection of Cost Per Case(in Rs.) for Emergency Transport	
Cost of Ambulance*	18500
Salary of Pilot (2.5)	15000
Salary of EMT(2.5)	20000
Repair Maintenance	11000
Medicine & supplies	25000
A. Total Monthly cost except POL**	89500
B. Variable Monthly cost of POL based on cases	
B1.If 4 cases per day	18000
B2.If 6 cases per day	27000
B3.If 8 cases per day	36000
Cost per case (in Rs.)	
1.If 4 cases per day (based on A + B1) Rs. 895.83	
2.If 6 cases per day (based on A + B2) Rs. 647.22	
3.If 8 cases per day (based on A + B3) Rs. 522.92	

- *Cost of ambulance Rs.11,00,000 spread over 5 years
- ** POL(Petrol, Oil and Lubricant) calculated on the basis of Rs. 50 per 10 Kms