

Recommendations for Pre-hospital trauma care in India

Report of a 2 day National consultation on Pre Hospital Trauma Care in India on 26th and 27th October 2006 at NIHFWS, Munirka, New Delhi.

BACKGROUND AND INTRODUCTION

India is in a dynamic state of demography and socio-economic transition. Socio-economic development has brought about increased movement of people and goods. The rise in the vehicular population has exceeded the pace of upgradation of road infrastructures, leading to increasing number of road traffic accidents. The profile of the road traffic accidents is changing. Road Traffic Injuries are major but neglected global health problem, more so, in developing countries like India, requiring concerted efforts for effective and sustainable prevention and management.

MAGNITUDE OF TRAUMA AND INJURIES

India has just 1% of the total vehicles in the world but accounts for nearly 6% of the road accidents. The accident rate of 35 per thousand vehicles in India is the highest in the world. 18.65 lakhs vehicles were registered in the year 1971 and it stood at 670 lakhs vehicles in 2003. The increase in the number of vehicles has resulted in steep upward trend in the number of accidents, injuries and death. Road traffic accidents in India result in more than one lakh deaths every year. There are two million hospitalizations, 7.7 million minor injuries and an estimated economic loss of Rs. 55,000 crores or nearly 3% of GDP every year. If the present scenario continues, India will witness death of 150,000 persons and hospitalization of 2.8 million people by 2010, increasing further to 185,000 deaths and 3.6 million hospitalizations by 2015.

More than 75% of the road traffic casualties are amongst the economically productive young adults. 50% of the victims have serious injuries to cardiovascular or central nervous system and die in the first 15 minutes. Of the rest, basic life support, first-aid and replacement of fluid, if arranged within the first hour of the injury (golden hour) can save many lives. The time between injury and initial stabilization is the most critical period for the patients' survival. Among trauma patients treated through conventional emergency services the preventable death ranges up to 17%.

NEED FOR PRE HOSPITAL EMERGENCY CARE SERVICES

Considering the magnitude of the problem, there is a strong need to have an urgent and comprehensive trauma care system encompassing the entire nation. Trauma care is an essential service because injury victims must reach definitive care centres within a short period of time to prevent death or disability. There is a need to develop and implement state wide emergency medical service (EMS) and trauma care system, designate trauma facilities, and develop a trauma registry to monitor the system and provide state wise cost and epidemiological statistics. This programme should have the following components: -

- (1) Injury Prevention.
- (2) Pre-hospital Trauma Care.
- (3) Hospital Care.
- (4) Rehabilitation of the injured.

AVAILABLE MODELS

1. Centralized Accident & Trauma Services (CATS) Govt of Delhi:

CATS is an autonomous body under the Government of Delhi started in 1991. Primary objectives of CATS are

- i. To reach the site of accident as quickly as possible.
- ii. Give first aid to the patient
- iii. Quick and safe transportation of the patient to the hospital
- iv. To involve liaise with other organisations as Delhi police, Delhi fire service and any other government agencies for the benefit and care of the accident victims.

Ambulances: CATS has a fleet of 35 ambulances (30 NISSAN URVAN & 05 Maruti Omni make) which have been deployed at strategic locations all over Delhi so as to reach the site of accident in the minimum possible time. These ambulances are equipped with wireless sets and sophisticated medical equipment. Each ambulance is manned by two ambulance personnel designated as Assistant Junior Ambulance Officer (AJAO). The AJAOs are graduates who have been trained in multidisciplinary skills of first aid emergency management, wireless communication and driving.

On receiving a call, the ambulance nearest to the site of accident is alerted and the ambulance along with the two ambulance personnel, reach the site of accident. The accident victim is provided necessary first aid and if required shifted to the nearest Govt. hospital.

Communication: The Central control room of CATS receives calls at **telephone Nos. 1099 and 102 (Toll Free number)** on 12 lines of telephones. The calls are also received through police control room and from Delhi fire service through wireless. The central control room and ambulance stations are linked with wireless sets for facilitating two-way communication between the sender and the receiver.

Usage and Financing: In all the emergency situations service is free of cost. For the transportation of non emergency cases the CATS is providing ambulance services on payment basis.

CATS also runs a course called “Basic Course for Ambulance Personnel” (BCAP) in its training centre for induction training of assistant junior ambulance officers (AJAOs).

CATS is planning to modernise its existing communication system with addition of more ambulances with GPS technology.

2. Emergency Management and Research Institute (EMRI), Hyderabad:

EMRI is a not-for-profit institute set up as a public-private partnership between the Governemnt of Andhra Pradesh and Satyam Computers to provide comprehensive emergency management services in Andhra Pradesh. The service started on April 2, 2005.

Ambulances and Two Wheelers: 75 ambulances and 30 two wheelers deployed across 50 towns in Andhra Pradesh.

Communication: Toll free number **108** is used as the centralized helpline for medical, police and fire emergencies. Currently 2.5 crore population in 50 towns and 3500 villages can access 108. Satyam Computers is the technology partner for EMRI. On receiving a call, a communication officer posted at the central call centre collects basic information, and transfers it to designated dispatch officer who assigns the ambulance most strategically positioned. The dispatch officer, Emergency Medical Technician in the ambulance, and the Emergency Response Centre Physician remain in conference till the patient reaches the emergency centre.

Usage and Financing: B.Ramalinga Raju, Founder and Chairman of Satyam Computer Services Ltd, and his brothers have provided the initial funding for setting up EMRI.

- **Ambulance Access for All (AAA) Foundation– Mumbai:**

It is a not for profit organization setup under Indian Laws to provide emergency medical transportation in life threatening medical situations. The project was started on 21st May, 2005. At present 10 ALS ambulances running in Mumbai supported by 14 affiliate ambulances upgraded by ZIQITZA.

Ambulances: There are 10 ALS ambulances available. All the ambulances are air-conditioned with mild sound proofing and silicon sealing of joints. Crew consists of on call doctor, driver and a helper. Drivers are trained in BLS with expertise in navigation & fast driving.

Communication: 1298 is the toll free number. Radio trunking with both CDMA and GSM backup. GPS and mapping of road network done.

Usage and Financing: User fee charged for services rendered. All the calls are attended irrespective of the ability to pay. Space on ambulance body is used for advertisements to generate additional revenues. Philanthropic funds used for capital expenditure and to subsidise/ make free services to the poor.

Life supporters Institute of Health Sciences (LIHS) is a sister organization setup under Indian laws to provide training to doctors, paramedics, drivers, assistants, common man, students and volunteers in first aid, emergency medical service, basic life support and advanced life support, accredited by American Heart Association and New York Presbyterian.

AAA foundation also started experimental model in the Kerala covering Cochin, Trivandrum, Calicut, Alleppey and Kottayam. They are also planning to set up AAA foundation in USA to channel funds from interested overseas Indians.

- **CMC Ludhiana**

CMC Ludhiana started an Ambulance Motorbike and Rescue Service (AMARS) in March 2003. The idea was to reach injury/ accident victims who

may be on narrow lanes and roads where standard ambulance may not reach in time.

Ambulances – 40 motorbikes and an ambulance. Areas covered by AMARS for trauma care are Punjab, Himachal Pradesh, Jammu & Delhi. There are total 57 trained paramedics available at various centres. AMARS has till now trained 400 traffic personnel.

Communication: Toll free No 104. Trained paramedics on motorbikes reach the accident site first; and are in position to triage and provide first aid by the time the ambulance arrives.

Usage and financing – User fees charged for services. Tiered charges based on ability to pay. Services provided based on patient need, and not on payment.

- **Emergency and Accident Relief Centre (EARC), Tamil Nadu**

EARC is a project by the Indian Medical Association with Government of Tamil Nadu., for providing emergency care to road traffic accident victims.

Ambulances – 75 booths have been set up along highways for emergency care. Each booth is manned by a paramedical team and has a highway ambulance stationed. The booths are run by interested hospitals located near the highway. Each booth is approximately 25 kms from the nearest city trauma centre. Emergency first aid is provided at the booths. Patients are then provided transport to the trauma care centres, government or private, depending on patient choice and ability to pay.

Communication – Toll free no 1073. Numbers are put up as signage on the highways, and on the booths. On receiving a call, ambulance is dispatched to pick up the patient.

Usage and financing - Services at the booth and transport are free of cost. Patients are expected to pay for the next level of care offered by the sponsoring hospital. If they do not wish to, they are provided free transport to the nearest government facility.

RECOMMENDATIONS

I. ORGANIZATION:

Establishment of Emergency Medical Service (EMS) councils at all levels

At each level, the EMS Council should be an autonomous body with fixed tenure which meets for policy directions. An executive committee made with the members drawn from the above group will be the administrative arm. Chairman of the executive committee should be decided by the executive committee. The location of the council could be in the ministry of health at national & state level and at district level in the collector's office.

- **National Level:**

- **Members** - Secretaries of Home, Health, Finance, Transport, Highways, Telecommunications, Insurance companies, NGOs, National IMA, Vehicle manufacturers association, truck operators, Industrial houses, ambulance operators, Oil companies and tyre companies
- **Role** – The National Council will decide the broad framework of EMS in the country with respect to
 - Policy and Finance
 - Intersectoral collaboration
 - National standards including criteria for selection of implementing agencies
 - Accreditation of training
 - Infrastructure augmentation
 - Research directions and dissemination of findings
 - Awareness generation

- **State Level:**

- **Members** - Named secretary for EMS preferred, secretary Home, Health, Finance, Transport, Director of Medical Education, Director of Health Services, DG of Police, State Transport Commissioner, Police commissioner-Transport, Ministers of Health, Home , State president of IMA, Insurance, Telecommunications, NGO representative, Ambulance operators, Corporate houses
- **Role** – The state council will supervise implementation of EMS in the state. It will identify the implementing agency at public sector / private sector, NGO sector or joint sector. The implementing agency will run the prehospital trauma care services for the state including upkeep of ambulances, personnel, revenue generation etc. State council should empanel all ambulances. Specific roles are
 - Implementation, Financing
 - State level coordination
 - Operation of state call centre
 - Classification of hospitals/trauma centers
 - Research
 - Awareness generation

- **At District level:**

- **Members** - District collector, DHO, IMA, elected representatives, Police commissioner, municipal commissioner, RTO, ambulance operators, corporate houses, representatives of hospitals.
- **Role** –
 - Field monitoring, Finance
 - Health facilities
 - Fitness certificate of ambulance
 - Awareness generation, monitoring

II. TRAINING:

The man power to be trained at various levels and the skills to be learned are:

- **First responders:**

- Persons to be trained: Drivers, Traffic police, petrol bunk workers, students and teachers.
- Skills to be learned: Basic skills, ABC, transfers, first aid-One day course
- Duration of training: One day course

- **PHC:**

- Persons to be trained: Doctors, Nurses, Pharmacist
- Skills to be learned: Risk identification, BLS, ALS.
- Duration of training: Three day course.

- **District hospitals:**

- Persons to be trained: Doctors, Nurses, Pharmacist
- Skills to be learned: Trauma team protocol
- Duration of training: Three day course.

- **Specialized Degree/ Diploma**

3 years degree course for trauma technologists (EMTs) and 1 year diploma course for trauma technicians. 6 weeks for paramedic course.

Trainees: Eligibility criteria for emergency medical technician courses should be 12TH pass with preferably science background. These courses should be introduced in collaboration with medical colleges and private institutions where there teaching facility exists. The central government should develop a standard curriculum for these courses. The course structure should be modular 8 modules for 3 years course and 3 modules for 1 year course. People from nursing background and practitioners of Indian systems of medicine can skip certain basic modules.

Trainers: People who have degree course in trauma technology would be the trainers and accredited institutions can provide the training.

Registration: The state EMS council should recognize these courses and to maintain the registry of these degree and diploma holders. The EMS council should also provide accreditation to centres to conduct such courses.

- **Personnel who man the emergency services:** Regular course in Emergency Medicine is widely available. Currently in India very few places (Chennai) have MD (Accidents & Emergency) courses. There is also a great need to start DNB courses in Emergency Medicine with recognition from Medical Council of India.

BLS and ALS courses should be developed for the Indian situation and also accredited by the EMS Council. These courses should be made mandatory for all doctors and other trauma care staff for being registered in the medical councils and EMS councils.

III. SERVICES:

1. Communication:

The number 102 allocated by ministry of telecommunication for ambulance should be made applicable nationwide and popularized.

In each state -

- Emergency Number for ambulance 102 under state control
- Accessible from land lines and mobiles of all operators
- Toll Free
- Emergency call boxes at every 2-3 Km distance
- Single call centre for the entire state
- All ambulances connected to call centre
- Ambulances with GPS and AVL
- Facility to transfer calls to police and/or fire services as needed

Communication flows

- ✦ Intra-hospital – between members of the trauma care team
- ✦ Between hospital and ambulance
- ✦ Between all levels of hospitals
- ✦ With police, fire, local authorities, and voluntary organizations
- ✦ With press, public and patients' relatives

2. Ambulance:

Standard guidelines should be developed for all the ambulances used for prehospital trauma care, to differentiate them from hearse vans

- Vehicle make, model and design specifications
- Classification as BLS and ALS based on facilities in the ambulance
- Equipment that should be available – for extrication, spinal immobilization etc.
- Drugs
- Communication systems and vehicle tracking

There should be 1 ambulance for 1.5 lakh population. These ambulances should be placed at every 50 kilometers in the national highways and at points specified by the district EMS at the district level.

3. Personnel:

There should be 2 people per shift per ambulance. The staff should both be trained paramedics qualified in driving and navigation. These qualifications and skills should be accredited by the state EMS council.

4. Hospital preparedness:

Emergency care services at hospitals need to be streamlined with per-hospital services to ensure optimum patient care, and improved survival.

Trauma care services at each level can be arranged as follows

- ❖ ***Primary level – Taluk hospital***
- ❖ ***Secondary level – District hospital***

❖ *Tertiary level – Medical college*

PRIMARY LEVEL (TALUK HOSPITAL)

Functions	Facilities
<p>Immediate life saving care</p> <p>Triage and appropriate referral</p> <p>Basic trauma care (simple fractures, chest and abdominal injuries, cuts and lacerations)</p>	<p>Emergency equipments: – Monitors, defibrillator, ambu bag, intubation set, tracheostomy set, crico set, oxygen, intercostal set, Boyle's apparatus, transport vents, ventilator, portable X-ray machine, USG, plaster room, basic OT room.</p> <p>Manpower: – Medical Officer (24 hrs), On call – Anesthesiologist, Surgeon, Gynaecologist, Paediatrician, Radiologist</p> <p>Others: – Computer system, Blood storage, Lab</p>

SECONDARY LEVEL (DISTRICT HOSPITAL)

Functions	Facilities
<p>All services as in primary level</p> <p>Definitive trauma care services including surgical care and intensive care</p>	<p>All facilities as in primary level</p> <p>Additional facilities</p> <ul style="list-style-type: none"> • ICU – 6 beds • CT machine • Blood bank • C arm in OT <p>Additional manpower: Neurosurgeon, Orthopedic surgeon, Radiologist. Other specialists to be available through tele - networking</p>

TERTIARY LEVEL (MEDICAL COLLEGES)

Functions	Facilities
<p>All services as in secondary level Extended critical care including super specialties Comprehensive rehabilitation services</p>	<p>All facilities as in secondary level</p> <p>Additional facilities</p> <ul style="list-style-type: none"> • MRI, Angiography • ICU – 12 bedded • Advanced OT with facilities for general surgery, • Neurosurgery, CTVS, Burns and plastic surgery, urosurgery • Spinal cord injury and head injury units • Training for rehabilitation care at district level <p>Additional manpower:</p> <p>Physiatrist (Specialist in Physical Medicine & Rehabilitation), Urologist, Plastic surgeon</p>

Stand alone trauma care centers are not recommended globally. The existing large hospitals can be upgraded for better trauma care services and trauma beds can be designated in large facilities. In the Intensive care units 15% of beds should be ear marked for trauma patients. All the concerned medical specialists should be involved for the better care of the trauma victim and certification is required for the hospitals to help in getting over the legal issues.

Triaging: Triage means the sorting and treating patients according to priority, which is determined by medical need, personnel and resources available. The pre hospital triage is most important in trauma care. In hospital triage should be done by a medical officer to ensure that institutional capabilities are not exceeded and patient gets appropriate care. Triaging also includes prompt and appropriate referral, diversion and transport. Better triage needs good communication and networking with ambulance system and other hospitals.

5. Rehabilitation services

This service is very important to reduce the long term disability due to trauma injuries. The rehabilitation service should be started on the first day of the trauma under the guidance of the rehabilitation physician. This service is divided into 3 phases; acute phase service, sub acute phase service and long term care services. There should be beds earmarked for spinal cord injury and traumatic brain injury patients in this unit.

6. Data recording and management

Data recording should be done at all levels of trauma care. Recording must include the following in all records

- ❖ Age and gender
- ❖ Mode of injury
- ❖ Condition on arrival
- ❖ Treatment and outcome
- ❖ MLC status

All data should be recorded by individual centers and collected at state level. Minimum data collection at PHCs as per WHO guidelines should be made compulsory. Later the data collection may be expanded to district and tertiary care centers. A national trauma registry should be set up by the EMS council. The burden of injuries can be estimated from selected population based sentinel surveillance centres.

IV. FINANCING:

Financing for the EMS can be done by government sources, public private partnership, independent service providers under guidance of the EMS Councils and insurance companies.

❖ **Capital expenditure** – can be sourced from

- a. Highways, Ministries
- b. Commissioner of transport
- c. Part of taxes collected for road and road users for EMS
- d. Cess from road/fuel taxes, 1% is earmarked for EMS
- e. Insurance companies: Specified amount of insurance premium to be earmarked for EMS. Government should also issue directives to Insurance companies regarding this aspect.

❖ **Recurring**

- a. To be budgeted
- b. NHAI and Road safety funds
- c. Local bodies have specific heads for ambulance service
- d. This fund to be transferred to EMS council.
- e. Professional associations can be actively engaged in the process

V. MONITORING AND EVALUATION:

The following aspects of service provision should be monitored

- Adequacy of ambulance fleet –through a checklist
- Response time
 - Call to ambulance
 - Ambulance to hospital
 - Call to hospital

Mechanism for logging in call time and patient arrived at hospital should be built into the system

- Patient profile and nature of hospital
 - Audit of calls to study the pattern of pre hospital care
- Classification of calls (Indian adaptation)

- Emergency
- Life threatening
- Non life threatening
- Availability of guidelines and adherence to them

The purpose of such monitoring and evaluation is to assist operators to achieve targets and benchmarks

VI. MEDICOLEGAL ISSUES:

Central government / EMS council should make provisions to protect the EMS team personnel from the medicolegal issues and death during transportation. All hospital staff should be provided appropriate training and orientation on legal aspects of medical care. Accurate and timely record keeping at all levels should be done. Liaison should be established with local police for appropriate action on MLC related events.

Consent: If bystander is around, mandatory consent has to be taken. Law regarding care of unconscious patients should be widely disseminated, and if needed amended. A consent format which can be used by the ambulance crew and doctors should be developed.

VII. PREVENTION:

This is a very important aspect in the pre-hospital trauma care. The government should strictly make a law and implement it properly to use helmets, seat belts, drink driving and road traffic regulations to be enforced. The medical community should actively participate and educate the public on use of helmets and seat belts. Safety component should be included as a component in all the road construction projects.

Awareness for road users and drivers: There should be a regular awareness programme for public and school children on road safety. As part of highway construction emergency boxes, rest areas for vehicles to be built and first responders and public to be trained to call for help and to use first

aid. Professional associations (Like IOA, Neurological society of India, IAPMR) and NGO's to be involved in awareness creating programme. Road safety day / week to be included as part of awareness creating programme for road users. In Delhi St Stephens Hospital trains school children on road safety measures; this should be followed in other hospitals and schools all over India.

VIII. RESEARCH:

Priority should be given on trauma research in all medical colleges and research institutions. EMS council should take a lead in this aspect. The following are the priority areas in trauma research.

- ❖ Epidemiology of trauma
- ❖ Evidence generation for interventions in trauma cases
- ❖ On training needs and capabilities
- ❖ On quality of care
- ❖ Technological innovations and cost-effectiveness

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