



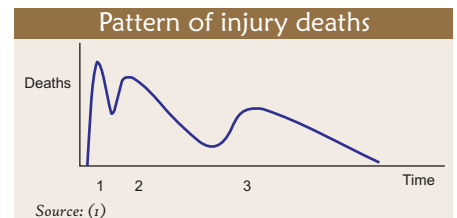
# Trauma Care



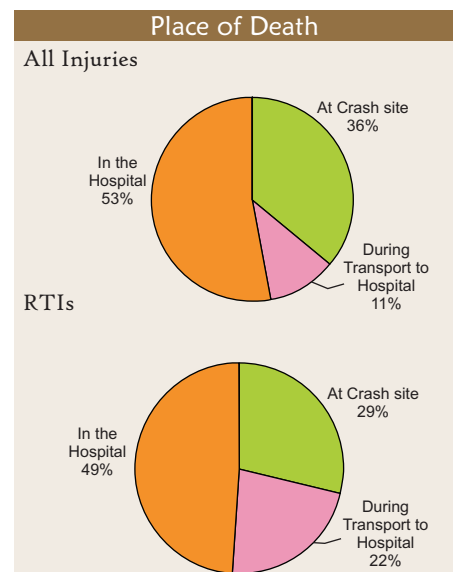
Every year, 5 million people die from injuries all over the world. In India, it is estimated that a million deaths occur and 20 million are hospitalized due to serious injuries. Various types of injuries like road traffic injuries, falls, burns, poisoning, disaster related injuries, suicides, violence, workplace / occupational injuries and several others result in damage to body organs. The nature, extent and severity of injuries depend on the amount of energy transferred, the physiological tolerance of the individual and use of protective devices. All individuals surviving an injury require trauma care services, ranging from measures to be done at injury site, on the way to hospital, in the hospital and after discharge. Trauma care ranging from pre-hospital and emergency care, acute hospital care and post hospital care is a continuous and systematic activity with each of the phases linked to one another.

## Preventing injury deaths - basic understanding

Death from severe injury is known to occur in three phases. These are classified as early deaths (those occurring immediately), intermediate deaths (few hours after the injury) and late deaths (days or weeks after the injury) as shown in the figure. Early deaths are due to major damage to vital organs, while delayed deaths are usually due to infections, failure of vital body organs or late complications.



Data from Bengaluru Injury Surveillance programme (BISP) showed that nearly 36% of the deaths occurred at injury site, 11% on the way to hospital and 53% in the hospital. In road traffic injuries, 29% died at crash site, 22% on the way to hospital & 49% after entering the hospital (2). Number of deaths after discharge is not clearly known.



Nearly 5000 deaths and more than 1,00,000 hospitalizations occur in the city. The real numbers of serious and mild injuries could be much higher. Two of the major causes were road traffic injuries and suicides. The latter includes burns, poisoning and hanging apart from other methods.

The prevention of injury deaths depends on the place of occurrence of injury and severity and involvement of body organs. Deaths occurring at injury or crash site can only be prevented by primary prevention strategies by activities to see that injury does not occur. The second wave of deaths can be effectively addressed by well-organized pre-hospital trauma care systems, while the third wave by a combination of pre-hospital as well as acute trauma care systems.

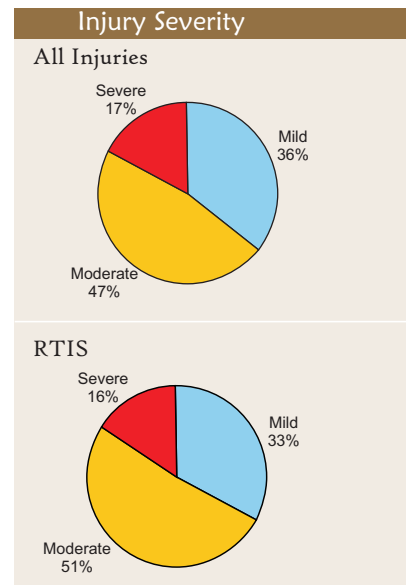
## Trauma care facilities - current scenario

The city of Bengaluru has large number of registered health-care institutions and an equally large chain of private and family health care providers. Number of unregistered and



unqualified health care practitioners also provide care for injured persons. The hospitals are divided between the public and private sectors ranging from smaller nursing homes to larger tertiary care hospitals. The facilities available vary across institutions. Nearly one third of the hospitals have 24 hours emergency trauma care facilities. Qualified medical practitioners with different level of specialties man each of the hospital emergency rooms. Commonly, groups of doctors with basic medical qualification and a team of nurses manage emergency rooms. Majority of the hospitals also have ambulance services, used for both shifting a patient from injury site as well as for inter hospital referrals. There is no central coordinating agency responsible for integrating activities under a common banner. Hospitals have their own ambulances; individual numbers for ambulances; and select trauma care programmes in few hospitals. Several medico legal barriers interfere in timely delivery of trauma care services.

It is essential to note that many individuals especially from lower and middle-income sections of the society are not covered by insurance and will have to meet the trauma care expenses on their own. While those employed in the organized sector have access to reimbursement facilities, those in the unorganized sector do not have any such facilities. With increasing costs of healthcare, especially in the private sector, it is difficult for many people to arrange for immediate resources. Further, with costs of trauma care going up in the private healthcare sector, many people are unable to afford care in these hospitals and thus, rely on public sector hospitals.

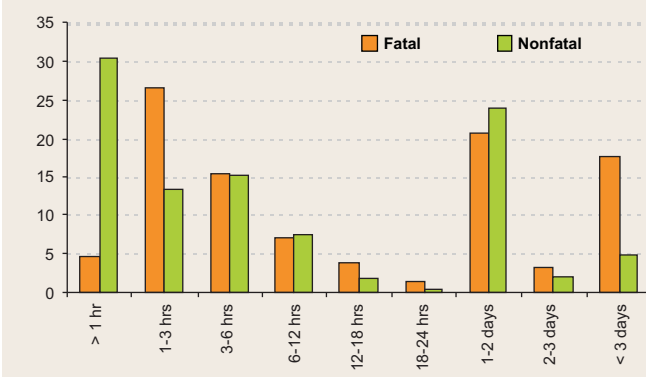


## Prehospital and emergency care

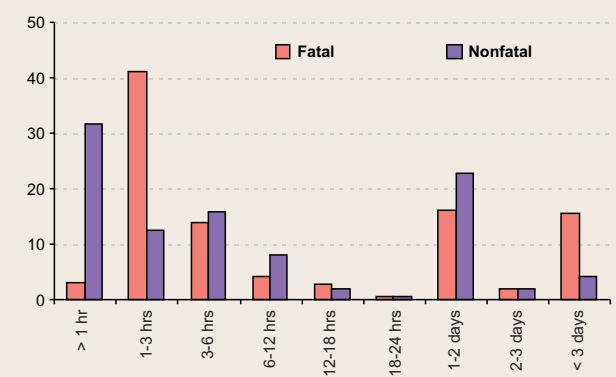
In the present programme, prehospital care components like availability and pattern of first aid, transportation methods, referral patterns, time interval between occurrence of injury and reaching a partnering hospital and number of medical contacts were examined. It was not possible to ascertain the quality of care provided at or near to injury site nor in the hospital and, requires further research.

- ❖ Nearly 28% of deaths and 48% of injured received some first aid before reaching the partnering hospital. Only 3% of all injuries and 1% of road traffic injuries were provided care at injury site. At times, the study hospital was the first center for provision of first aid.
- ❖ Doctors and nurses were the basic personnel to provide basic first aid. It was glaringly evident that common first aid responders like police, drivers, and volunteers were not available at the injury site.
- ❖ In a city with no organized ambulance networks, the primary mode of transportation is private vehicles and three-wheel auto rickshaws. More than three fourths of injured persons were transported in these vehicles and ambulances were used in less than 20% of injuries. The pattern was similar in rural areas.
- ❖ The time interval between injury and reaching the definitive hospital is a major determinant between survival and death. An earlier the patient reaches a definitive hospital, better are the chances of his/her survival. Only 30% and 47% of injury patients and 32% and 45% of RTI patients reached a hospital in less than one hour and three hours, respectively. Time interval was significantly higher in rural areas.
- ❖ Referral of patients from one hospital to another was a common practice due to number of reasons. These included non-availability of facilities like manpower, investigation or management facilities, inability of the patients to pay,

Time interval between time of injury and registration, Fatal & Non-fatal, all injuries



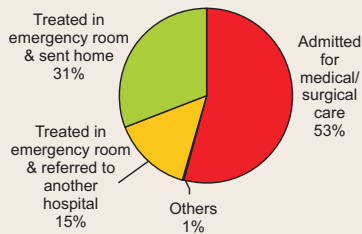
Time interval between time of injury and registration, Fatal & Non-fatal, RTIs



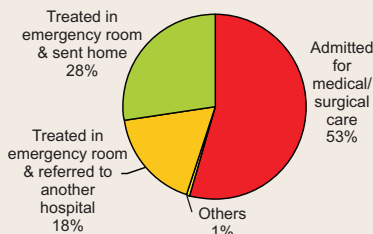


## Mode of management

### All Injuries



### RTIS



individual choices and others. Data from the study shows that 47% of all injury patients and 53% of RTI patients were referred from one hospital to another.

- ❖ As part of BISP activities, attempt was made to examine medico legal practices in the city. As some injuries are considered medico legal, it is mandatory for hospital to document injuries in number of registers – report injuries – attend courts as and when called for – provide certificates – and others. The time spent was not found to be commensurate with procedures and >75% doctors reported that their work did not make any difference for the case. Instead, it was found to be a waste of time.

On the contrary, medico legal issues interfered in people accessing care for the fear of police and legal investigation. It also resulted in frequent referrals, as some did not want entanglement with police and legal issues. Hence, causes were always unknown, not clear – others (majority of suicides were due to chronic stomach pain, etc.).

## Injury Patterns

- ❖ Commonly in road traffic injuries, injury to head (77% in fatal and 42% in non-fatal) and face (19% in fatal and 27% in non-fatal) was frequent, followed by injury to upper (25% in fatal and 35% in non-fatal) and lower limbs (37% in fatal and 46% in non-fatal). Injury to chest and abdominal organs were documented in 23% of patients.
- ❖ Nearly half of patients were admitted and managed through medical or surgical line of intervention.
- ❖ One third of injuries were mild, nearly half were moderate and 15–20% being serious injuries. This could be due to nature of hospitals included in the programme. This also indicates the state of preparedness required in hospitals to manage injured patients.

Further aspects with regard to follow up and recovery were not included in BISP and require better understanding. Since trauma audits are not in practice, it is essential to focus on this area in the coming years.

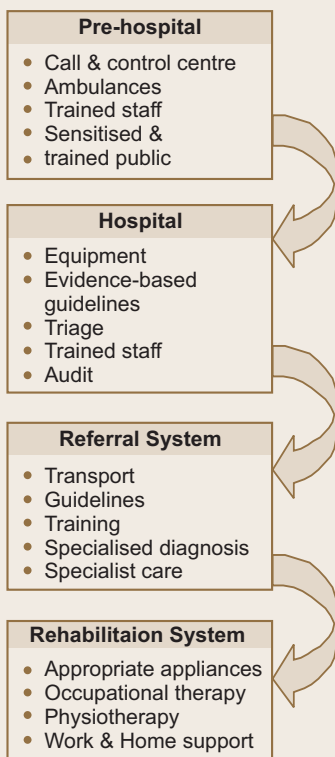
## Strategies for strengthening trauma care

Improving trauma care services in Bengaluru and many other parts of India requires an organized and a programmatic approach. As it is an interlinked and intersectoral activity requiring close coordination between different partners, it requires a systematic approach.

- ❖ A lead organization should be established within the Ministry of health to guide co-ordinate, implement, monitor and evaluate all trauma care activities at the state and city-level. This agency should set up appropriate guidelines and standards for delivery of trauma care. The agency should provide directions for development of suitable manpower resources at different levels of first aid responders, basic first aid care responders and advanced trauma care personnel along with improving facilities and setting standards.

- ❖ Integrated emergency care programmes covering all types of emergencies need to be developed, as basic principles of emergency and trauma care remains similar in many situations except the type and mode of emergency care.
- ❖ The concept of first aid responders should be improved with basic first aid training to all drivers, police, teachers and other interested people. These personnel should be able to get involved in assisting a victim at the sight of injury, call for help, assess safety, help the victim and provide immediate assistance.
- ❖ Basic first aid care providers should be developed in all institutions with training in trauma care capable of providing minimal interventions like removing the person, clearing airway, control bleeding and patient assessment.
- ❖ Advanced pre-hospital and trauma care facilities should be available in all hospitals with bed strength of more than 100.
- ❖ All public sector hospitals must be well equipped with basic facilities and skilled personnel to provide appropriate trauma care. Hospitals should be in a state of preparedness to receive trauma patients without time delays.

## Elements of Effective Trauma Care System





- ❖ All doctors and nurses should be trained in emergency care and should receive periodical training in basic trauma care. Emergency care should be a part of basic medical and nursing courses.
- ❖ A well-organized ambulance system is required in the city, which does not necessarily mean high-tech expensive ambulances. Safe transportation should be the criteria at an affordable cost and with minimum required facilities. A nationwide number, which people can easily remember, should be introduced and organized in Bengaluru Central – East – West – North – South.
- ❖ Ambulances must be provided free and easy access, and should not be caught in traffic jams.
- ❖ Triaging should be introduced to refer patients based on type and severity of injury to the designated hospitals.
- ❖ Hospitals should be in a state of preparedness to receive trauma patients and provide immediate care. Notification to hospitals will be an important step to prepare them for receiving trauma patients.
- ❖ Facilities to manage trauma patients should be strengthened depending on the type and level of the hospitals and should be categorized. Larger public sector hospitals in cities, district hospitals and community health centers should be strengthened to deliver trauma care.
- ❖ Trauma registries and trauma audits should be an integral part of larger activities and should be introduced in all medical college hospitals and larger public and private sector hospitals.
- ❖ Increasing costs of trauma care are often prohibitive for poor patients to get care, resulting in increasing referrals and movements of patients from one hospital to another in a crisis situation. Mechanisms need to be developed to address this issue in a joint manner.
- ❖ To develop implement and strengthen programmes, a research input is very much essential and all programmes need to be well monitored and evaluated to make future changes.
- ❖ Public awareness programmes for public participation and involvement are required. Despite the presence of the Supreme Court order, public does not come forward to help injury victim's at times of need. Despite the presence of a judgment by the Supreme Court ( Pt. Parmanand Katara vs. Union of India and others reported in 1989 ACJ 1000: AIR 1989 SC 2039: 1989 (3) SCR 997: 1989 (4) SCG 286), public are not aware and needs to be informed.
- ❖ Public should be provided basic knowledge of first aid. They should be able to decide on what to do and what not to do in an emergency due to injury.



With the understanding that nearly two thirds of the injured patients die either during transit or after entry into a hospital, it is essential to develop pre-hospital and trauma care programmes in Bengaluru and many other parts of India including rural / district areas and on highways. A high-tech sophisticated technological oriented system will only deliver minimal results, while strengthening basic and foundational aspects of emergency care will yield maximum results. It is also essential to highlight that improvement of trauma care services should happen at all level of emergency care and at all levels have healthcare delivery system. Improving/upgrading facilities in one hospital or one institution will yield little results as compared to strengthening care across all healthcare institutions. An organized and systems approach is essential to strengthen trauma care. If the activity is unregulated and left to individual partners and institutions, it is unlikely to improve the total scenario. Most importantly, transfer of technology from the West may not be highly effective and efficacious and local solutions based on local data needs to be developed. Needless to mention, all programmes and individual components of every programme need to be monitored and evaluated for further changes. If the present scenario is not recognized and given due importance in the coming years, Bengaluru and India will only witness a greater number of deaths and serious injuries.

### Suggested reading

1. Dobson M, Wilkinson D. Primary life support : a proposal to increase survival and reduce disability following trauma in developing countries. Oxford 1996.
2. Bengaluru Injury Surveillance collaborators group. Bengaluru Injury Surveillance Programme: A feasibility study. National Institute of Mental Health and Neuro Sciences, Bangalore. Publication No.68, 2008.
3. Sethi D, Aljunid S, Sulong SB & Zwi AB. Injury care in low and middle income countries: Identifying potential for change. Injury Control and Safety Promotion. 2000 7(3) 153-164.
4. Sasser S, Varghese M, Kellermann A, Lormand JD. Prehospital trauma care systems. Geneva, World health organizations, 2005.

Reducing deaths, hospitalizations, disabilities and economic costs of road crashes requires an intersectoral and integrated approach. Many high income countries around the world have shown a significant decline in deaths and injuries due to implementation of programmes through combined measures of engineering, enforcement, education and emergency care. The success of these programmes are due to development of evidence based / data driven programmes from many partners, better coordinations mechanisms, integrated approaches and development of lead organization(s) focusing on safety. Research / data / evidence formed the formation for many of these activities. Managing road safety was based on development of system wide approaches and rational decision making. Road crashes occur due to multiple causes and prevention and control involves many partners ranging from health, police, transport, judiciary, urban and rural development, excise and many others and many difficulties are seen in coordination and implementation of programmes. To overcome these factors, establishment of a lead agency to coordinate all activities were set up with required administrative powers, support, budget and the teeth to implement programmes. Lessons need to be learnt and mere concern and anguish on deaths and injuries is just not enough. There is a need for clearly defined road safety policy, programme and a defined plan of action for the coming years to save lives and limbs.