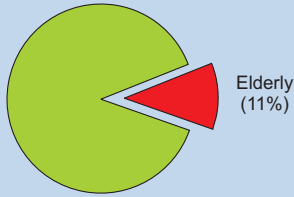
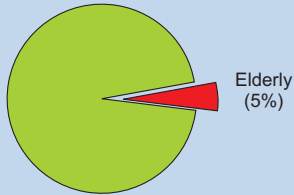




### Fatal



### Non-Fatal



Mrs. R, a 78 year old female, one evening fell from her bed and despite efforts could not get up. Just two days earlier, she had slipped and fallen down in the bathroom. A local doctor referred her to the nearby hospital for an x-ray. It revealed that there was fracture neck of femur and an inter-trochanteric fracture which had to be operated upon. She was obese and had delayed healing of wounds; Her discharge got postponed twice. By this time the family had exhausted all their savings. Even after returning home, Mrs. R is now dependent on others for her daily activities.

The life expectancy of Indians has increased from 56.6 to 63.7 during the last two decades (1). With marginal success in control of communicable and infectious diseases along with improved standards of living, the number of elderly people has been on the increase. Consequently, people are living longer and elderly population has been increasing. Nearly 8% of Indian population is comprised of people in 60 + years (2). As per United Nations estimates, nearly 9% (117 million) of population will be elderly by the year 2015 in India (3). The city of Bengaluru has an estimated 3,00,000 persons beyond 60 years (2).

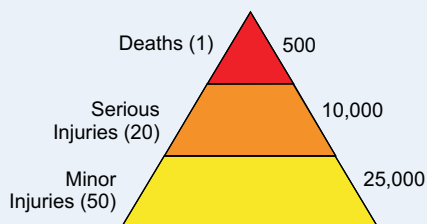
Injuries among elderly are of special importance for a number of reasons. With ageing, many normal reactions of an individual begin fading due to the ageing process. Vision, hearing, loco motor abilities, ability to respond, reflex actions, concentration and coping abilities begin to decline. The vulnerability of body organs to injury also increases due to fragility of organs. The time to recover from an injury is also long due to slow recovery process. The social life patterns of elderly are also changing with breakdown of joint family systems. Today, many elderly live an isolated life in an empty nest syndrome. As the environment in which elderly live, travel or carry day-to-day activities is different from those of adults, injuries are likely to be on the increase due to difficulties in risk recognition and coping abilities. In addition, injuries among aged population results in poor quality of life affecting day-to-day activities. Further, policies and programmes in transport, housing, environment, welfare, urban/rural development and others do not consider needs and limitations of elderly.

## The problem

As per the National Sample Survey organization, 39% of elderly above 60 years are likely to be suffering from one or the other health problem (4). It is estimated that 1.7% and 1% suffer from visual disability, 1.5% and 1.3% hearing and 2.7% and 2.8% loco motor difficulties in rural and urban areas respectively (5). Information on the burden, determinants and impact of injuries among elderly is not clearly known.

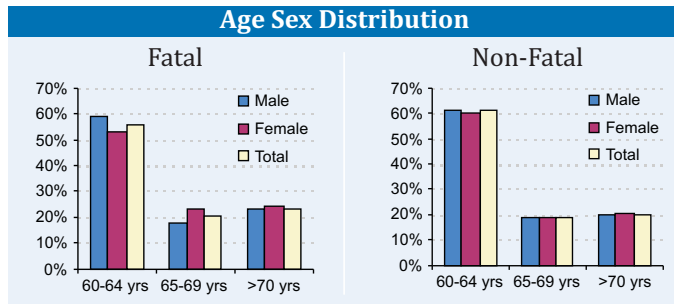
Data from National Crime records Bureau for the year 2006 indicate that 34,594 elderly individuals lost their life due to an injury (6). Some epidemiological surveys on aged population indicate that 1.7% were affected with injuries (7). Previous studies from NIMHANS on traumatic brain injuries and road traffic injuries reveal that 5 – 8 % of deaths and hospitalisations are among elderly people (8). Among the various types of injuries, road traffic injuries (RTIs) and falls are found to be the leading causes of injury. One-year data from Bengaluru injury surveillance programme showed that (9)

### Injury pyramid



- ❖ 360 individuals above 60 years died due to injuries in 2007.
- ❖ In the same period, there were 2643 elderly people brought to hospitals with an injury.
- ❖ The ratio of fatal to nonfatal injuries was 1: 8
- ❖ The male to female distribution was almost equal with 198 men and 162 women.
- ❖ Highest number deaths and injuries occurred in 60 - 65 years (45 %).
- ❖ Majority of those killed or hospitalized belonged to middle-income families.

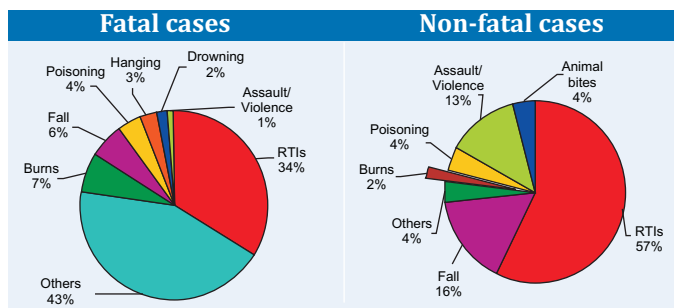
- Nearly 80% of elderly were not working and did not have any specific occupation.



## Profile and Pattern

Several factors like age, sex, socioeconomic status, physiological factors, health status, living conditions, place and location influence the occurrence of injuries varying from region to region.

- Among injury deaths, Road Traffic injuries was the leading cause resulting in deaths of 119 persons. Falls and burns were the other two leading causes contributing for 6 and 7 % of deaths, respectively. Suicides determined on intent were responsible for 5 % of deaths. Violence among elderly, more due to interpersonal causes and assault by family members or unknown persons, had resulted in 1 % of elderly deaths.
- For every death, nearly eight persons were brought to hospital for care and management. The causes were almost similar with RTIs contributing for 58% of hospital contacts. Falls and assaults were responsible for 16% and 13% of contacts.

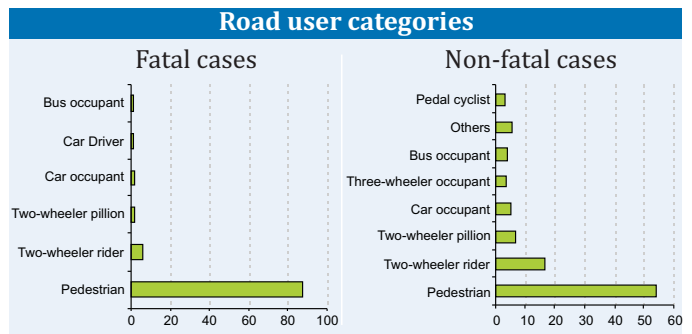


Injuries among elderly are highly underreported due to number reasons. Even if a death occurs due to one or more late complications of injury, it is not routinely mentioned in death certificates as an antecedent or associated cause in both police and hospital records. Thus, significant numbers of deaths are listed as unnatural deaths, unclassified or due to miscellaneous causes. As elderly cannot reach hospitals at distant locations due to non-availability of support at the time of injury, many of them resort to care near to their home, commonly in a nursing home or local general practitioner or to home remedies. Hence, the number of fatal and nonfatal injuries would be much higher as data was collected from police records and selected 21 hospitals in the city. Thus, it is estimated that the city of Bengaluru would record, on an average, nearly 500 deaths, 10,000 severe and 25,000 moderate injuries among elderly every year.

## Risk factors

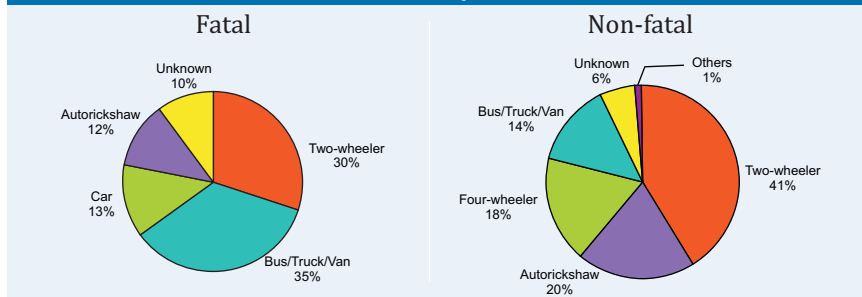
The risk factors for various injury causes are different as per age, sex, place, location, physiological factors and others.

- Road Traffic injuries was the leading cause for death and hospitalisation with one third of deaths and half of hospital contacts. Majority of the road crashes had occurred within the city and commonly during 9am to 12 pm and 6pm to 9 pm. Pedestrians were the most commonly affected group for both deaths and hospitalisations. Two of the commonest timings of road crashes were when elderly were walking or crossing the road. Pedestrians hit by heavy vehicles like buses, cars, trucks and van / jeeps resulted in nearly half of deaths. Collision with a two wheeler in a heterogeneous traffic environment resulted in one third of deaths. The commonly seen three wheeled auto rickshaws were responsible for 1 in 10 of the hospital contacts.

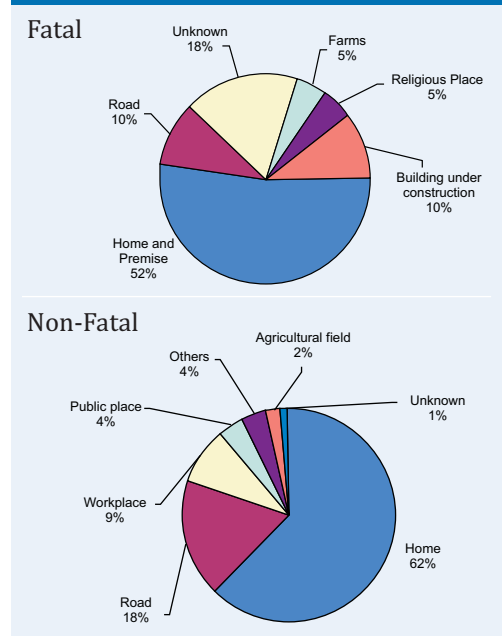


- Falls were the second leading cause for injury hospitalization among elderly. Nearly 30 persons had died and 416 were hospitalized due to the direct effect of a fall. Every second death and two thirds of hospitalization due to a fall occurred at home. The other common places of falls were roads (18 %) and public places (5 %). Identifying specific individual and environmental risk factors needs further research.
- Burns were also an important cause of injury. Nearly 7 % of elderly deaths were due to burns. Nearly 90% of fatal and nonfatal burns occurred at home. The commonest methods of burns were due to clothes catching fire or hot liquids falling on the individual.
- Violence against elderly has been on the increase as per anecdotal reports and is an important cause of hospitalisations. Nearly 350 people were brought to hospital for care and management after assault and majority could be due to assault by unknown persons or immediate family members.
- Suicides were reported among few deaths, while hospitalisations occurred among nearly 100 individuals in the age group of 60 plus years. The commonest mode of suicide was self poisoning with organophosphorus compounds or due to overdose of drugs. All cases had occurred at home when the person was alone without the care of immediate family members. Accidental poisoning was reported in 10 to 20% of deaths and hospitalizations. Specific risk factors could not be identified in the present study and requires further research.

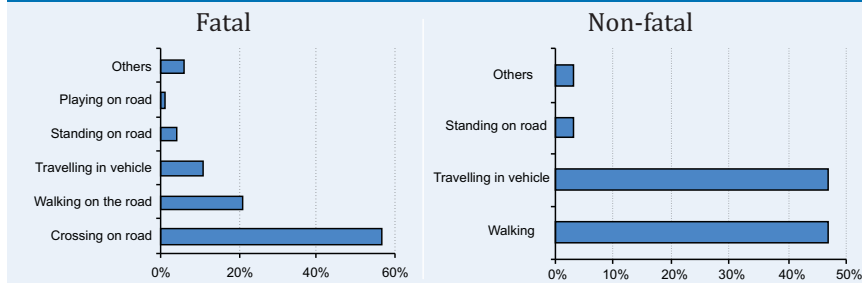
## Hit by



## Place of falls



## Activity at the time of injury



- ❖ Animal bites were generally due to dog bites. More than hundred aged persons were brought to study hospitals for care and management. Nearly half of dog bites occurred on roads and an equal number at home.

## Emergency Care

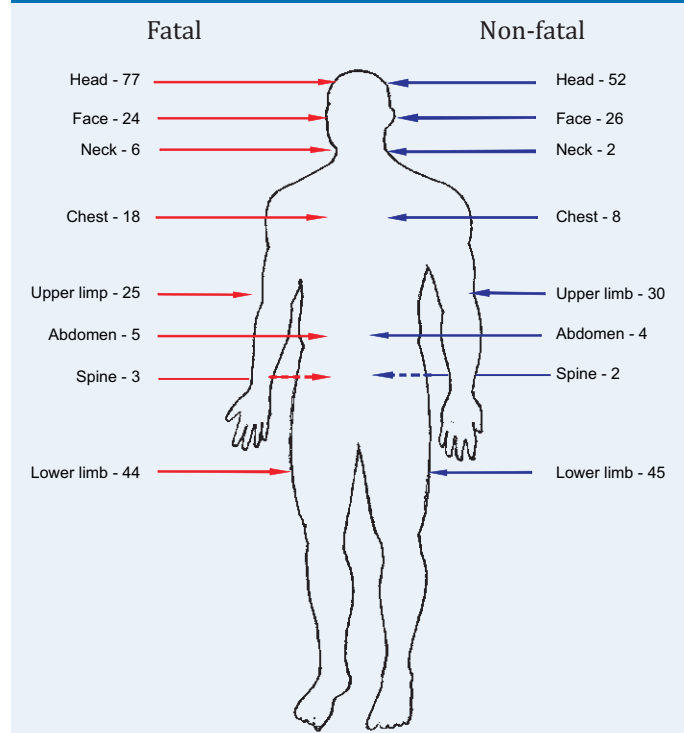
Availability of efficient prehospital and hospital care makes significant difference for outcome from injuries. The findings from the present programme revealed that majority of injuries among elderly had occurred at a time when the person was alone. The injured persons had to make their own arrangements or wait for help to arrive. Less than a third of patients received care within three hours after injury and delayed care was the commonest pattern. Doctors and nurses in the nearby hospitals were the primary source of first aid and definitive care. Majority were transported by private vehicles (39%) or three wheeled auto rickshaws (13%). Considerable delays were noticed in the availability of immediate care. Nearly half the patients were referred to another hospital for number of reasons.

## Impact

The type, nature, severity and outcome depend on collision patterns, type of body organs involved and the amount of energy transferred due to an injury.

- ❖ Vital organs of the body like head, face, chest and abdomen were injured in number of deaths and hospitalised elderly persons. Generally, RTIs, falls and assaults resulted in higher extent of head and face injuries. Head injury was commonly seen in 77 % of killed and 52 % of hospitalised RTIs. Upper and lower limb injuries were predominant among falls in 18 % and 34 % of hospitalisations. Nearly two thirds of burn injuries were serious resulting in deaths within a short period of time.

## Body Parts injured in RTIs (%)



- ❖ More than half of the hospitalized elderly had moderate (47%) to severe (24%) injuries. It is important to note that the extent and severity of injuries are generally higher among elderly due to the process and effects of ageing, requiring protracted hospitalization and intense management. Majority of the burn injuries resulted in deaths during the course of hospital stay. Even though, the disability patterns were not documented in the present programme, it is an apparent that majority of those discharged from hospitals will have varying levels of disability affecting their day-to-day life. Previous studies from NIMHANS on traumatic brain injuries has shown that the extent of disability is much higher among elderly population.

# Prevention and control

With an ageing population and emergence of injuries as a major public health problem, the burden of injuries will increase in the coming years. Since injury happens due to a multiplicity of risk factors in different environments depending on the nature of products, prevention and control strategies has to be multiple as applicable to individual settings. The interventions need to be integrated in a comprehensive manner to reduce the occurrence of injuries among elderly, focus on provision of effective trauma care services in the event of an injury and rehabilitation of those after an injury. The findings clearly reveal that road safety and home safety needs strengthening for improving health of the elderly.

- ❖ It is crucial that all policies and programmes aiming to improve transport, mobility, urban and rural environments, product development, welfare and others, need to consider the limitations and requirements of elderly people in their respective programmes.
- ❖ All programmes aiming at improving the health of the elderly should have a component of safety promotion and injury prevention. It is also crucial to guide, coordinate, integrate, monitor, and evaluate several activities for promoting health of senior citizens.
- ❖ The design, construction, maintenance and management of roads and vehicles need to consider the limitations of elderly people in using the road environments. Some of the common measures like appropriate speed management strategies, better design of roads, traffic calming, traffic separation, greater emphasis on public transportation, safe pedestrian walking and crossing facilities, reducing drinking and driving, improving visibility of roads and people, etc., are likely to reduce pedestrian deaths and injuries. Adequate facilities for walking and crossing roads for elderly should be given importance.

- ❖ Fall injuries can be reduced with a set of countermeasures like antiskid flooring, improved visibility, better construction of houses ( balconies, railings, staircases, etc.), improved supervision by family members and caregivers, better product designs, and others.
- ❖ Encouraging elderly people to maintain better health so that the impact of the injury can be reduced.
- ❖ Strengthening prehospital care services for early care of the injured and efficient care when they reach a hospital will help in reducing the impact of injuries.
- ❖ Capacity strengthening and training of all professionals (especially police, transport, health, education, public works, urban - rural development, etc.) involved in safety promotion and health care of the elderly will help in better design of environments and products which elderly constantly use.
- ❖ Strengthening rehabilitation facilities for restoring the health and functioning of the elderly is very crucial.
- ❖ Most importantly, it is crucial to increase research across a wide variety of sectors ranging from health to environment and product development to develop a better understanding for reducing the risk of injuries among the elderly.

With increasing globalization, motorization and an ageing population, Indian cities and districts would face a major problem of injuries among the elderly in the years to come. Elderly health cannot be achieved, if their limitations, needs and requirements are not taken into account from early planning stages till implementation. Efforts are urgently required in this area to reduce the burden on the health sector for care of injured elderly and every opportunity needs to be seized in this direction. An investment in research will lay the foundation to develop injury prevention policies and programmes for improving health of the senior citizens.

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Bengaluru Injury / Road Traffic Injury Surveillance Programme is a collaborative Programme between Bengaluru City Police, 25 hospitals, Bengaluru Metropolitan Transport Corporation and Bruhat Bengaluru Mahanagara Palike. The programme is coordinated and implemented by National Institute of Mental Health & Neuro Sciences and facilitated by Indian Council of Medical Research and World Health Organization, India office. The programme aims at reducing / preventing injuries, improving trauma care and strengthening rehabilitation services.



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