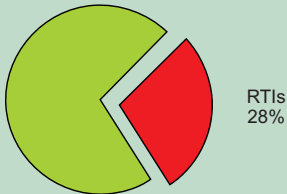
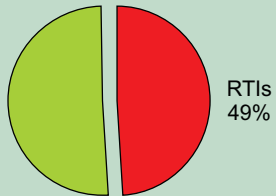




Fatal



Non-Fatal



40 die in accident near Hassan

May 30, 2008, Times of India
Bangalore, Page 1

Gayana Samaja secretary dies in road accident

Sep 1, 2008 Times of India Bangalore

2 student bikers ram into trailer; 2 killed in accidents

Sep 2, 2008 Times of India

KAT official dies in road accident Traffic Piles Up On Busy Old Madras Road in Peak Morning Hour

Jan 26, 2008, Times Of India
Bangalore, Times City; Page 4

Bus driver's negligence claims life of student; 3 - yr - old run over; mob stones BMTc buses

Jan 21, 2008, Times Of India
Bangalore, Times City; Page 3

Buses stoned, cops beaten up Accident sparks tension

Jan 18, 2008, Deccan Herald
Bangalore, Page 2

4 dead, 22 injured in highway accident

June 2, 2008, Times Of India
Bangalore, Times city, Page 3



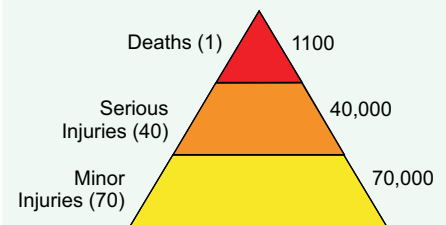
Estimated road deaths and injuries in 2007

	Deaths (1)	Serious injuries (20)	Mild injuries (50)
India	1,25,000	2,500,000	6,250,000
Karnataka	9,000	1,80,000	4,50,000

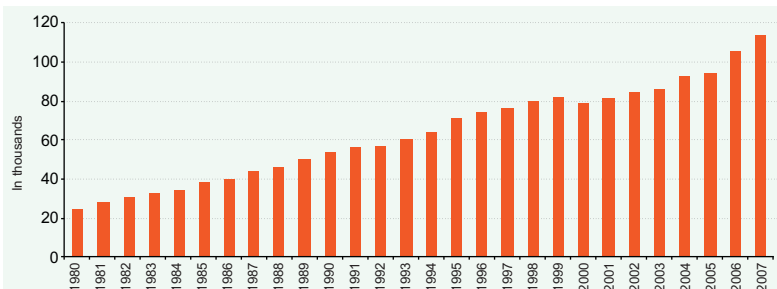
Recent years have witnessed an increase in motorisation, infrastructure expansion and increasing mobility of people in India and in cities like Bengaluru; this change is likely to continue in the coming years. Consequently, there has been an increase in road crashes, deaths, injuries (RTIs) and disabilities. Road deaths and injuries are increasing at a rapid

pace in Bengaluru and other parts of India and are likely to increase if systematic and scientific road safety policies and programmes do not accompany this change. Available data indicate that the economically progressive states of India are already reporting higher number of crashes, deaths and injuries (1), only highlighting that mobility, transport and safety need to grow together for a healthy and safe society. In addition, greater reliance on motor vehicles also results in many direct and indirect health effects leading to some noncommunicable diseases (obesity, cardiac diseases, diabetes etc.) and environmental and climate changes.

Bengaluru RTI pyramid

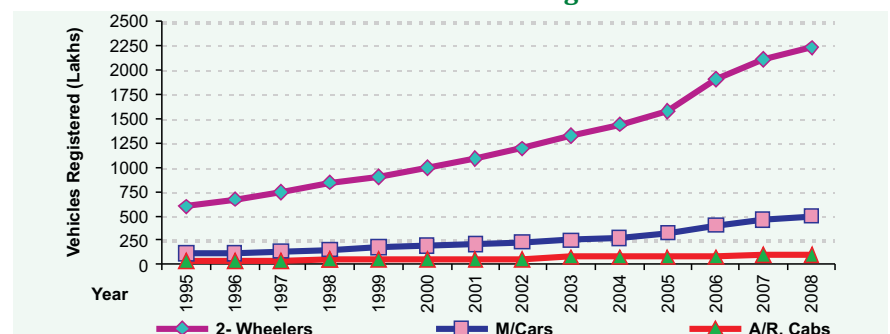


Road Accident Deaths in India, 1980-2007



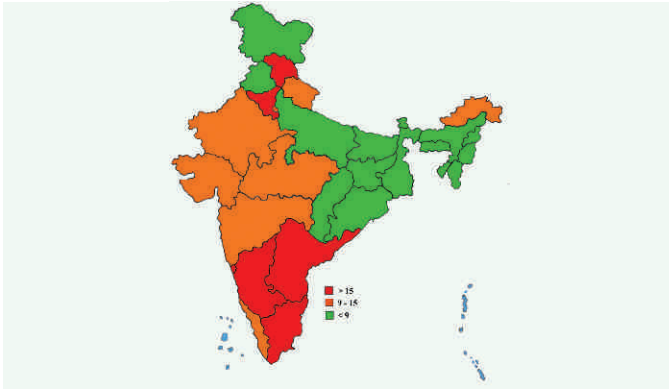
The city of Bengaluru has recorded unprecedented motorization in the last decade. The motorization index of Bengaluru shows an increase from 164 to 310 over a 10-year period, with the number of vehicles increasing from 0.7 million in 1995 to 3.1 million in 2008; the increase in the number of total two wheelers has been significant (2).

Vehicular Growth in Bengaluru

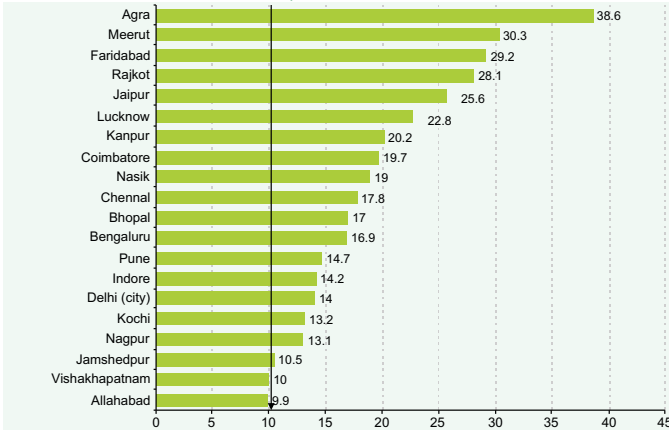


Source: www.rto.kar.nic.in/bng-veh-stat.htm

State wise distribution of RTIs in India, 2007
(Rate / 100,000 population; National average 10.1/ population)



Rate of RTI deaths in major cities (National Average 10.1/1,00,000)



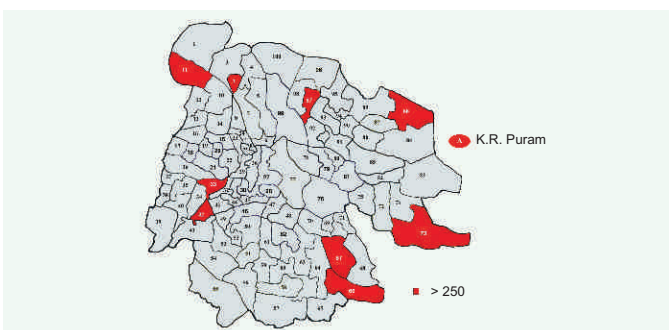
The problem

Road deaths in Bengaluru have increased from 639 in 2000 to 1,100 by 2007. For every death, an estimated 40 persons are likely to be hospitalised with 70 sustaining minor injuries. The BISP data (4) showed that-

- ❖ There were 943 deaths registered in Bengaluru in 2007. With an estimated under reporting of 10% (late deaths, misclassifications, etc), the total number of deaths are likely to be 1,100 during 2007.
- ❖ 26,191 patients were registered in casualty departments of 21 hospitals and the estimated number of hospitalizations due to RTIs is likely to be around 40,000 every year.

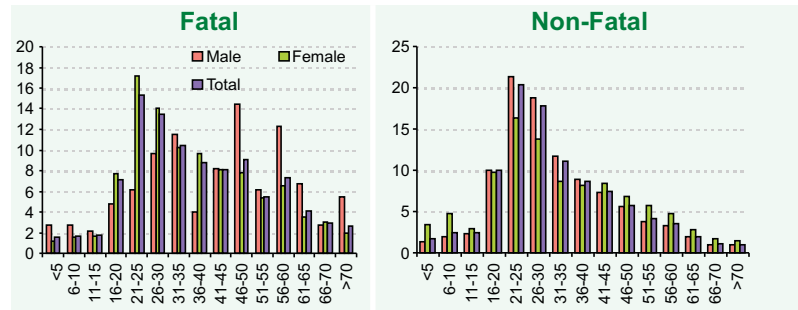
Using geographical mapping of RTI occurrence, top 10 areas with high occurrence is shown in the map. This indicates that due to heavy traffic congestion in central parts of the city, road crashes are occurring in higher numbers in peripheral and outer parts of city.

Traffic Fatal and Non Fatal Combined



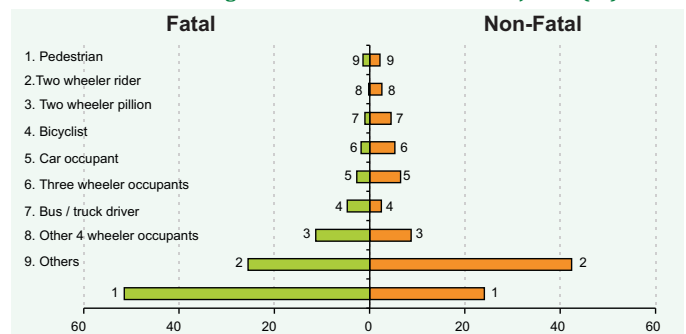
Profile and pattern

- ❖ 84% of deaths (758 out of 943) and 82% of hospitalizations (21,449 out of 26,191) were amongst men.
- ❖ 29% of fatal and 38% of non-fatal road injuries occurred in the age-group of 21 to 30 years. In total, 63% of deaths and 76% injuries were in 15 - 44 years.
- ❖ Children contributed for 5% fatal and 7% non-fatal injuries.
- ❖ Elderly accounted for 13% of fatal injuries with non-fatal injuries being 6%.



- ❖ Pedestrians were the leading road user category for both deaths (51%) and injuries (24%).
- ❖ Two wheeler riders and pillions were the second leading group contributing for 37% deaths and 51% of hospitalizations.
- ❖ Bicyclists were the third leading group for deaths (5%), while car occupants were represented in 6.5% of hospital registrations.

Road User Categories in fatal and non-fatal injuries (%)



Risk factors

Understanding crash characteristics in terms of situation, nature, context, and collision patterns is important to develop preventive strategies.

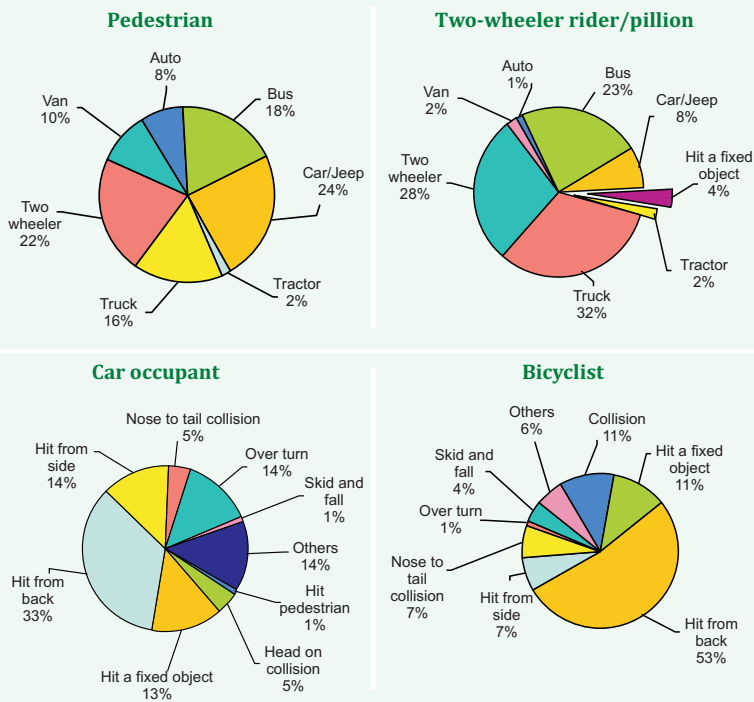
- ❖ 30% of fatal and 23% non-fatal crashes occurred between 7 pm and 12 midnight.
- ❖ Nearly two thirds of crashes occurred in the city / municipal roads as against 1/4 on highways traversing from the city.
- ❖ Collision with heavy vehicles like buses and trucks resulted in higher deaths.

- ❖ One third of deaths occurred at crash site, 22% enroute to hospital & nearly half during hospital stay.
- ❖ Information on influence of alcohol was poorly documented, as only 7% and 13% of fatal and non-fatal injuries respectively were due to alcohol use. Previous studies by NIMHANS have documented the involvement of alcohol in one third of fatal and non-fatal crashes occurring during night times (5,6).
- ❖ Usage of protective devices like helmets (< 50%) and seatbelts (<15%) were extremely low among those injured & killed, despite the presence of laws for both.
- ❖ A broad understanding of causes revealed that speed is one of the major contributors for road deaths and crashes, requiring further research in this area.

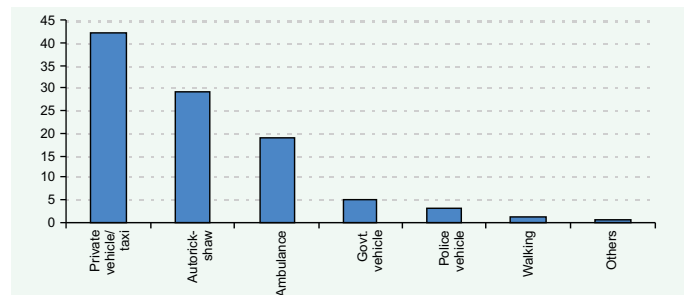
transportation within the shortest possible time and proper referral. BISP data indicate that

- ❖ The first place of first aid availability was the nearby hospital for more than half of road traffic injury patients.
- ❖ The role of first aid responders was virtually absent, and doctors and nurses were the first to provide any first aid care; < 5% of fatal cases received care within an hour.
- ❖ Half of injured patients were transported in a private vehicle and one third in an auto rickshaw; ambulances were used for transfer of few patients and mainly for inter-hospital referrals (19%). A similar pattern was observed in rural Bengaluru.

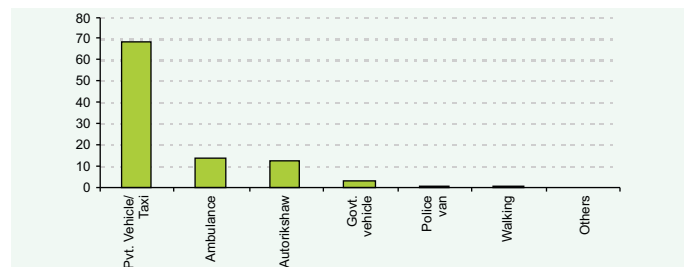
Collision Patterns in fatal RTIs



Mode of transportation from injury site to hospital in urban Bengaluru



Mode of transportation from injury site to hospital in rural Bengaluru



- ❖ Referral from one hospital to another was a common practice as more than 70% had visited more than one hospital prior to reaching the definitive hospital.
- ❖ 1% were brought dead to the hospital and another 2% died in the emergency rooms of the hospitals
- ❖ Triage was commonly absent at or immediately or later after the crash.
- ❖ Notification of RTI to the hospital was virtually absent.

Emergency care

Trauma care comprising of measures undertaken at the crash site and till the person reaches a hospital are important determinants of death and survival. Prehospital and emergency care includes a wide range of activities comprising notification, first aid care, triage, safe



Impact

- ❖ Injury to head and face was the most common injury in 77% of fatal and 45% of non-fatal injuries. Injury to upper and lower limbs was present in 62% of fatal and 80% of non-fatal injuries. Injury to chest was found in one fourth of deaths.
- ❖ Half (51%) of road traffic injury patients had a moderate injury requiring observation and intensive management. One sixth (16%) of patients had a serious injury requiring varying periods of admission and surgical/medical management.
- ❖ Even though disabilities were not documented in the present programme, it is known that all severely

injured patients, 50% of moderately injured and 20% of mild injuries are discharged from the hospitals with varying levels of disabilities, requiring short-term and long-term rehabilitation services.

Prevention and control

Prevention and control of road traffic injuries requires an integrated and coordinated approach between all concerned ministries and departments. The new understanding of road traffic injuries reveal that if systematic programmes can be put in place, it is possible to prevent road crashes. A road safety management authority is crucial to guide, coordinate, integrate, monitor, and evaluate several activities, without which road safety cannot improve.

Since RTIs happen due to several causes, the solutions are also several. Different types of interventions need to be implemented in an integrated manner to obtain maximum results as each one contributes for decreasing injuries to a certain extent. A number of interventions have been implemented in high-income countries and results are evident. Some effective strategies include (7):

- ❖ Incorporating road safety principles and good practices in transport, urban - rural development, infrastructure development policies/programmes and all other area development activities.
- ❖ Capacity strengthening and training of all professionals (especially police, transport, health, law, education, media and others) involved in road safety.
- ❖ Better design of roads and highways with focus on safety.
- ❖ Traffic calming and speed control measures in all urban areas and highways.

- ❖ Augmenting public transport systems and thereby discouraging individual modes of transport.
- ❖ Separation of traffic at all possible locations with provision of people friendly facilities for different class of road users.
- ❖ Provision of safe pedestrian walking and crossing facilities.
- ❖ Total legislation and implementation of helmet laws.
- ❖ Implementation of seatbelt laws and encouraging use of child restraints.
- ❖ Reducing drinking and driving by enforcement and education.
- ❖ Improving visibility of people and vehicles on roads.
- ❖ Enhancing safety standards and crash worthiness of vehicles.
- ❖ Improving emergency and acute care facilities in hospitals.
- ❖ Increasing public awareness to accept and practice safety on roads.
- ❖ Strengthening research (surveillance, trauma registries, multi-disciplinary crash investigations, etc.) in both health, police, transport and legal sectors.



Implementation of combined and integrated interventions through a systems approach is the key to save lives on Indian roads (8). It is the joint responsibility of governments, industry, professionals, media and people to promote road safety in India (9). The travel and transport patterns are likely to change in the coming years and the country/state/cities require a road safety management authority, road safety policy and an action plan to address the present and future problems through evidence based and systems approach.

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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.



Published by NIMHANS with support from World Health Organization, India Office, New Delhi.
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