



“Our Safe Right Of Way”



**Centre for Science
and Environment**

*Dialogue on
Assessment of Safety
and Accessibility in
Indian Cities*

**New Delhi
June 23, 2014**



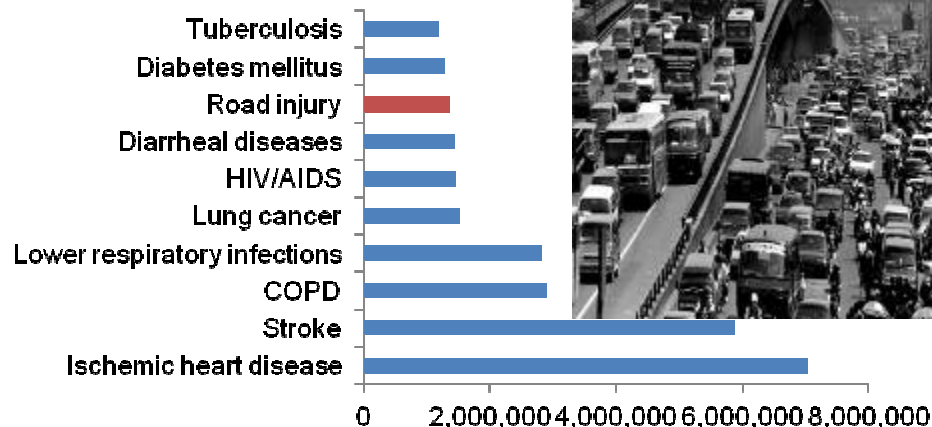


Global Burden of Disease changed the way we understand health impact of motorisation

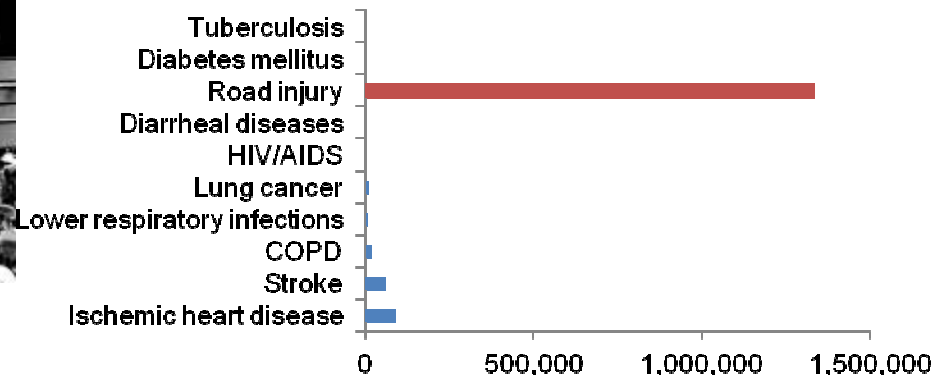
Combined burden of road injury and deaths and illness



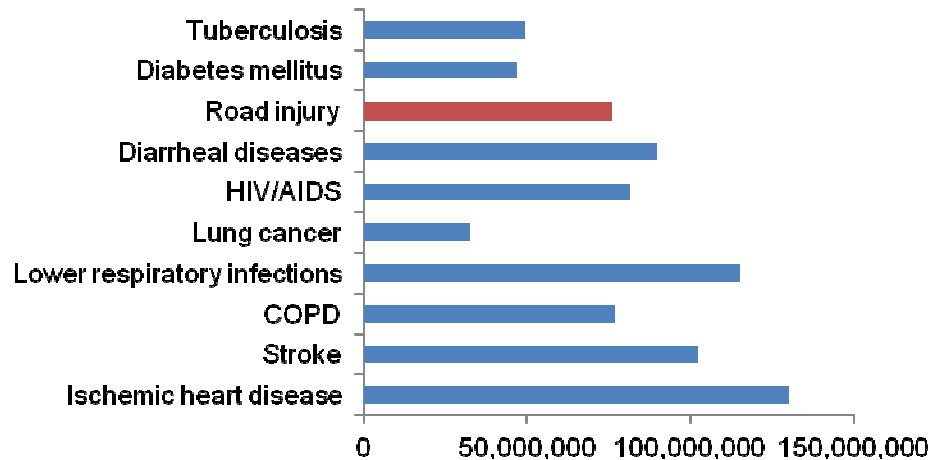
GBD Deaths



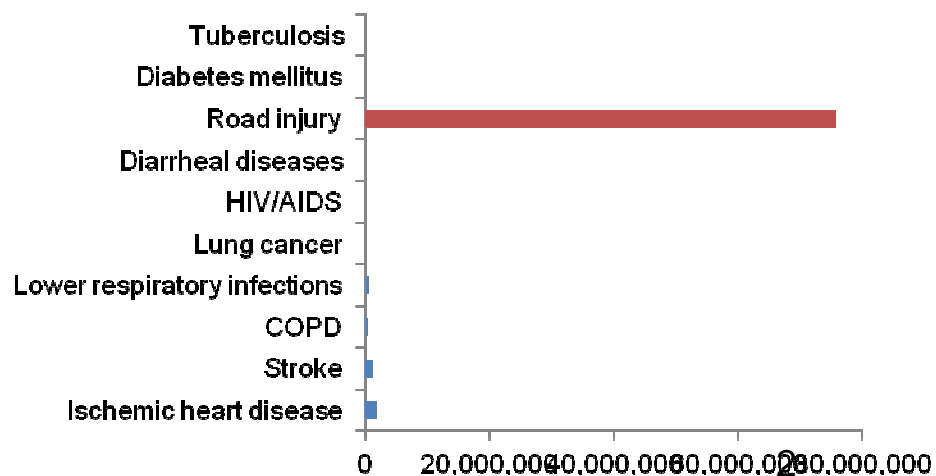
Death Burden attributable to motorized road transport



GBD DALY



DALY Burden attributable to motorized road transport

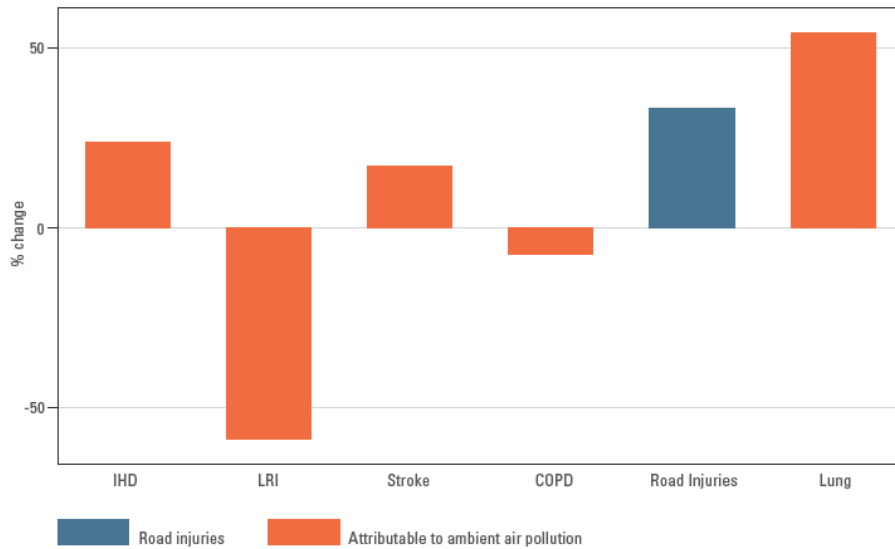




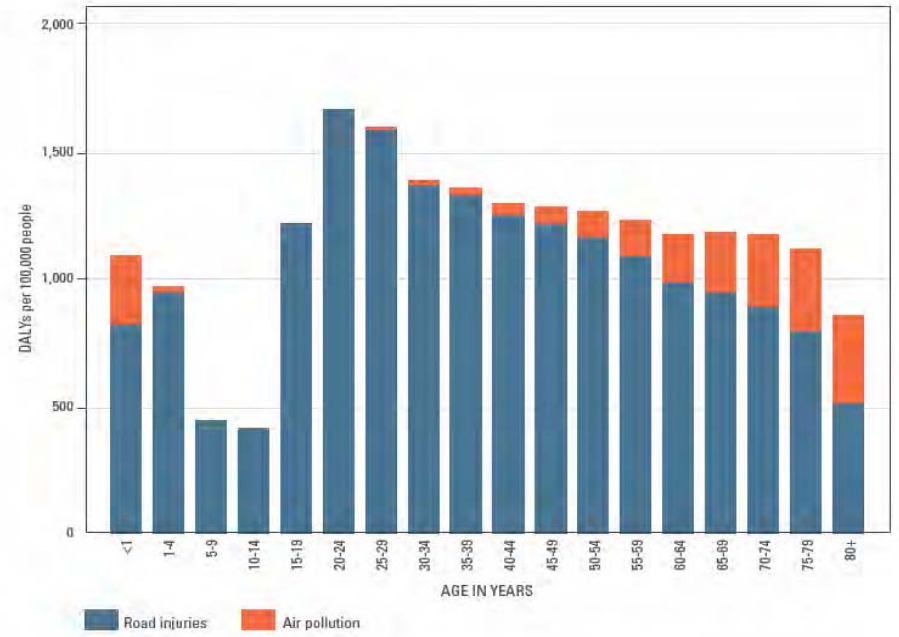
Dramatic change in burden of disease from air pollution and road injuries



Global shifts in healthy years lost due to road injuries and outdoor air pollution from 1990-2010



Rate of health years lost to injuries and air pollution from motorized road transport 2010



Source: The World Bank Group and , Global Road Safety Facility



What about India?

Union Ministry of Road Transport and Highways:

India reported 490,383 accidents -- **509,667 injuries** and **138,258 road traffic deaths** in 2012 – this is about 11% of the total road accident deaths worldwide.

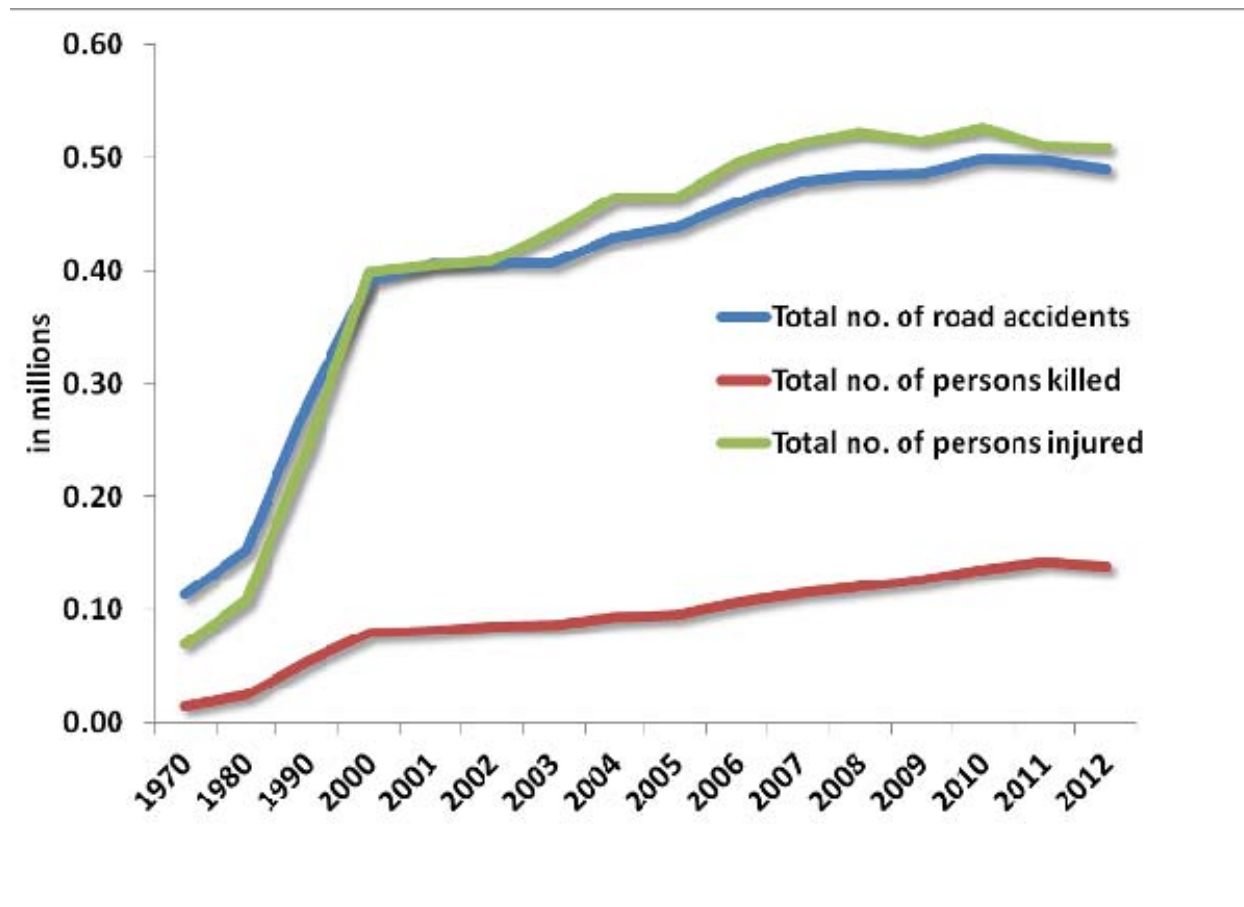
This means almost half the equivalent population of Iceland or Maldives is wiped out on Indian roads every year.



India: a major accident hotspot



16 deaths and 58 road injures every hour in India....



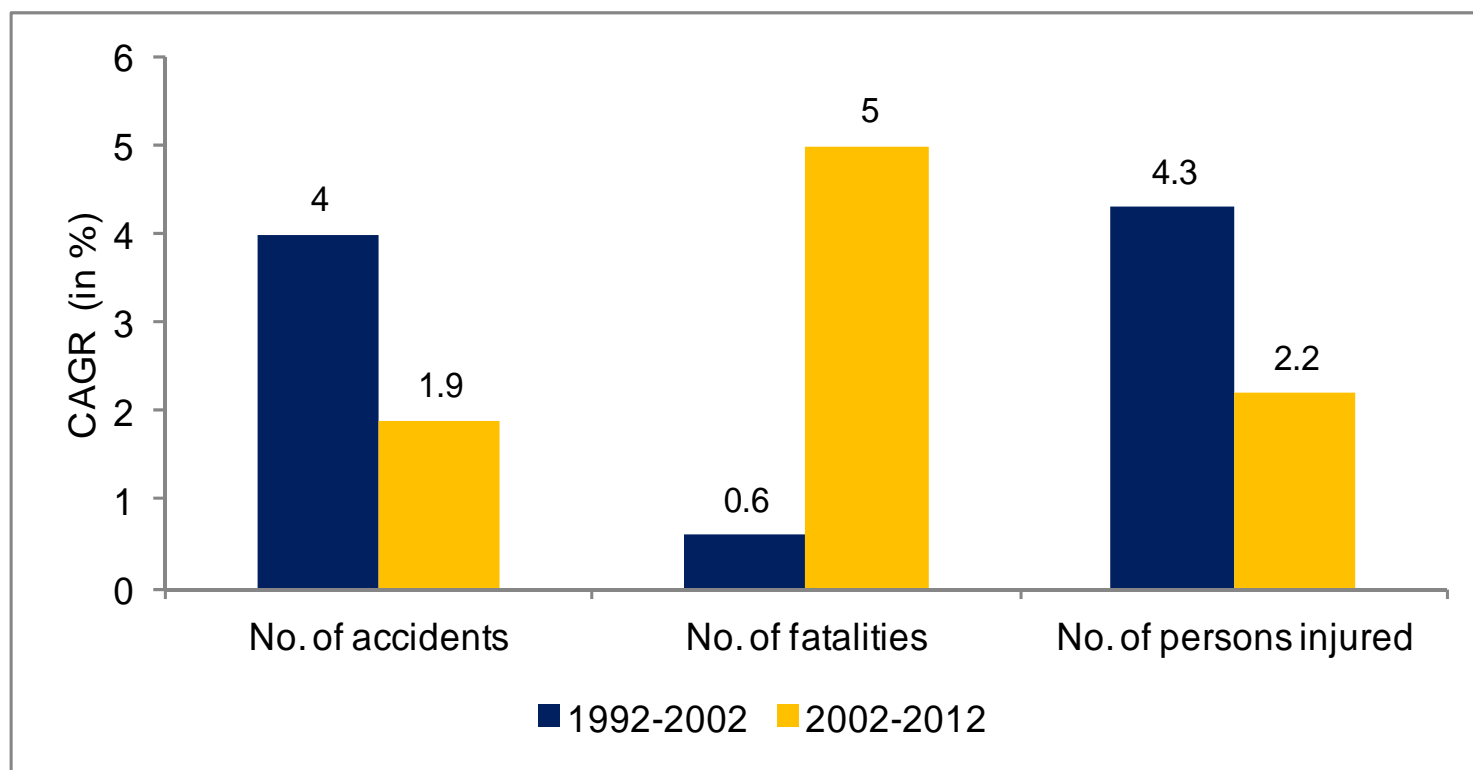


Sharp increase in fatality rate in India



-- In the last two decades the total number of accidents and injury has declined. But fatalities increase sharply.

-- Since 2003, the proportion of fatal accidents in total road accidents has up from 18.1% to 25.1% in 2012.



Source:
MORTH 2012

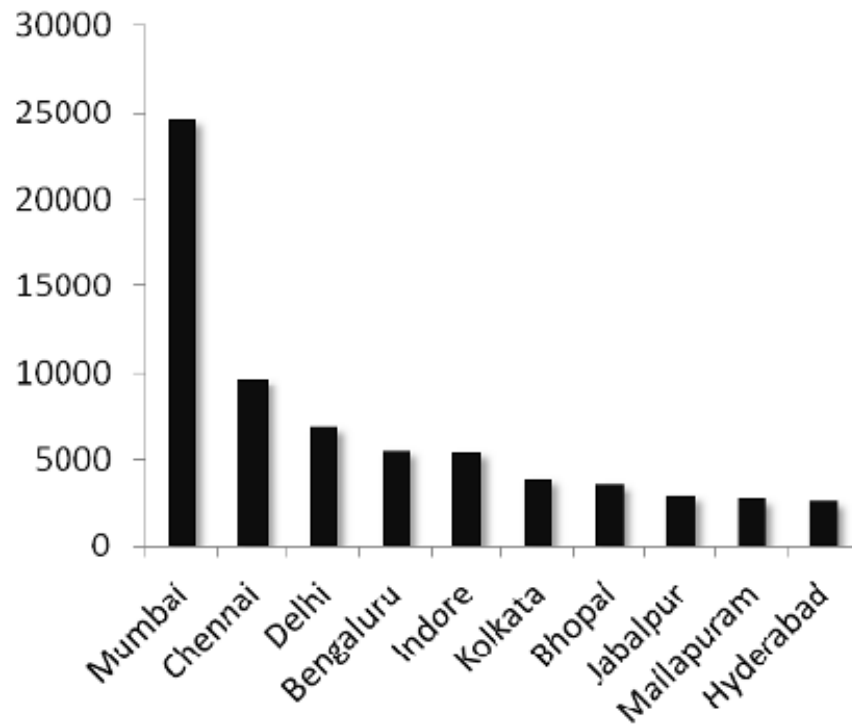


Cities on killer roads

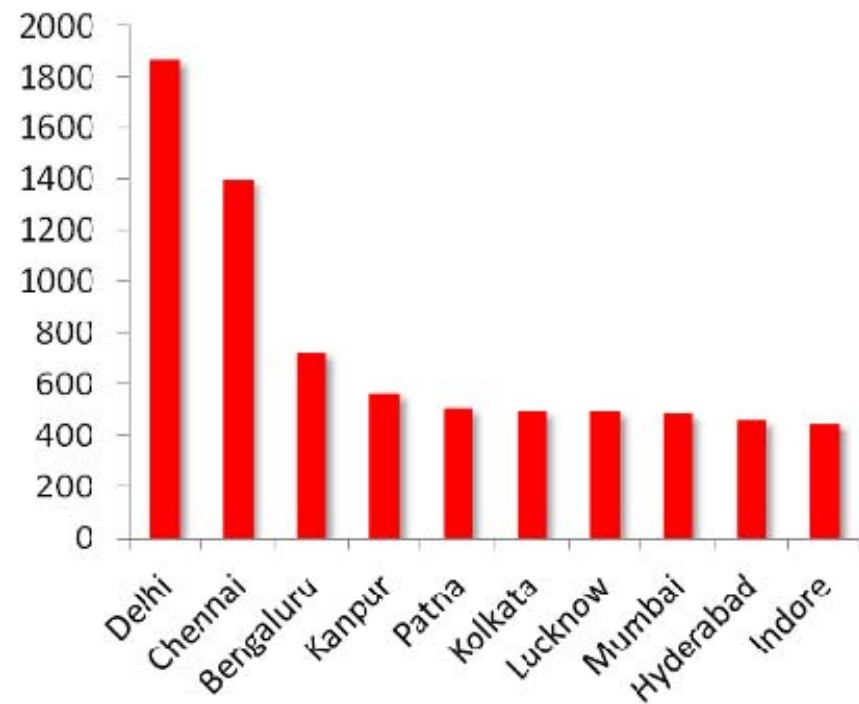


Mumbai records the highest number of all types of accidents.
But Delhi records more fatal accidents

Total no. of accidents



Total no. of persons killed





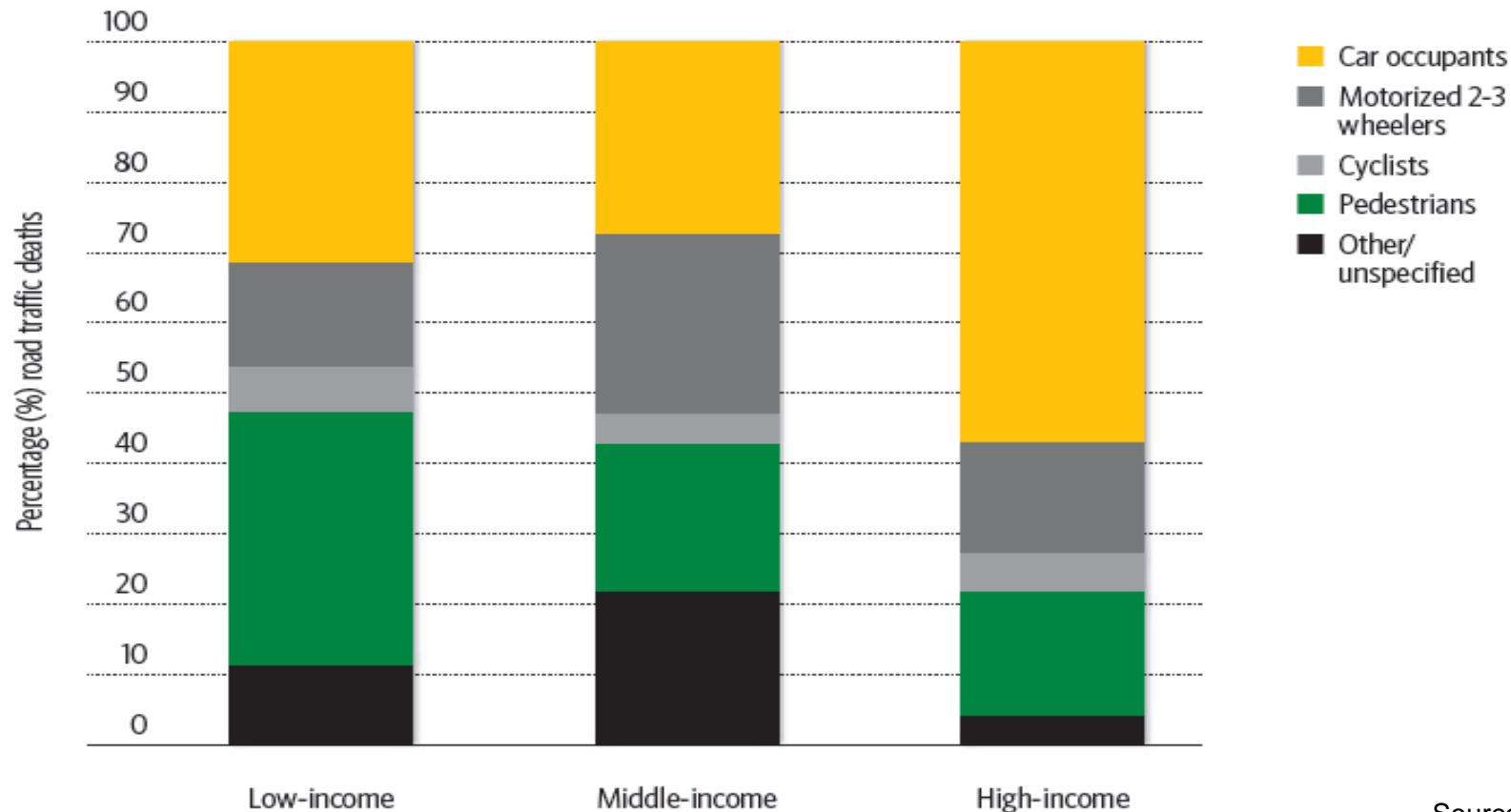
Who are most vulnerable?



Globally ... Walkers and cyclists



A quarter of world's road traffic deaths occur among pedestrian and cyclists (25 per cent).

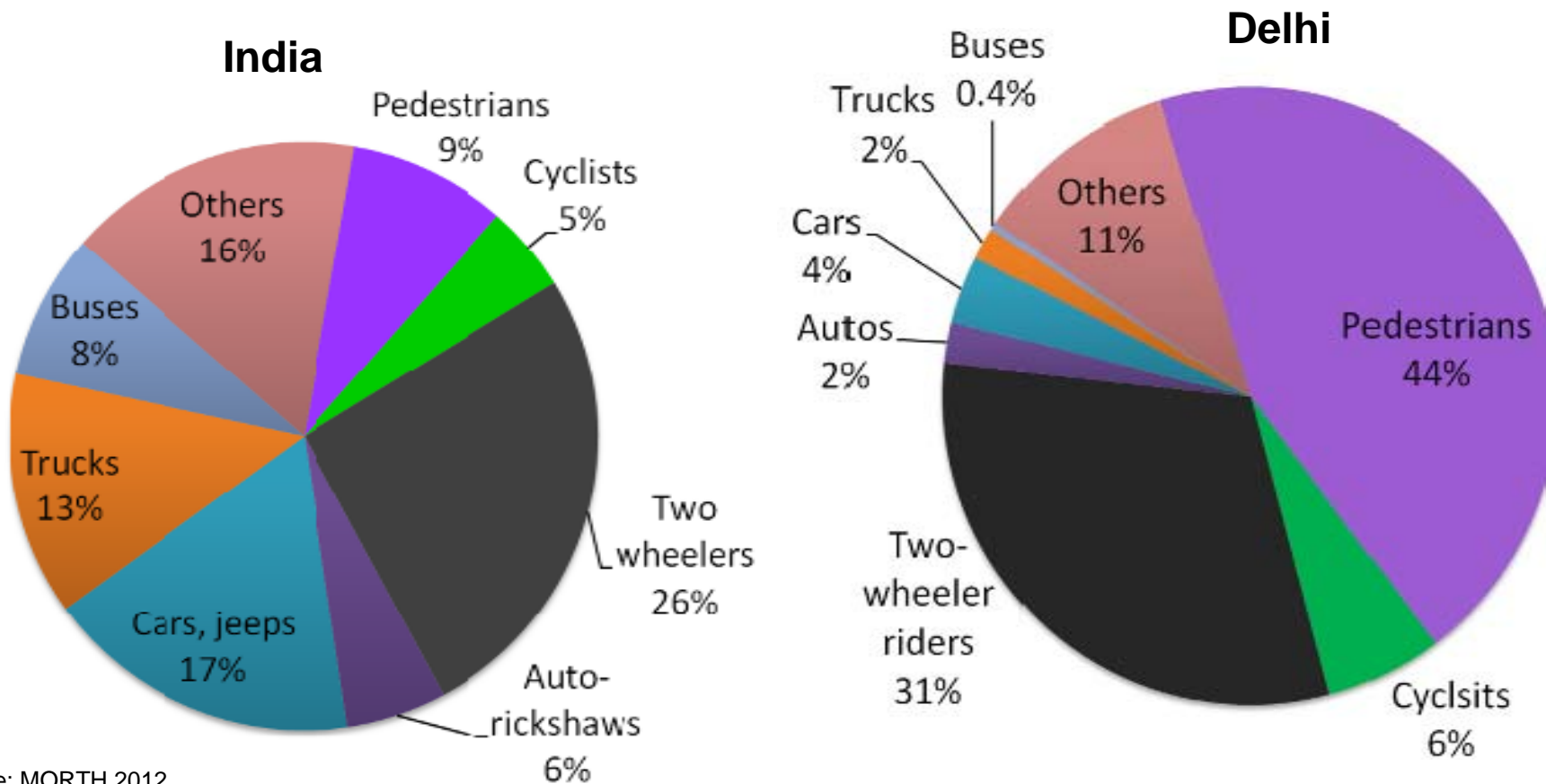




Who is vulnerable...



Pedestrians are most vulnerable in Delhi – pedestrian and cyclist together are 50% of the victims





Who is vulnerable...

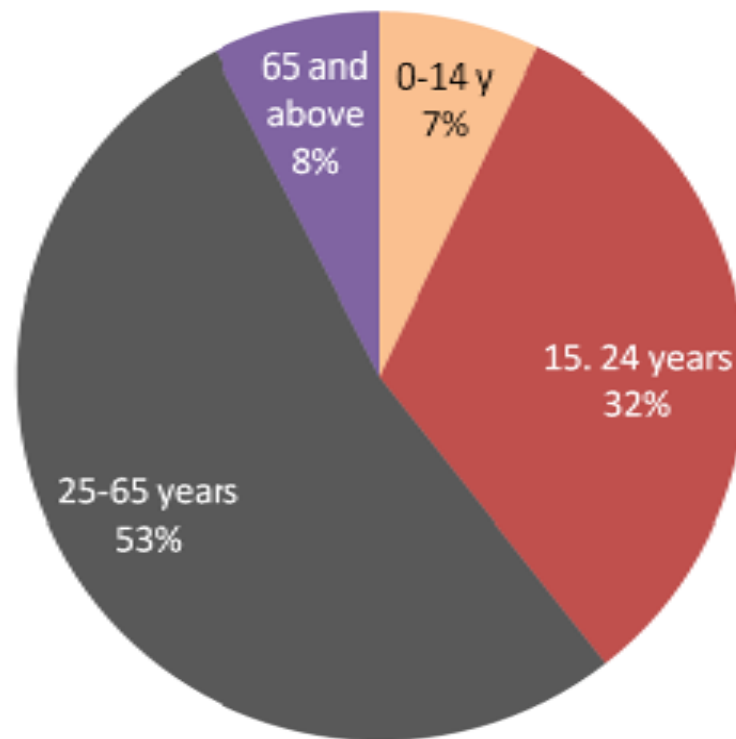


Nationally, young population in the age group 0-24 years constitute 40% of victims

-- In 2012, 5,879 children in age group 0-14 years and 26,709 young adults in age group of 15-24 years were victims

-- 53% are in the most productive years of life – 25-65 years

Age profile of road accident victims (other than drivers)



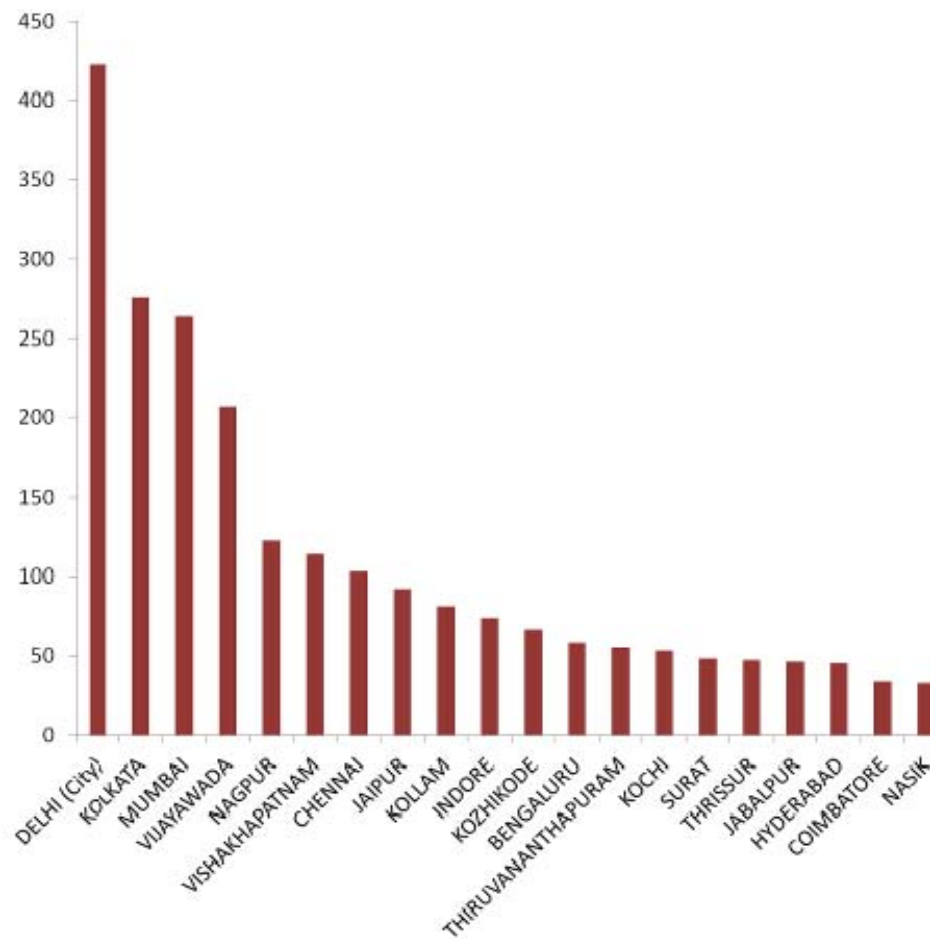


Walkers and cyclists deaths in Indian cities

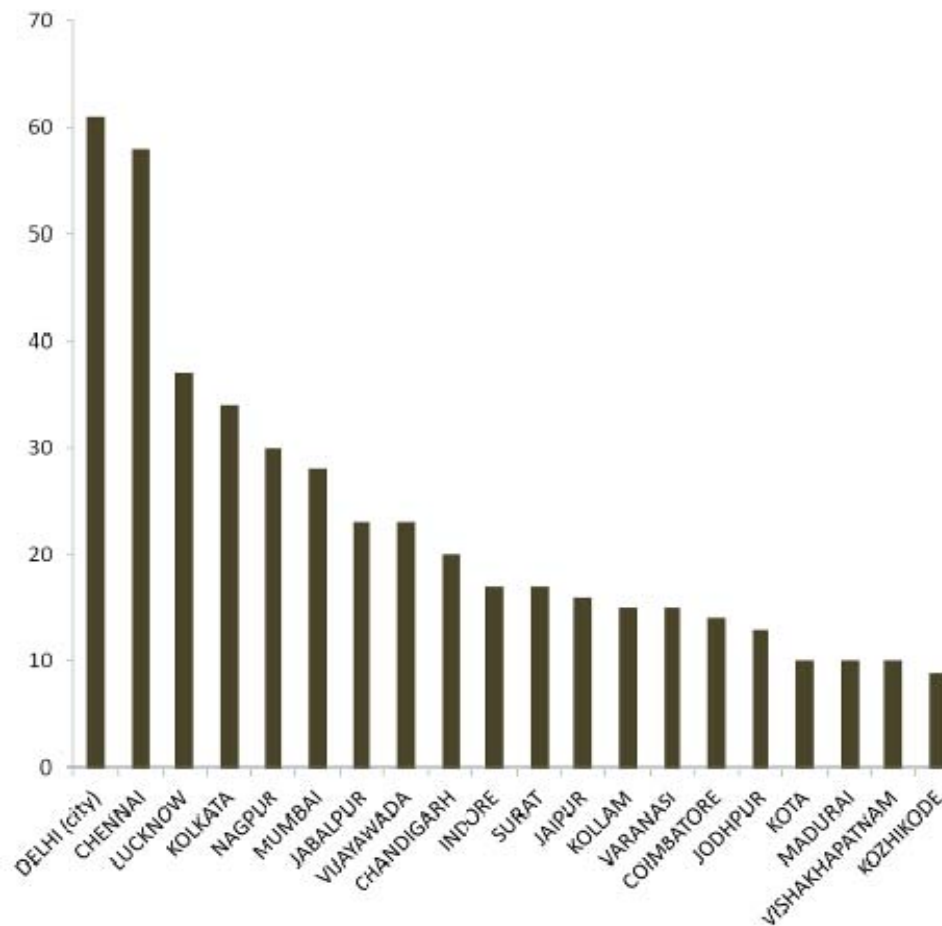
Walkers and cyclists are the largest number of victims ranging from 40-50 in big cities



Pedestrians road accidental deaths 2012



Cyclists road accidental deaths 2012





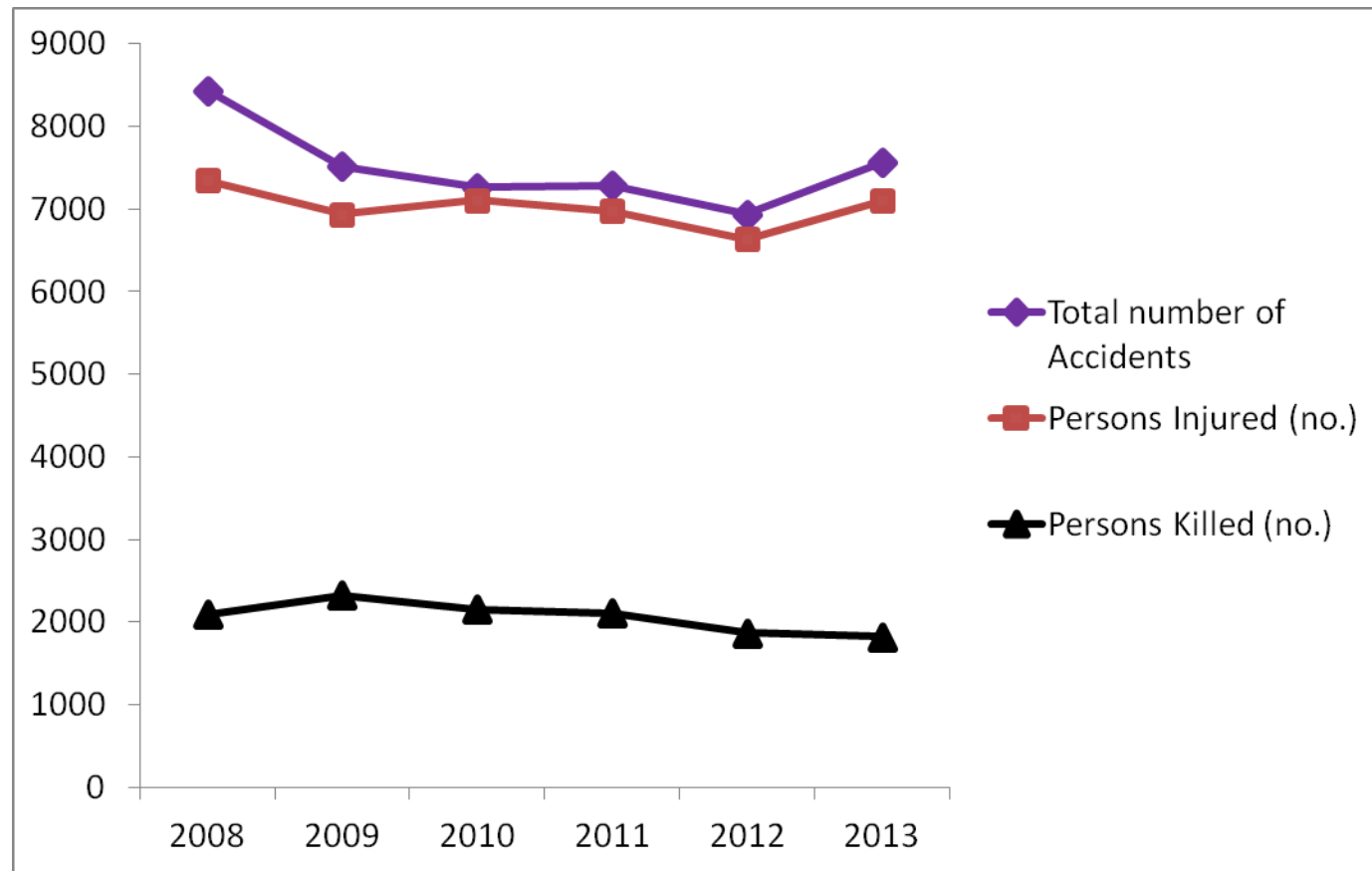
Delhi: The death trap.....



Dubious trend in Delhi



Delhi records 21 road accidents and 5 deaths on-an-average every day





Scary evidences from hospitals: AIIMS Trauma Centre



- At AIIMS, almost 60,000 casualties are reported at the Trauma centre every year. But the trauma centre has facilities to accommodate 15,000 only
- There is a 10% yearly increase in accident cases reporting at trauma centre emergency departments
- Approximately 5,000 casualties are severe casualties that require major operations.
- Of the total cases reported for injuries -- head injuries are 40% of the cases; orthopedic and torso injuries – 30% respectively.
- In case of brain injuries there are only 40% chances of recovery. The other cases, which are not that severe, require maximum resource but outcome is always poor.
- Most of the pedestrians belong to lower socio economic strata



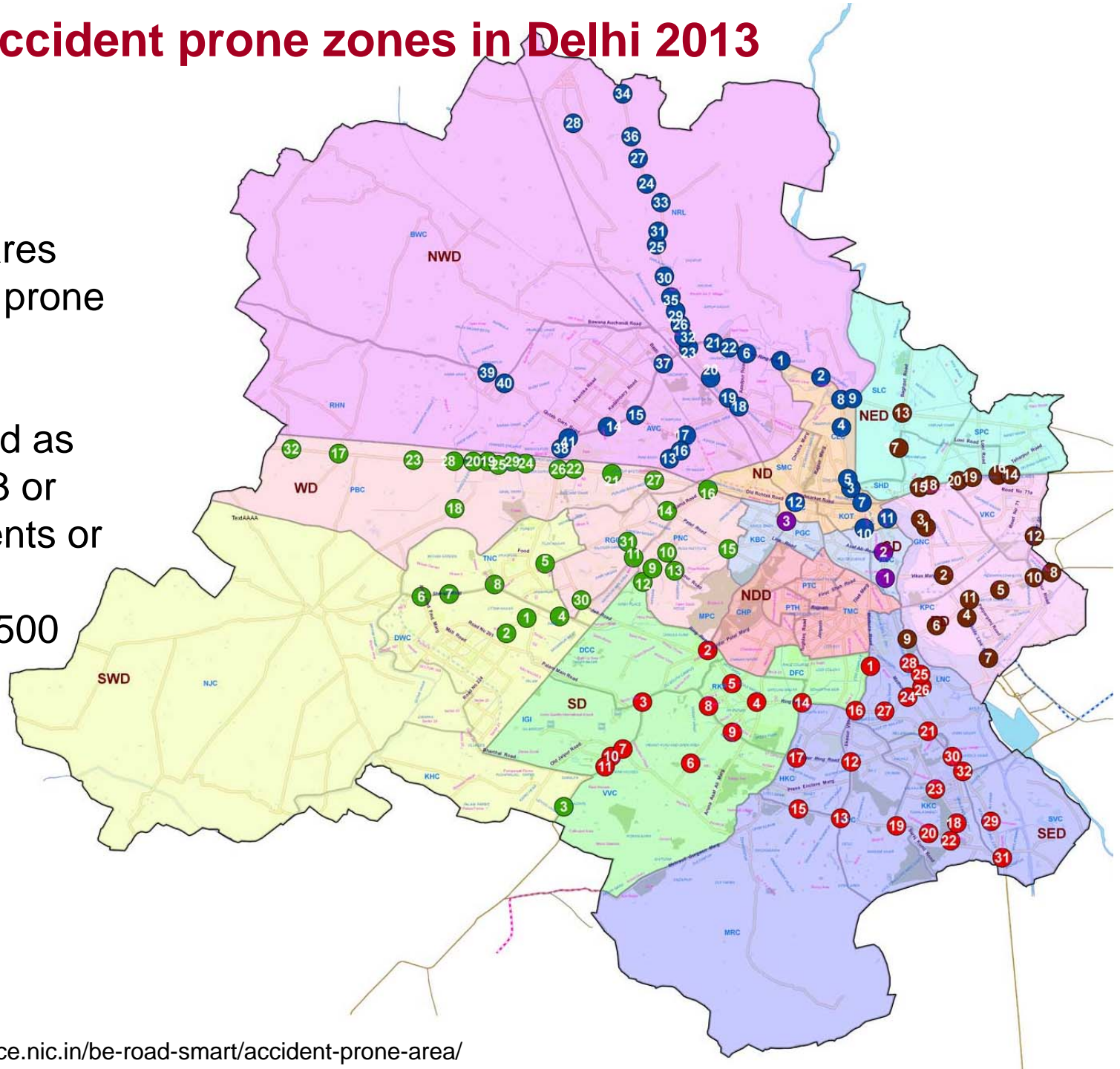
CSE rapid survey of 128 accident hotspots in Delhi.....



Accident prone zones in Delhi 2013

Traffic police shares data on accident prone zones

These are defined as areas recording 3 or more fatal accidents or 10 or more total accidents within 500 meters diameter

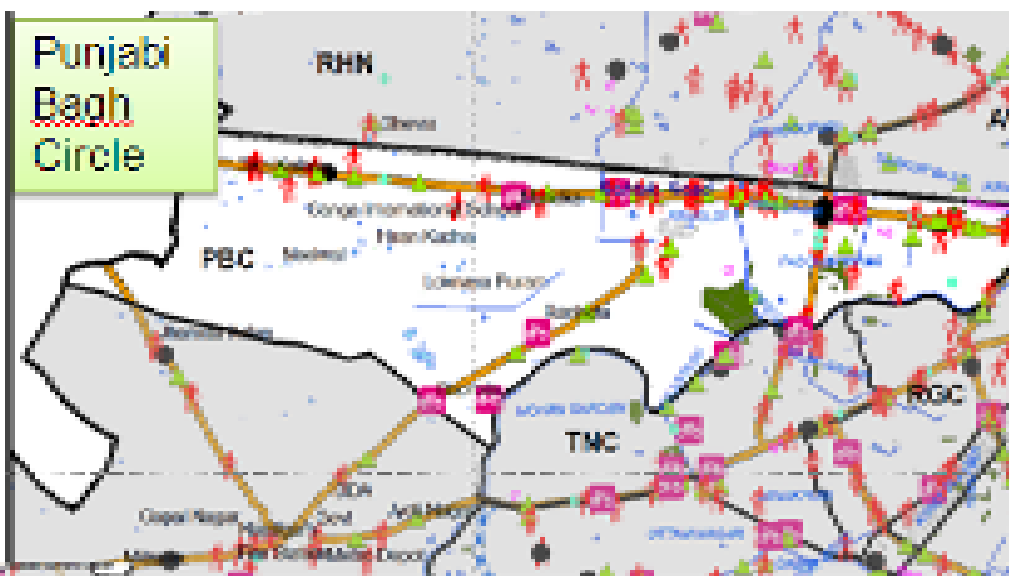




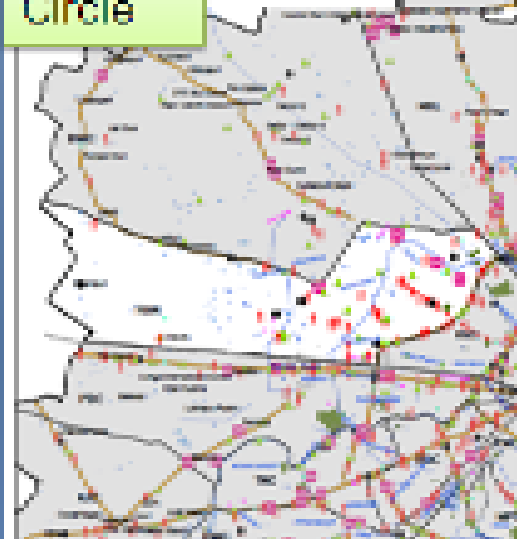
Delhi Traffic Police initiatives: GIS mapping of victims



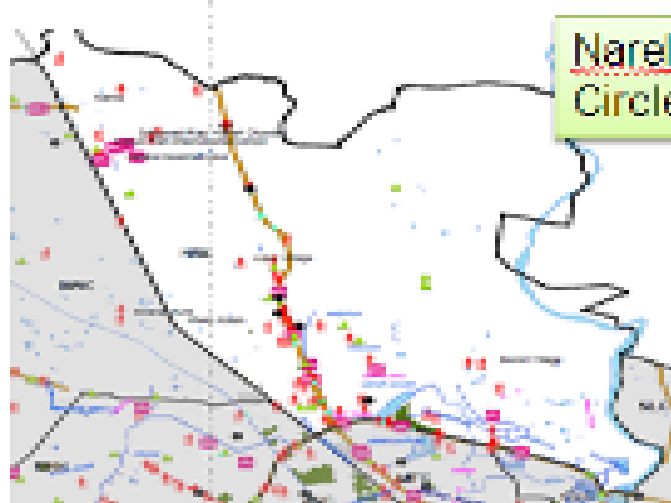
Mapping showed which roads are having more accidents and deaths



Rohini Circle



Narela Circle

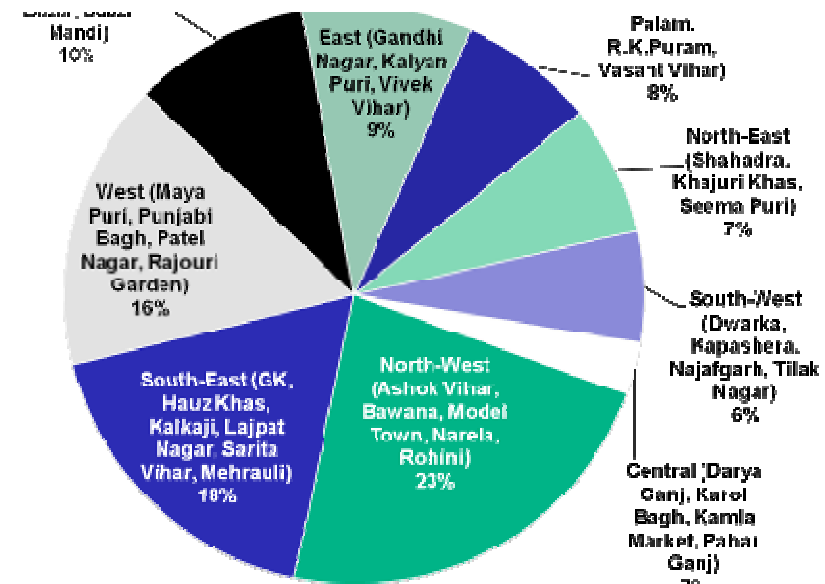


Source:
Problems in
improving road
safety ,
Satyendra Garg,
Joint CP Traffic,
Delhi , 6th
December 2012

Distribution of accident hotspots

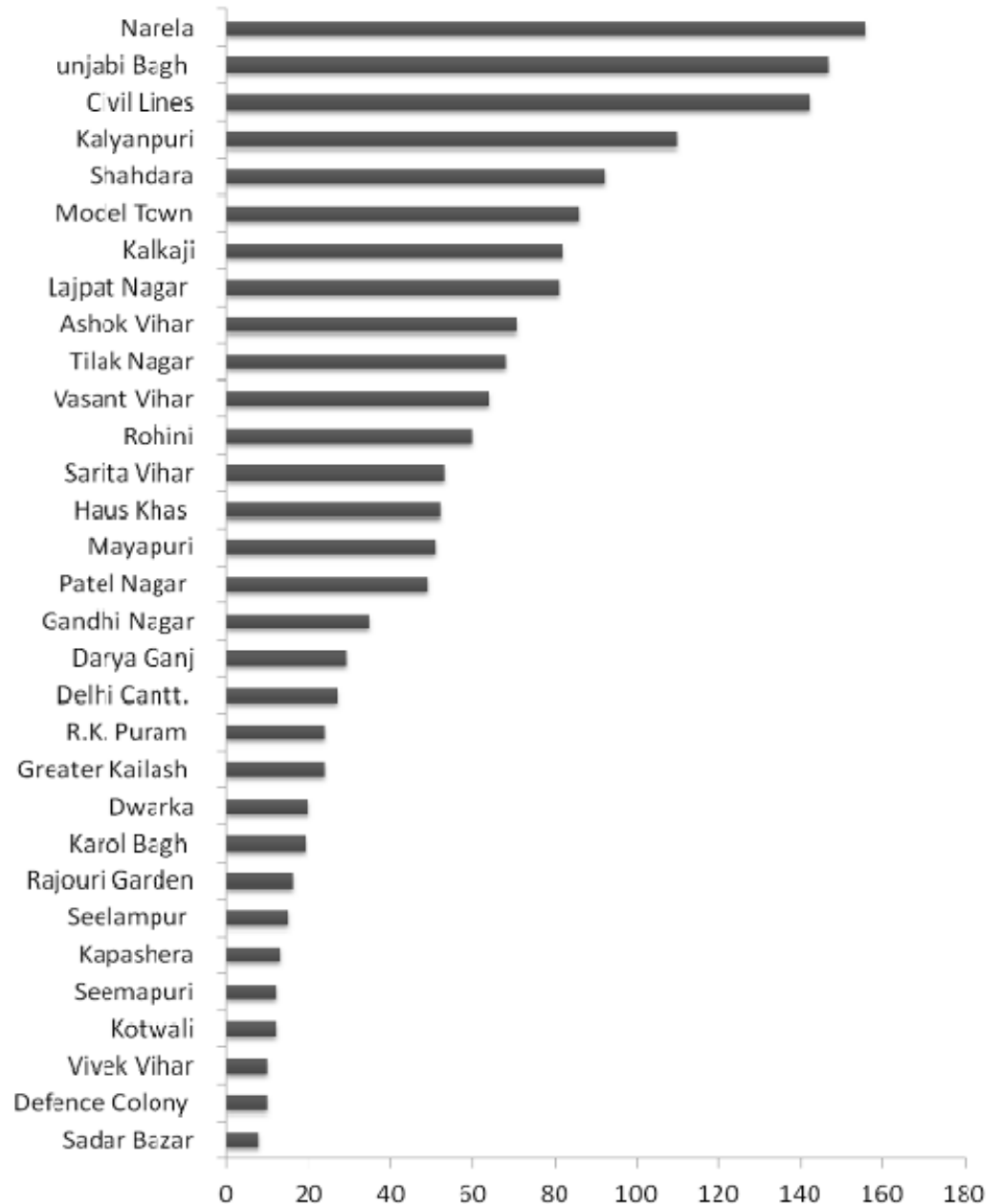
Maximum in north-west district followed by south west district and west district

Key black spots in -- Narela, Punjabi Bagh, Civil Lines, Kalyanpuri , Shahdara , Model Town, Kalkaji, Lajpat Nagar, Ashok Vihar, Tilak Nagar– These areas together record 60% of total accidents.....

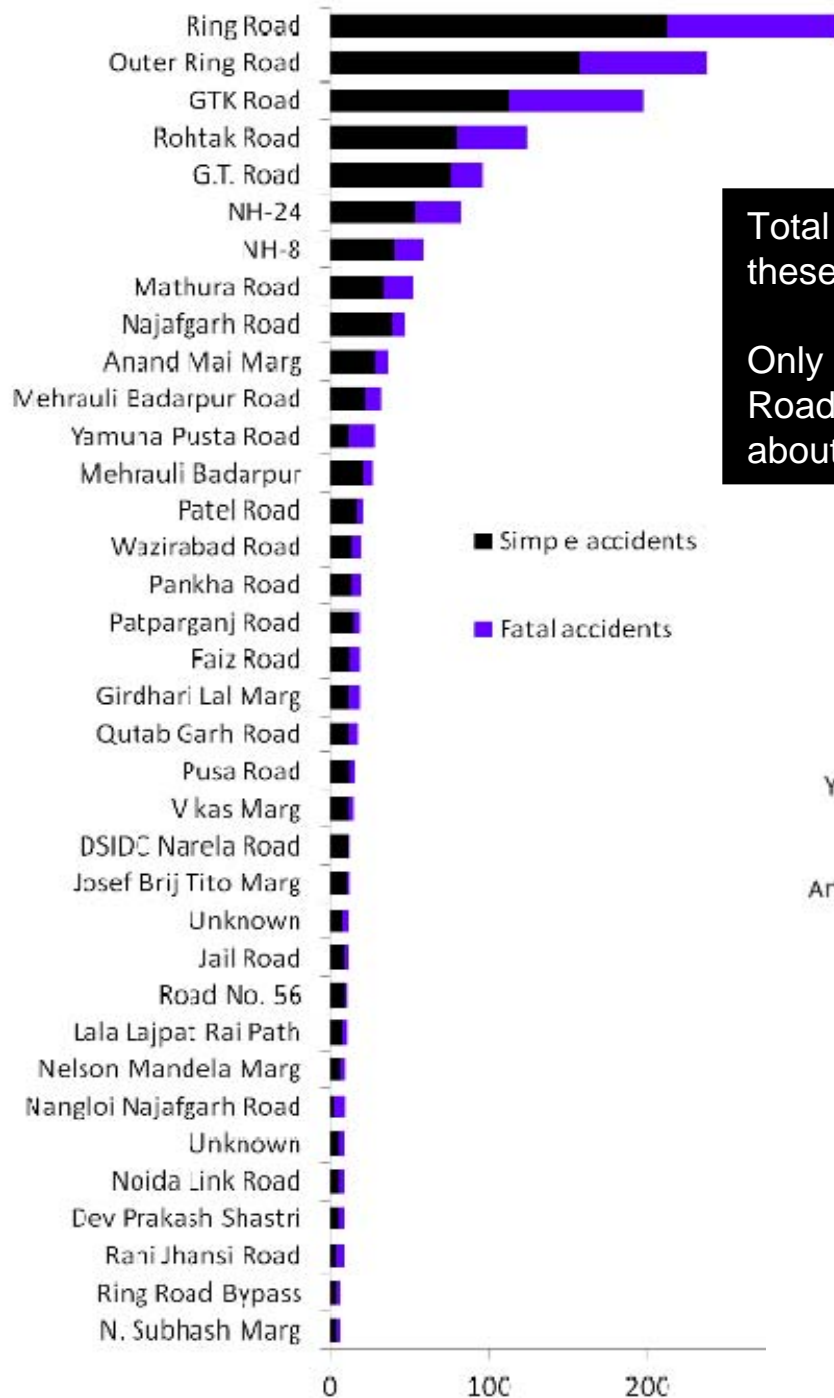


Source: Traffic Police

Number of total accidents in different traffic management circles

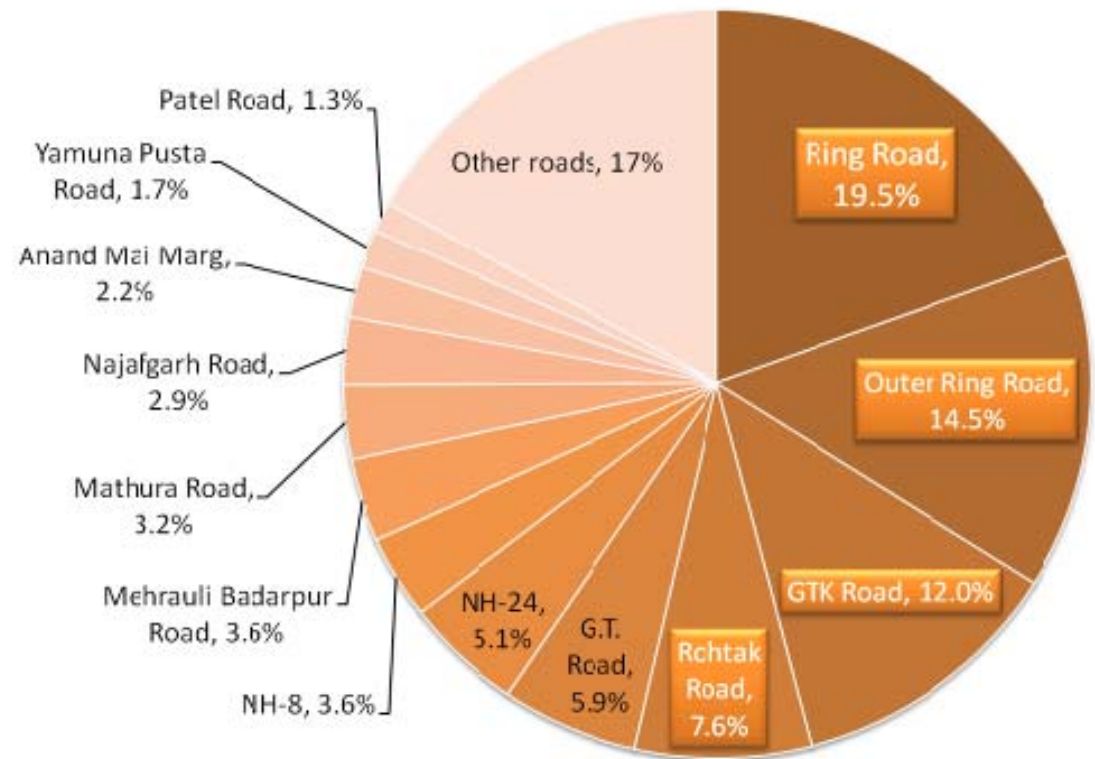


The deadly roads



Total 1638 accidents recorded in accident prone roads, 33% of these were fatal accidents

Only 5 roads -- Ring Road, Outer Ring Road, GTK Road, Rohtak Road, G.T. Road, NH-24, NH-8 and Mathura Road account for about three-fourth of total accidents and fatal accidents





2014 in key places



In 2014 till May, it has already been reported that 325 people have lost lives in accidents during night time and 332 in day time. Violation of rules is rampant. There are 329,000 cases of signal jumps, over 14,000 cases of drunken driving and 45,158 vehicles have been challaned for overspeeding.

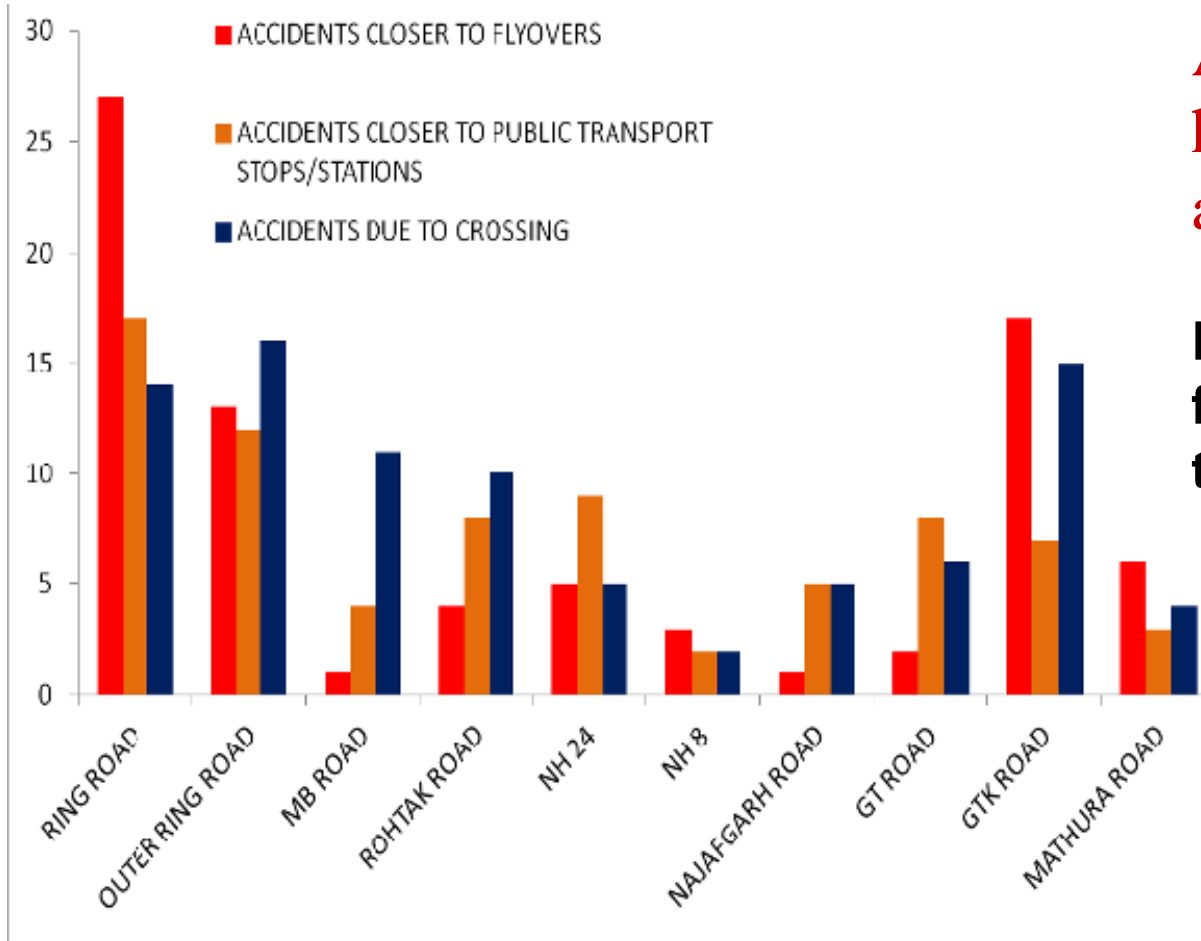




What is the problem?



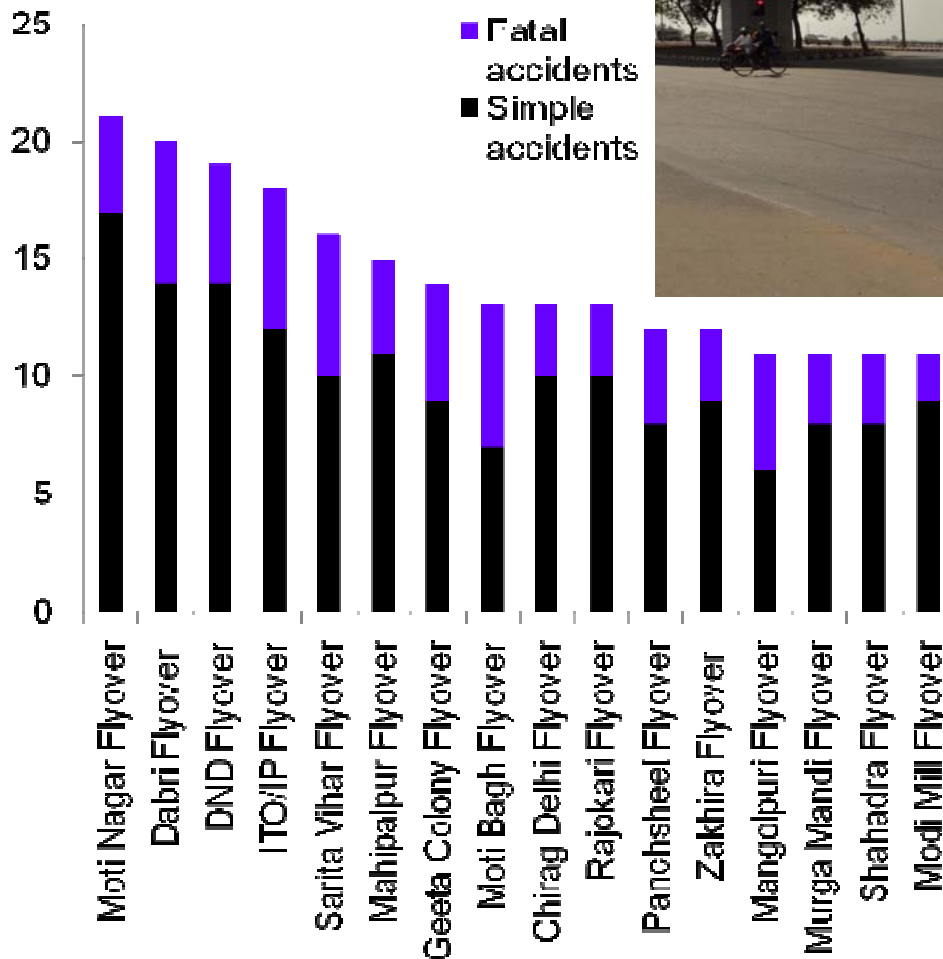
Where are most accidents happening?



Almost all accidents hotspots are on the arterial roads,

Flyovers, poor crossing facilities and public transport access zones

Flyovers: High risk zones



16 flyovers are listed as accident prone, they accounted for a total of 14% of the total accidents,

Dabri flyover, ITO/IP flyover, Sarita Vihar flyover and Moti Bagh flyover are among the worst in terms of fatal accidents.



Flyovers increase speed of vehicles and accident risk

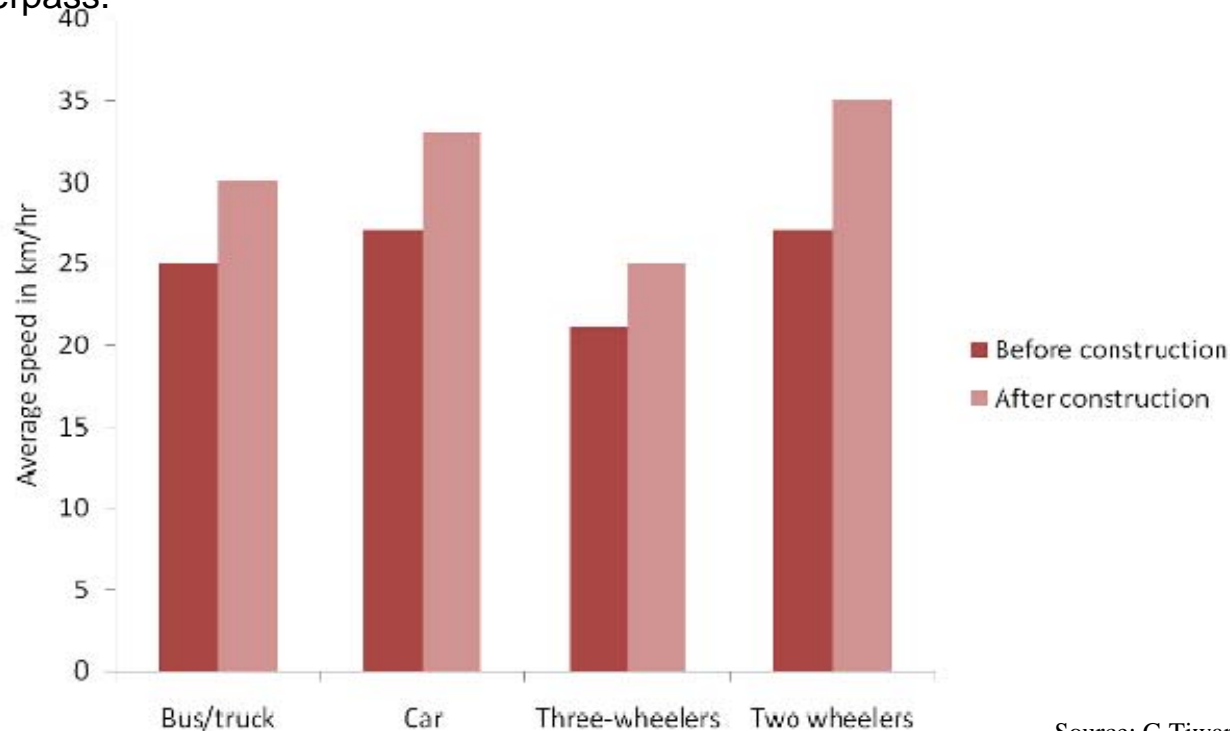


- **IIT study of AIIMS flyover**

- After the construction of flyovers speed of vehicles increased to 21.5%, 22.6%, 15%, 31.6% for the heavy vehicles, car, three wheelers, two wheelers respectively.

- Increased speed shortened the time gap at every stage of crossing. The probability of pedestrian fatality with a specific vehicle group increased 67%, 100%, 100%, and 200% respectively.

- Nearly, 22 per cent of pedestrians continued to accept high risk crossing at grade despite the presence of pedestrian underpass.

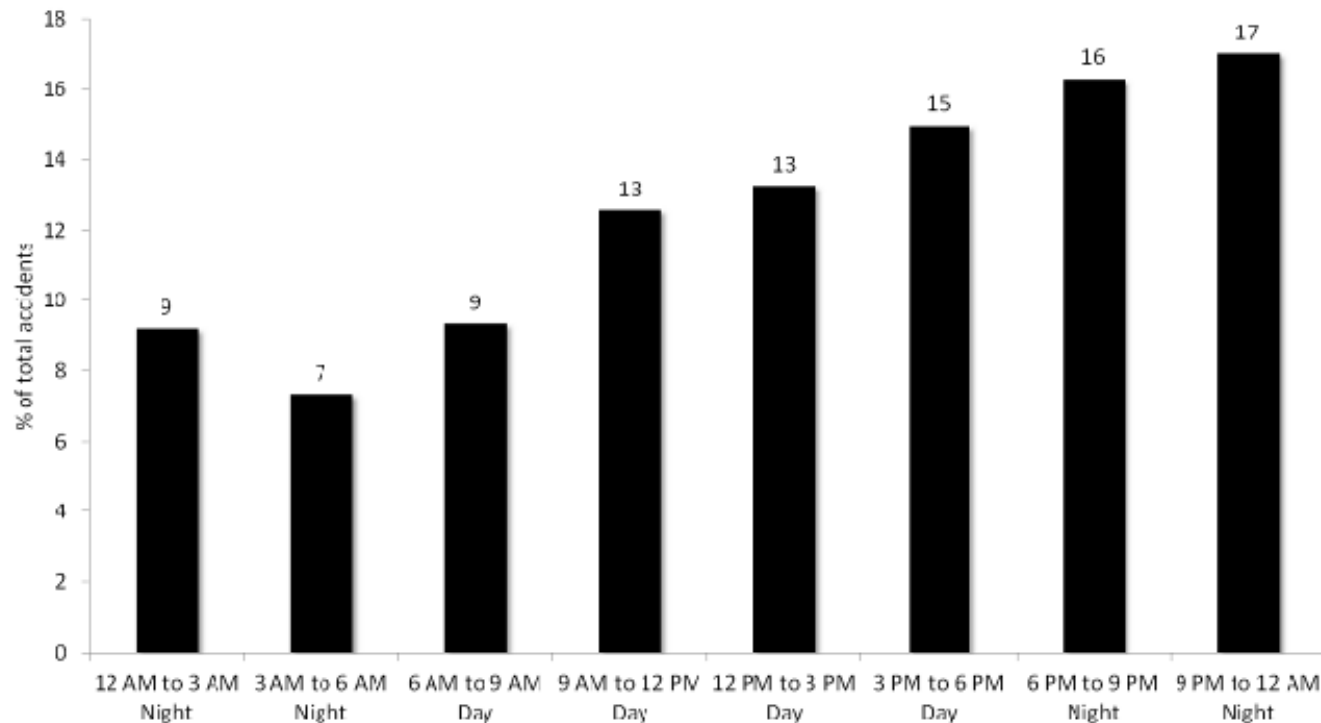




Delhi time of occurrence of accidents 2012



- 50% of accidents in Night, 50% of accidents during day
- Early morning time 3 AM to 6 AM has lowest accidents 7% of total
- 6 PM to 12 AM Night 33% of accidents happen



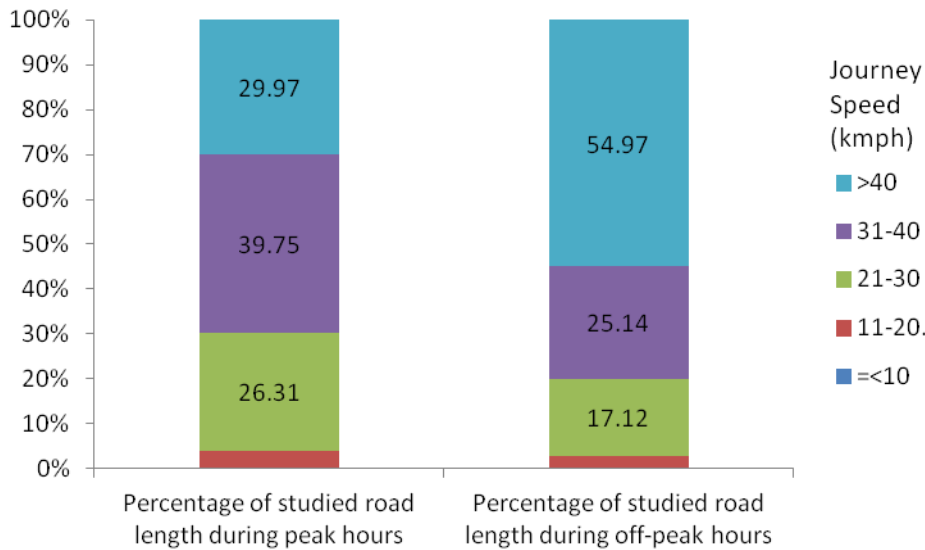
Source: National Crimes Records Bureau
<http://ncrb.gov.in/CD-ADSI-2012/table-1.13.pdf>



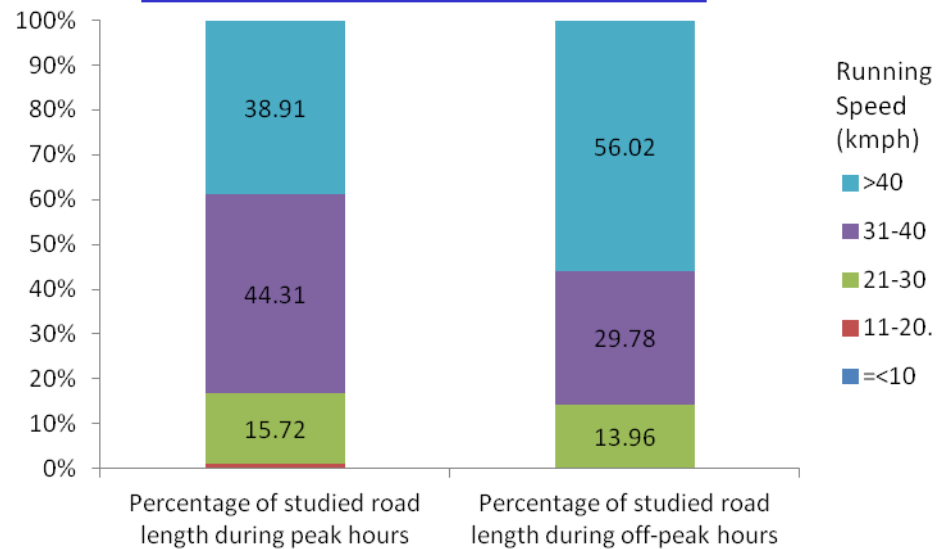
Example from Chandigarh: The city designed for speed, compromise safety



Distribution of Peak/Off-Peak Hour Journey Speed



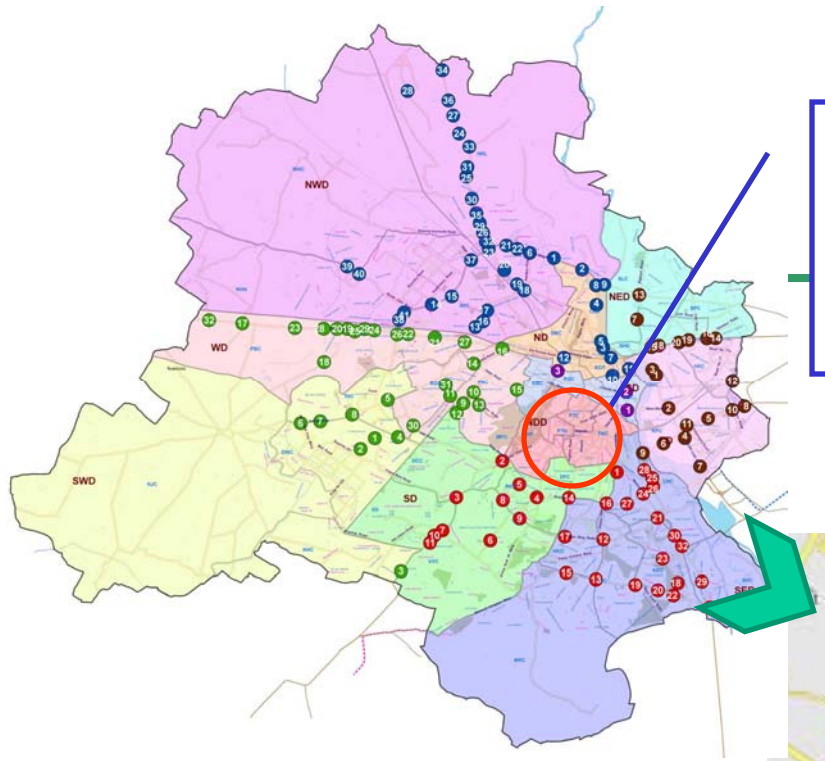
Distribution of Peak/Off-Peak Hour Running Speed



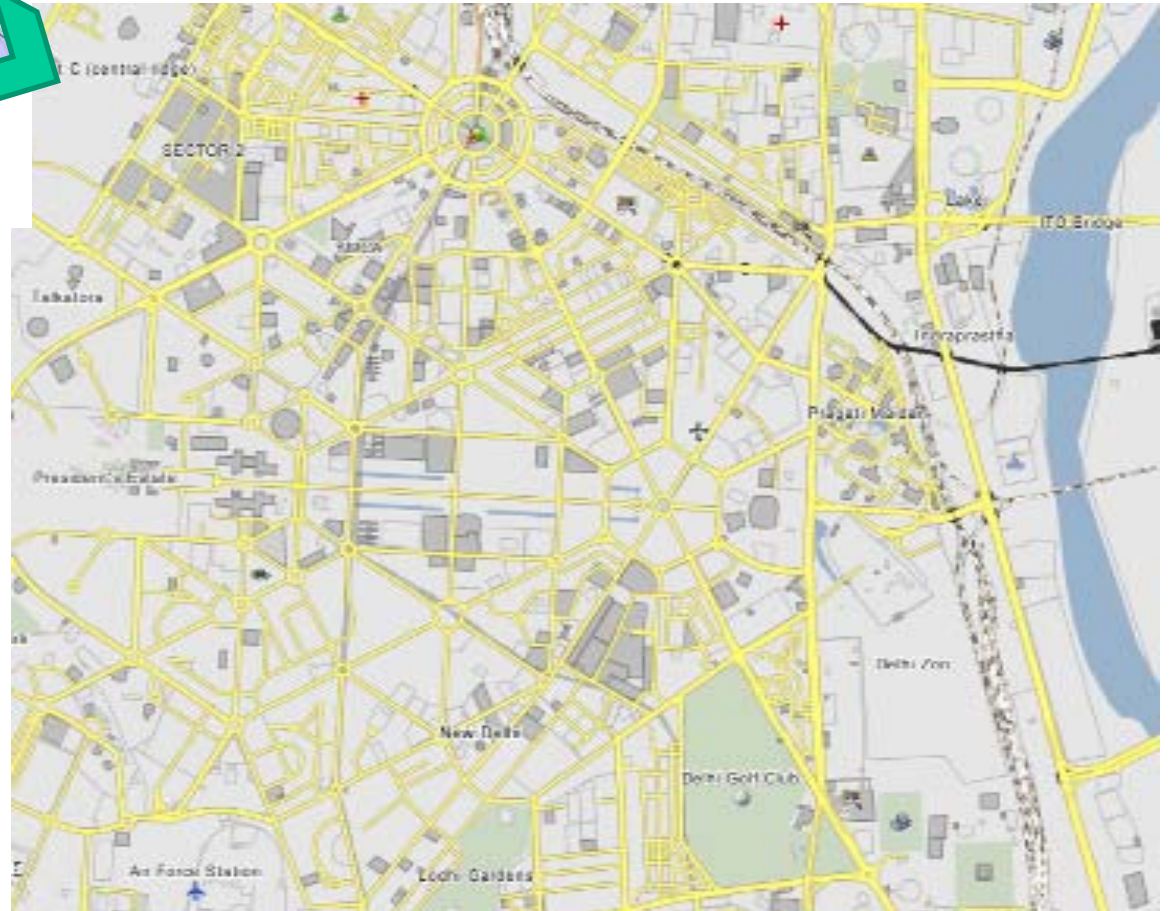
Near PGI and Punjab university speed limit was 65M/hour. This has been reduced now



Lutyen's Delhi has no accident prone zone, do we see a pattern here in road network



Its road design, four lanes, easy crossing, walk space, roundabouts that have traffic calming effect have an impact





Roundabouts need improvement

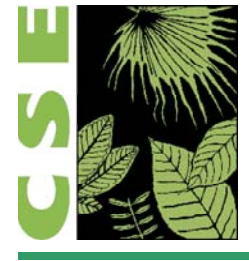


Rotaries at the intersection need design improvement to make it safer and calmer: These will require design improvement and traffic calming measures safety of all road users. Becoming accident prone.

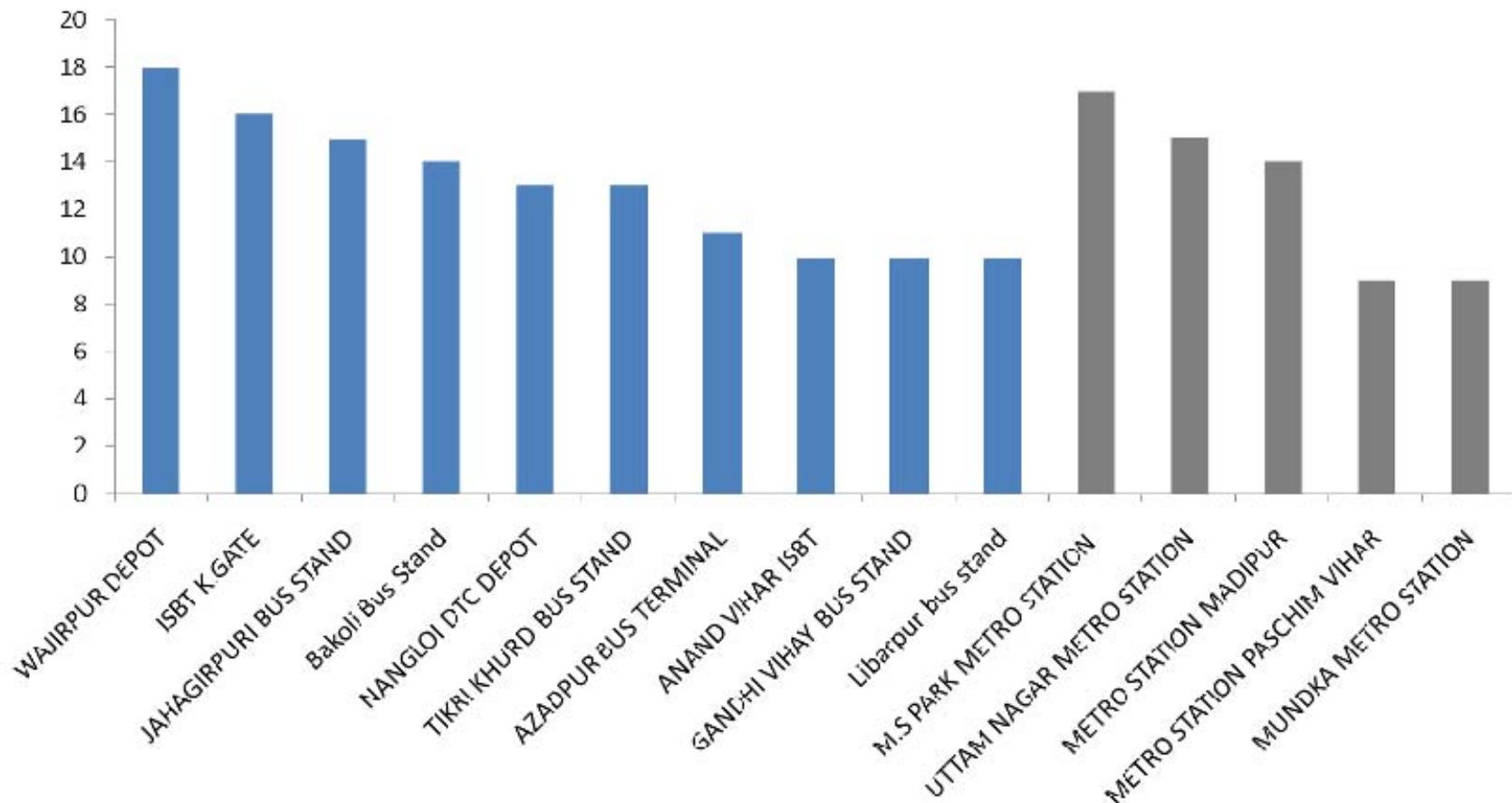
Example London: Global innovations.....



Access to bus and metro stations unsafe: accident hotspots near metro and bus stations..... 10 Bus Stops are listed as accident spots, account for 8% of the total accidents; 5 Metro stations are listed as accident spots, account for 4% of the total accidents.



Accidents near public transport nodes



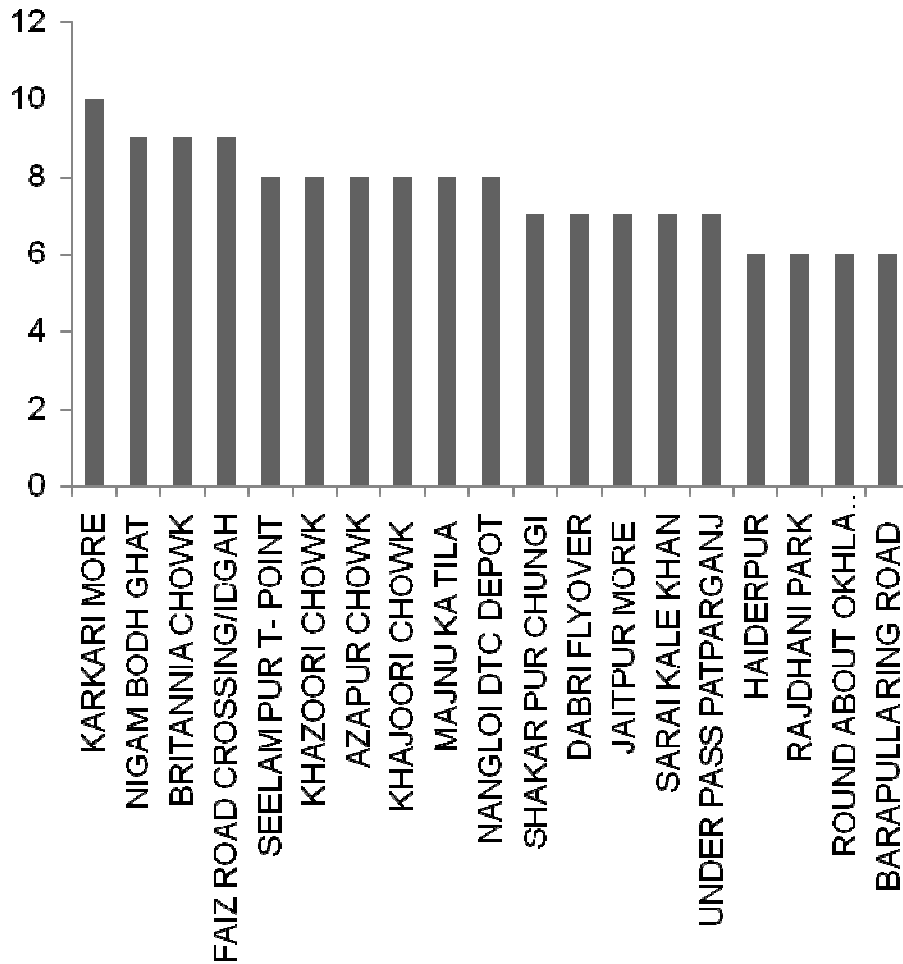


Areas with high footfall and cyclists are accident prone zones. Signal free roads further enhance risk

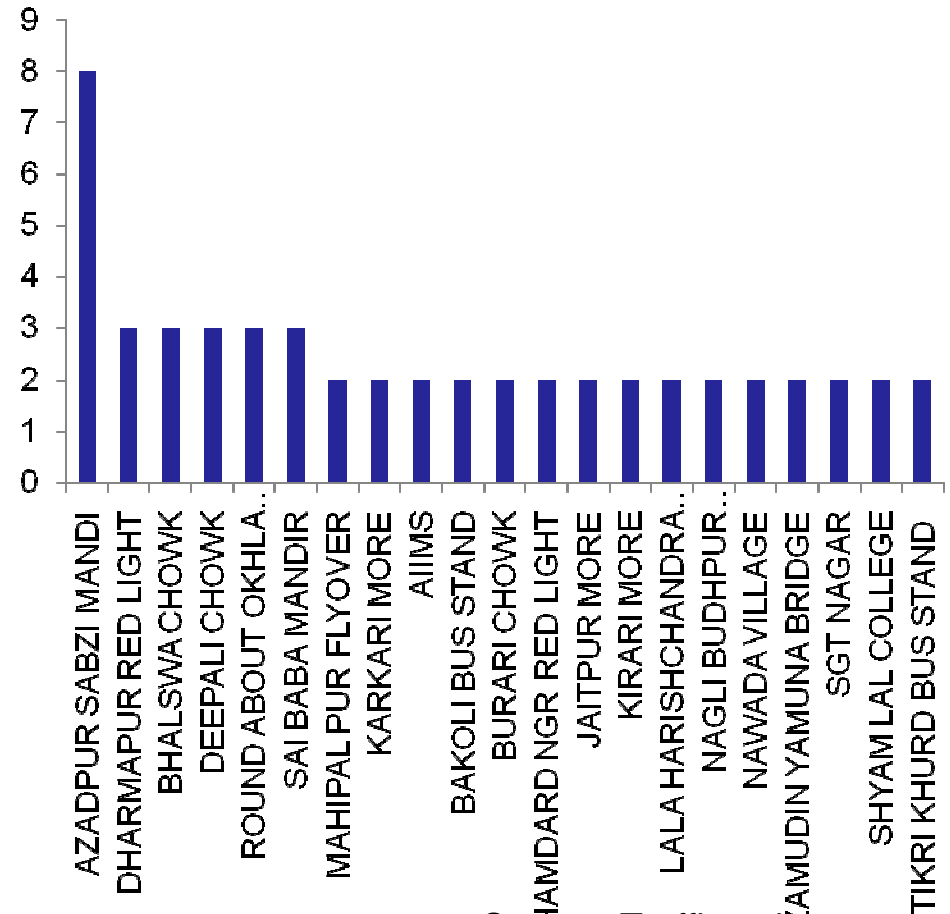


318 pedestrian accidents reported in 56 Accident prone spots and 53 cyclist accidents reported in 31 spots

Key pedestrian accident spots in 2013



Cyclist accident spots in 2013



Source: Traffic police



Photo documentation by traffic police, Delhi



Foot of flyover



Run for life



At the mercy



Beware



Source: Satvendra Garg,
Joint CP Traffic, Delhi
Walkability and pedestrian
initiatives



Photo documentation by traffic police, Delhi



Source: Satyendra Garg, Joint CP/Traffic, Delhi, Walkability and pedestrian initiatives



Poor state of crossing



Roads with no proper crossing: 26 junctions are listed as accident hotspots. 23% of total accidents are related to improper junction and safe crossing. 23% of the accidents happened on the junctions only. Some key locations -- Burari Chowk, Ashram Chowk, Seelampur T point.

30%



Dark alleys



- Walkways: blacked out

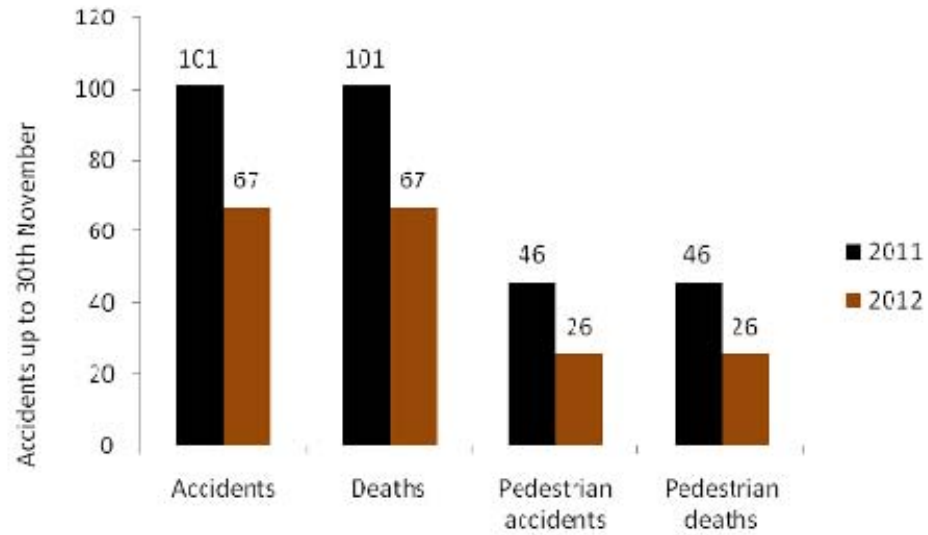




First steps to reduce accident risk.....



GT Karnal Road NH-1 Intervention of Delhi traffic police

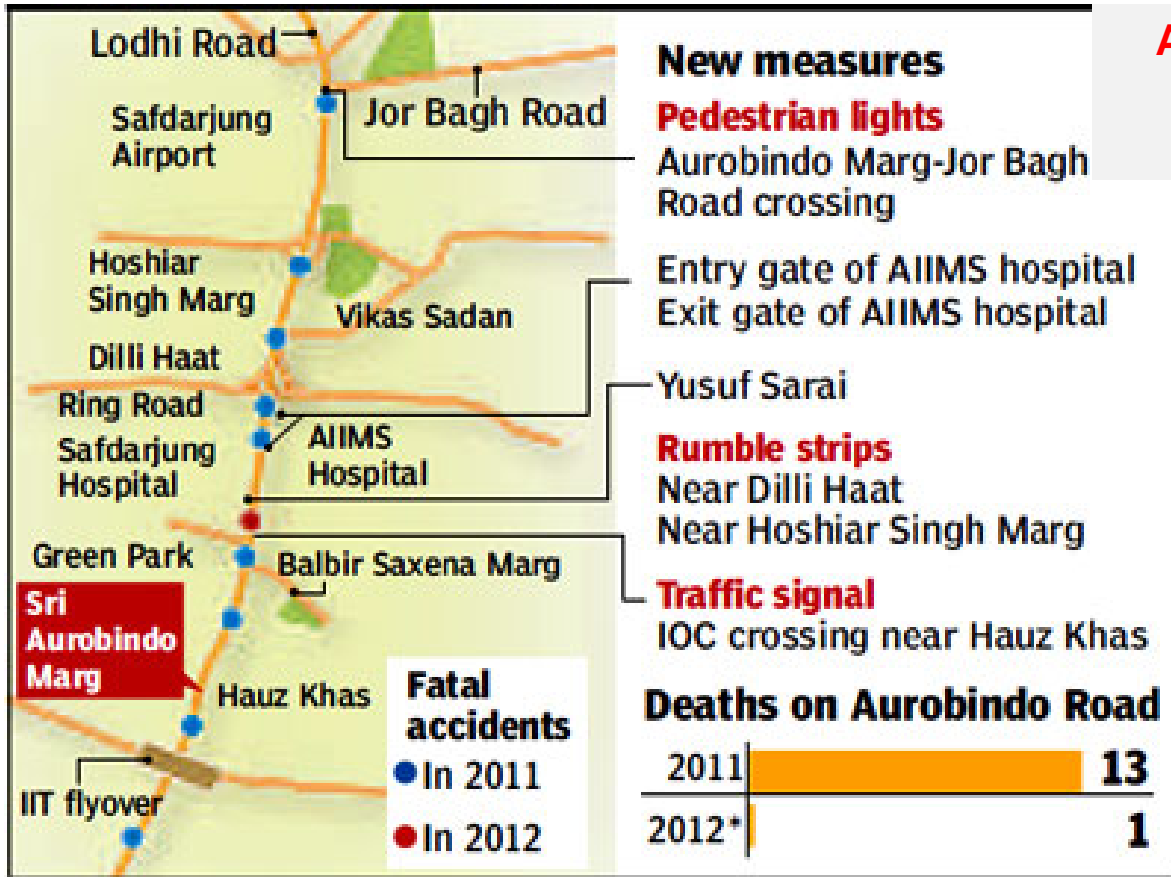


SPEED CAMS AT SHAROOF HADAR

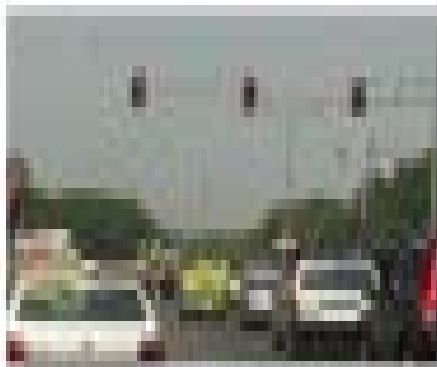


PEOPLE CAN CROSS ROAD SAFELY

Aurbindo Marg retrofit: saves lives



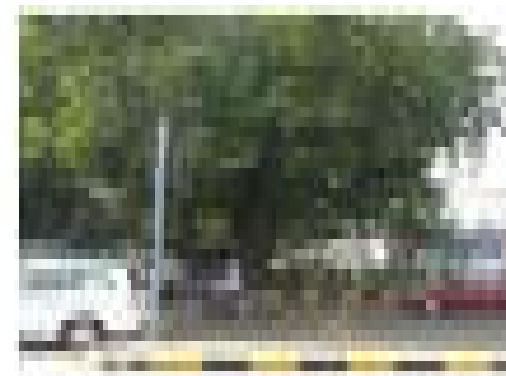
*Till August 15



Traffic signal at Jor Bagh



Rumble strips at Dilli Haat



Pedestrian lights at Jor Bagh



Focus on safety surveillance.....



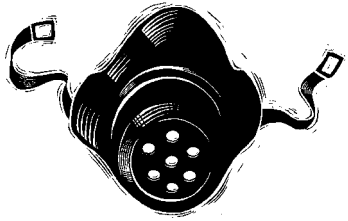
- CCTV cameras installed but used for crime surveillance not road safety enforcement.

- Plans to install more CCTV cameras along with central control room and a data centre. 3 corridors selected that have wide roads with high vehicles speed

- Intelligent Traffic Management System (ITMS) -- traffic police plans to cover 220 km of urban roads with approx. 240 signalled intersections. Includes a multi-layered system for upgrading traffic lights, automatic number plate recognition system, automatic issuing of traffic fines.

- The speed cameras would also be used to detect accidents.





Road engineering to remove people from surface for safety will hurt sustainable mobility



This location indicates a sharp decline in pedestrian accidents 20 to 5. Mandatory FOB effect? **Anand Vihar** indicates a sharp decline in pedestrian accidents 20 to 5. Mandatory FOB effect? Traffic police studies have shown that foot over bridges do not work.

Barricading and FOB



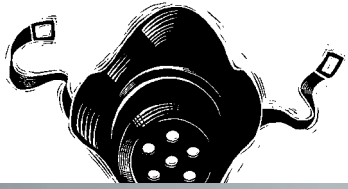


Focus not only on injury reduction per se but also on reducing road danger.....



With seamless traffic and FOBs pedestrians disappear from the roads. Cities become unsafe





Devil in detail



**Delhi:
Even when new
infrastructure
is created
according to
guidelines any
design flaw can
make the
facility
unusable**



Encroached pavements: Parking is a serious problem



Alaknanda



Inventive design, Source: I Trans, Anvita Arora





Hawking can be built into the design



Best practice from Bhubaneswar



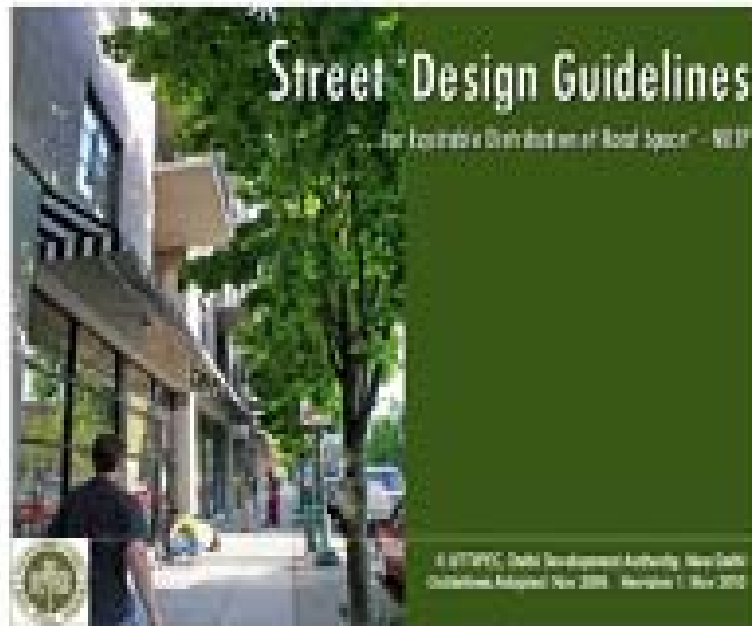
Raj path road, Bhubaneswar



Delhi has adopted street design guidelines



UTTIPEC guidelines



Acknowledgements

The preparation of Street/Urban Design Guidelines was initiated after a detailed presentation on "Street/Urban Design Guidelines for Delhi" was made by Dr. Consultant, UTTIPEC in the Governing Body meeting on 24-12-2009. The presentation was appreciated and final design agencies were requested to adopt some of the best practices on proposed basis. All following these set of guidelines were put together based on best practices available around the world and customized to ground conditions and challenges in India, particularly in Delhi. In this, the UTTIPEC Core Team was helped immensely by the advice, time and material provided by several experienced/supervised experts in the field, mentioned below:

- Architects, Planners, Architects, Planners, Architects Design Associates
- Gargi, S., Arora, A., Varma, R., Singh, Y., Sharma, S., Jaiswal, P., Institute for Cycling Expertise (ICE), Manual for Cycling Inclusive Urban Infrastructure Design in the Indian Subcontinent, 2009
- Aggarwal, Anjan, Executive Director, Transportation, Guidelines for Inclusive Pedestrian Facilities, Report for IRC, 2009
- Transport Research and Injury Prevention Programme (TRIPP), DTU Delhi, BRT Design Specifications, 2009
- Christian, Amanda P., Associate Director, Centre for Science and Environment, Pollution: Obstacle Course in Indian Cities, Right to Clean for Campaign, 2009
- Integrated Urban Design Design, Inc.
- IWACO, Delhi Chapter

In June 2010, a review of Pedestrian Design Guidelines was initiated after 3 months of its publication to include some more chapters related with Storm Water Management, Road Segments, Top Roads, Bus Corridor and updates on Signage and Left Lane rules, rules of Lending movement of left lane, etc. and/or overall review evaluation to incorporate various suggestions received from experts & implementing agencies.

Dr. S.S. Datta, Chairman-UTTIPEC and Mr. Ashish Kumar, Commissioner (P&UDA), Co-Chairman of P&UD have given their complete support with timely advice for revision and completion of the guideline document within a particular time frame. Dr. S.K. Jaiswal, AC (TC&R), DDA has provided necessary guidelines which has helped complete the process of preparing the final document.

Several external consultants have also voluntarily helped in the preparation of drawings and sketches incorporated in the guidelines including Mr. Parul Chawla, an international and Mr. Anand Kumar, Ashish Ambekar & Urban Design. The document was prepared and finalized by the UTTIPEC Core Team under Mr. Pramod Kojur, Dr. Consultant with the assistance of in-house consultants and interns from SDC with a special mention to Mr. Sanjay Sainani, during the period from 1st May to 1st July.

All the other sub-group members and special invitees who have attended various meetings of Working Group-4 and the sub-group, have provided necessary inputs for formulating and finalizing the Street Design Guidelines. List of references is placed at Annexure-I. List of Working Group members, sub-group members, UTTIPEC Core-Consultants team, and other participatory/invited invitees is placed at Annexure-II.

Dr. Ashish Ambekar,
Director (P&UD), UTTIPEC



Best practice



Focus not only on injury reduction per se but on reducing road danger.



Globally countries are moving towards zero tolerance policy on accidents and transforming urban and road design for safety.

Sweden: Vision Zero road safety policy. Sweden prioritise safety over speed. Policy include low urban speed-limits, pedestrian zones and barriers to separate cars from bikes. Proposing speed limit of 30 km/hour.

Built 1,500 km of "2+1" roads where each lane of traffic takes turns to use a middle lane for overtaking have saved 145 lives.

Built 12,600 safer crossings, including pedestrian bridges and zebra-stripes flanked by flashing lights and protected with speed-bumps along with strict policing have halved the number of pedestrian deaths over the past five years.

Swedish police guidelines include safety audit guidelines. Integrated gGuidelines for traffic safety, crime prevention, under Traffic for an attractive city (TRAST)

Netherlands: Sustainable Safety vision has led to implementation of effective road safety measures. Infrastructure measures have reduced number of fatalities by 30 per cent nationwide.

Europe: Slowing traffic down, separation of vulnerable people from motorised traffic, initiating awareness campaigns, and more pedestrian crossings and fines for violation of pedestrian spaces.

In EU, fines are prescribed by law, either as part of a Road Traffic Act, or subject of a special legislative provision.

In some countries, limits are provided to allow police officers to decide the actual amount of the fine according to the specificity of the traffic situation.

In Finland, Sweden, Norway and Switzerland the amount of the fine is a function of the net income of the offender.



High degree of stringency



United Kingdom: Careless driving can be fined up to £100 and points are added on to their licence. Another proposal from department of transport -- restricts motorists to a speed of 15 mph and a fine of 100 pounds and three penalty points for overtaking cyclists. This is for few cities where cycle flows are high.

Germany: A computerised point system for traffic violations. One can incur up to three points if offence endangers traffic safety. Once there are eight demerit points, the license is immediately revoked. To get it back, one need to take a physical and mental status examination and pass it successfully.

Paris: City Mayor has announced a maximum speed limit of 30 km/hr on all streets of the city.

California: A new traffic law that will be implemented from September 2014 aims to reduce high rates of bicycle accidents, injuries, and fatalities across the state. Motorists will be required to keep at least a three-foot distance away from bicycle riders as they pass them of the road.

Oman: As part of the various measures to curb road accidents, the Royal Oman Police introduced scores of speed cameras — both stationery and hidden to monitor roads. Stricter punitive measures against those who jump signals were introduced and all these contributed in reduction in number of road fatalities.



**Safety audit of most dangerous roads for
pedestrians.....**



Lesson from Delhi



VIKAS MARG



TUGHLAKABAD FORT



Plethora of regulations that have implications on road safety
Fragmented, do not address safety of vulnerable road users. Most policies are oriented towards safety of motorists



The Motor Vehicles Act 1988 have provisions for motorists to prevent causing accidents (speed limits, dangerous driving, use of protective gears) and this is meant to provide protection other road users including pedestrians. MV Act empowers State Government to make rules that **prohibit the use of footpaths or pavements by motor vehicles**. This also cautions against danger, injury to the public, among others, however this is rarely enforced. **The provisions are not a strong deterrent.**

Central Motor Vehicles Rules 1989: “**show courtesy and consideration for the safety and convenience of other road users**, such as pedestrians, drivers of other motor vehicles or cyclists.”

India Penal Code, 1860: The sections of the IPC such as 279, 304A, 336, 337, 338 deal with road accidents cases due to rash and negligent driving. These impose penalties or imprisonment for causing death by negligence, endangering life or personal safety of others, causing hurt and grievous hurt by act endangering life or personal safety of others. **Most of the offences are bailable.**

The Rules of the Road Regulations, 1989: The provisions include: right of way for pedestrians at uncontrolled pedestrian crossings; Motorist can not drive on footpath or track; While approaching a road junction or pedestrian crossing a motorist must slow down; It prevents parking on pedestrian pathways; Motorist have to strictly stop at the stop line at Junctions/ or pedestrian crossings.



Policies specifically for road user safety



National Road Safety Policy, 2010: The key strategies listed in the Policy include ~~raise awareness about road safety issues, establish a road safety information database, ensure safe~~ **road infrastructure, safe vehicles, safe drivers, safety of vulnerable road users, road traffic safety education and training, enforcement of safety laws, emergency medical services for road accidents, among others.**

For its implementation, the government is to set up a National Road Safety Board and a National Road Safety Fund to finance road activities.

National Road Safety and Traffic Management Board Bill 2010, which is pending in Parliament, envisages creation of National Road Safety Traffic Management Board to oversee road safety and traffic management in India.

The two guidelines, Street Design and Indian Roads Congress deal explicitly with road design and pedestrian facilities. However these are **voluntary**.



CSE Recommendations



Limitations of existing policies and acts

- Existing policies are fragmented and most are oriented towards motorists. Very few policies address pedestrian and cyclists safety.
 - Safety of disabled friendly road users is not ensured.
 - Weak enforcement hampers policy implementation, fines and penalties are minimal
 - Most of the IPC provisions for causing deaths due to road accidents are bailable
 - Guidelines for pedestrian facilities and street design exist but these are voluntary.
- Need for comprehensive road safety act** addressing safety of all road users including vulnerable road users such as pedestrians, cyclists and two-wheeler riders.
- Road design interventions to reduce road accidents should be an integral part of the policy.
 - Speed limits must be lowered to 30 km / hr within the city limits. Traffic calming must on highways/arterials within city
 - Road safety audit pre and post construction should be made mandatory and periodic
 - Fines and penalties for traffic violations should be increased to act as a deterrent
 - Amendment in laws for strict punishment for rash and negligent driving and strict monitoring and enforcement
 - A target should be set to achieve reduction in road fatalities and finally approaching near zero fatalities. For this an action plan needs to be developed at the city/state level.

While government is presently redrafting the Motor Vehicles (Amendment) Bill to enhance road safety in sync with advanced nations, India needs to revise the existing Penal provisions and penalties immediately. CCTV cameras, cancellation of licenses of repeat offenders, data centralising are being discussed.



Design interventions needed in cities Policy recommendations from CSE's detailed study of 6 corridors



Need for a system design with equitable distribution and designated use of road space and provisions of all components as part of infrastructure facilities to make safe and smooth movement of all modes and people on these corridors.

- a) Optimum use and equitable distribution of road space to provide segregated and safe movement of pedestrians /cyclists all along the corridor with safe crossings facilities.
- b) Provision of all standard signals, signages, markings all along the corridor and intersections as part of effective traffic control measures for regulated movement.
- c) Specific and adequate provision of designated spaces for PT and IPT modes with all amenities and safe boarding/alighting facilities for passengers.
- d) Effective utilisation of misused/unused spaces in the r/w for more organized and vibrant public space to facilitate commuters/all road users with women safety consideration on road as priority.