Enforcement and road safety

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Road Safety Audit Course for BRO officers
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Helmet use by drivers in most Indian cities is low

- Observational surveys across cities in India (late 2021)
- Large variation in helmet use across the cities
- Large variation within the states
- Does not seem related to income levels of state or city size
Pillion riding is highly common but not helmet use

Average occupancy: 1.5
Average helmet use: 12%
Seat-belt use among car drivers remains low in many Indian cities

Average: 61%
Outline

• Need for enforcement for road safety
• Theories that explain working of enforcement methods
• Types of enforcement strategies and their effectiveness
• Effectiveness of penalty
Need for enforcement for road safety

• Traffic laws rarely translate to a high compliance rate without enforcement
• Personal crash risk of an individual is so low that they have no incentive or motivation to comply with traffic laws voluntarily
• [e.g. a motorcycle rider may have spent years without wearing a helmet and not have been involved in a crash, confirming their bias that a helmet is of no use]
• It is only at the population level that low risks of individuals add up to a high incidence rate of injuries
• Enforcement is only successful when it achieves compliance by most road users
Mechanism of enforcement measures

- Road safety measures can be broadly divided into those that work through engineering effect and those that work through behavioural effect.
- They both can result in reduction of crashes and injuries.
- Changes in road design to improve safety is based on engineering effect.
- Enforcement aims to change behaviour of individuals such as speeding, helmet use, etc., which then result in improved safety.
Mechanism of enforcement measures

- For an enforcement measure to work
  - it should result in change of targeted user behaviour (e.g. wearing helmets)
  - change in behaviour should prevent crashes or injuries
- In other words, success of enforcement should not be measured simply by level of compliance
- If respective changes are not observed in injuries, enforcement needs to be evaluated
Deterrence

• The underlying theory which explains the effectiveness of different enforcement measures is called the ‘deterrence theory’
• Deterrence is ‘the omissions or curtailment of a crime from the fear of legal punishment’
• According to this theory the fear of punishment encourages potential offenders to comply with the law
• The enforcement measure works not only by apprehending the offenders, which is often a very small proportion of all road users and in fact a small proportion of all offenders, but also by discouraging ‘potential’ offenders because of the perceived certainty of getting caught
Two types of deterrence

• **Specific deterrence** primarily focusses on punishing apprehended offenders and assumes that they will be deterred from repeating their offence in the future to avoid punishment
  “I should not drink and drive because *I paid a hefty fine* when I was caught last time”

• **General deterrence** focuses on the population in general and assumes that the threat of punishment will deter people from violating the law in the first place
  “I should not drink and drive because there is strict enforcement and *I might be penalised*”
Two types of deterrence

• The greater the perception of risk of punishment, the greater the likelihood that general deterrence will be effective.

• For an enforcement policy to be effective, it needs to ensure both types of deterrence (specific and general) are at work.

• A sanction should not only impact the individual who is being punished but also others who do not directly experience the sanction.

• Highly visible and publicised enforcement helps in general deterrence.

• High intensity of ticketing (or challans) helps in specific deterrence; here unpredictability rather than visibility is the key for effectiveness.
Safe systems approach to road safety

- Enforcement aims for safer speeds and safer road users
- Indirectly results in safer roads
- Increasing the use of helmets and seat belts, reducing speed and drunk driving make road users safe

Motorcycle deaths as a proportion of all road deaths across the regions

- **Worldwide**: 18% motorcycle, 34% driver/passengers of 4 wheeled vehicles, 7% pedestrian, 2% cyclists, 2% motorcyclists, 2% others/unspecified
- **Americas**: 18% motorcycle, 34% driver/passengers of 4 wheeled vehicles, 3% pedestrian, 23% motorcyclists, 2% others/unspecified
- **Europe**: 9% motorcycle, 48% driver/passengers of 4 wheeled vehicles, 27% pedestrian, 11% motorcyclists, 2% others/unspecified
- **Eastern Mediterranean**: 10% motorcycle, 39% driver/passengers of 4 wheeled vehicles, 34% pedestrian, 3% motorcyclists, 2% others/unspecified
- **South-East Asia**: 25% motorcycle, 16% driver/passengers of 4 wheeled vehicles, 14% pedestrian, 43% motorcyclists, 2% others/unspecified
- **Africa**: 40% motorcycle, 40% driver/passengers of 4 wheeled vehicles, 7% pedestrian, 4% motorcyclists, 2% others/unspecified
- **Western Pacific**: 14% motorcycle, 22% driver/passengers of 4 wheeled vehicles, 22% pedestrian, 6% motorcyclists, 36% others/unspecified

Road death victims in six Indian cities (2010-2014)

- Pedestrians are about 40-50% of all road victims
- Motorcyclists are about 30%
- Cyclists are about 10-15%
- Data like these are important for identifying effective enforcement strategies

Focussing on safety of pedestrians and motorcyclists can result in large benefits in Indian cities
Road deaths across five districts in Chhattisgarh state (2017-2019)

- Motorcycles contribute more than 60% of all road death victims in Chhattisgarh
- They are also involved in deaths of other victims (pedestrian, other motorcyclists)
Motorcycle helmets

- Head injuries are diagnosed as the leading cause of death in a majority of motorcycle crashes
- When a motorcycle is involved in a collision, the riders’ heads can hit other vehicles, fixed hard objects around the road, and the surface of the road
- The risk of serious injury and death increases with increase in impact velocity of the head with the hard object
- However, head injuries can result among two-wheeler riders falling off at low speeds also (10-15 km/h)
- Two-wheeler riders must always wear a helmet when moving
- Helmets provide a cushion around the head and thus protect the wearer from some of the more severe forms of traumatic brain injury
Effectiveness of helmet use

• There is considerable research that has been conducted on the effects of wearing a helmet on the risk of a head injury as a result of a collision over the past half a century.

• The use of PTW helmets in the majority of outcome measures led to reduced injury or fatality risk to a helmeted PTW user compared to those who were not wearing helmets. The estimates for reductions in injuries are as follows:

  ❖ Fatal injury  28%-64%
  ❖ Head injury   58%-60%
  ❖ Brain injury  47%-74%
  ❖ Face injury   14%-63%
  ❖ Neck injury   14%-48%

Papadimitriou, E. et al. (no date) ‘The European road safety decision support system. A clearinghouse of road safety risks and measures, Deliverable 8.3 of the H2020 project SafetyCube’. 
Components of motorcycle helmet enforcement

• While ensuring universal helmet prevalence should be a priority, that alone should not be an indicator of a successful helmet program

• Helmets will be most effective if they are correctly fastened, of appropriate size, and of standard design, all of which remain major gaps in helmet use in low-and-middle income countries

• The use of substandard helmets is both because of availability of such helmets in the market and lack of awareness among the helmet users about their ineffectiveness in case of a crash

• The surveys to determine the helmet usage should therefore include at least three indicators—helmet use, standard design of helmet, and fixation status
Components of motorcycle helmet enforcement

• Motorcyclists with loosely fastened helmets compared with those with firmly fastened helmets increased their risk of head injury by almost two-fold

• A loosely fixed helmet can be ejected during a high-impact crash

• It is recommended to include fixation status in the helmet legislation

• The likelihood of ejection is also dependent on the type of helmet: A full-face helmet is less likely to be ejected, and therefore, both fixation status of the helmet and the type of helmet can modify the effectiveness of a helmet
Helmet requirement according to Motor Vehicles Act of India

Section 129 in The Motor Vehicles Act, 1988

129. Wearing of protective headgear.—Every person driving or riding (otherwise than in a side car, on a motor cycle of any class or description) shall, while in a public place, wear [protective headgear conforming to the standards of Bureau of Indian Standards]: Provided that the provision of this section shall not apply to a person who is a Sikh, if he is, while driving or riding on the motor cycle, in a public place, wearing a turban: Provided further that the State Government may, by such rules, provide for such exceptions as it may think fit. Explanation.—”Protective headgear” means a helmet which,—

(a) by virtue of its shape, material and construction, could reasonably be expected to afford to the person driving or riding on a motor cycle a degree of protection from injury in the event of an accident; and

(b) is securely fastened to the head of the wearer by means of straps or other fastenings provided on the headgear.
Education or enforcement?

- Educating road users about the safety benefits of wearing a helmet is not effective in encouraging helmet use—this has been found to be true for many road safety related behaviours.

- Travelling on the road is a daily activity for most population and an injury incidence (even for those without a helmet) is a rare event, drivers are rewarded for their behaviour every time they complete the trip without an incident.

- Drivers often overestimate their skills in avoiding a crash and believe that they are aware of the safe driving behaviour.

- Education and mass awareness programmes in combination with visible enforcement are many times more effective than education alone.

- In addition to education, individuals should also be given incentives to change their behaviour. In the presence of strict enforcement, avoiding penalty from non-compliance provides that incentive.
Other concerns with helmet enforcement in India

• Hot and humid weather often acts as a barrier in voluntary helmet use
• Poor availability of affordable and standard helmets
• Standard helmets for children are often not available in the market
• Motorcycle taxis passengers may not wear the helmets used by other passengers
• There are myths about helmets that they may result in neck injuries
Driving under influence (drink and drive)

• As alcohol levels rise in a person’s system, the negative effects on the central nervous system increase
• A person's alcohol level is measured by the weight of the alcohol in a certain volume of blood and is called Blood Alcohol Concentration, or BAC
• BAC of 0.1 means 0.1 grams of alcohol in 100 ml of blood
• BAC is measured either through urine or blood test
• Alcohol is absorbed into the bloodstream and carried onward to brain and lungs, and is present in breath of the person
• BrAC is the Breath Alcohol Content which is measured by breathalyzer and is used as a measure of BAC

https://www.nhtsa.gov/risky-driving/drunk-driving
Drink and drive according to Motor Vehicle Act of India

Section 185 of the Motor Vehicles Act, 1988
Driving by a drunken person or by a person under the influence of drugs. Whoever, while driving, or attempting to drive, a motor vehicle:
• (a) has, in his blood, alcohol exceeding 30 mg. Per 100 ml. of blood detected in a test by a breath analyzer, or
• (b) is under this influence of a drug to such an extent as to be incapable of exercising proper control over the vehicle, shall be punishable for the first offense with imprisonment for a term which may extend to six months, or with fine which may extend to two thousand rupees, or with both; and for a second or subsequent offense, if committed within three years of the commission of the previous similar offense, with imprisonment for a term which may extend to two years, or with fine which may extend to three thousand rupees, or with both.

Explanation.—For the purposes of this section, the drug or drugs specified by the Central Government in this behalf, by notification in the Official Gazette, shall be deemed to render a person incapable of exercising proper control over a motor vehicle

Fines have been revised under the Motor Vehicle (Amendment) Bill 2016
## The Effects of Blood Alcohol Concentration

<table>
<thead>
<tr>
<th>BLOOD ALCOHOL CONCENTRATION (BAC) IN G/DL</th>
<th>TYPICAL EFFECTS</th>
<th>PREDICTABLE EFFECTS ON DRIVING</th>
</tr>
</thead>
<tbody>
<tr>
<td>.02</td>
<td>Some loss of judgment; relaxation, slight body warmth, altered mood</td>
<td>Decline in visual functions (rapid tracking of a moving target), decline in ability to perform two tasks at the same time (divided attention)</td>
</tr>
<tr>
<td>.05</td>
<td>Exaggerated behavior, may have loss of small-muscle control (e.g., focusing your eyes), impaired judgment, usually good feeling, lowered alertness, release of inhibition</td>
<td>Reduced coordination, reduced ability to track moving objects, difficulty steering, reduced response to emergency driving situations</td>
</tr>
<tr>
<td>.08</td>
<td>Muscle coordination becomes poor (e.g., balance, speech, vision, reaction time, and hearing), harder to detect danger; judgment, self-control, reasoning, and memory are impaired</td>
<td>Concentration, short-term memory loss, speed control, reduced information processing capability (e.g., signal detection, visual search), impaired perception</td>
</tr>
<tr>
<td>.10</td>
<td>Clear deterioration of reaction time and control, slurred speech, poor coordination, and slowed thinking</td>
<td>Reduced ability to maintain lane position and brake appropriately</td>
</tr>
</tbody>
</table>

https://www.nhtsa.gov/risky-driving/drunk-driving
Drunk driving causes high crash rates of drivers

- Drivers with a BrAC of 0.05 are approximately 2 times more likely to crash than drivers at zero BrAC.
- At 0.08 BrAC the adjusted relative risk of crashing is approximately four times that of drivers at zero BrAC.
- At a BrAC of 0.10 the adjusted risk increases to approximately 6 times, and at 0.15 BrAC drivers are at least 12 times as likely to crash.

<table>
<thead>
<tr>
<th>BrAC</th>
<th>Unadjusted Risk</th>
<th>Adjusted Risk (Age and Gender)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>0.01</td>
<td>0.51</td>
<td>0.54</td>
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<tr>
<td>0.02</td>
<td>0.82</td>
<td>0.85</td>
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<td>0.03</td>
<td>1.17</td>
<td>1.20</td>
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<td>0.04</td>
<td>1.57</td>
<td>1.60</td>
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<tr>
<td>0.05</td>
<td>2.05</td>
<td>2.07</td>
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<td>2.61</td>
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<td>0.08</td>
<td>3.98</td>
<td>3.93</td>
</tr>
<tr>
<td>0.09</td>
<td>4.83</td>
<td>4.73</td>
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<tr>
<td>0.10</td>
<td>5.79</td>
<td>5.64</td>
</tr>
<tr>
<td>0.11</td>
<td>6.88</td>
<td>6.67</td>
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<td>7.82</td>
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<td>0.13</td>
<td>9.51</td>
<td>9.11</td>
</tr>
<tr>
<td>0.14</td>
<td>11.07</td>
<td>10.56</td>
</tr>
<tr>
<td>0.15</td>
<td>12.82</td>
<td>12.18</td>
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<td>0.16</td>
<td>14.78</td>
<td>13.97</td>
</tr>
<tr>
<td>0.17</td>
<td>16.97</td>
<td>15.96</td>
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<td>0.18</td>
<td>19.40</td>
<td>18.17</td>
</tr>
<tr>
<td>0.19</td>
<td>22.09</td>
<td>20.60</td>
</tr>
<tr>
<td>0.20+</td>
<td>25.08</td>
<td>23.29</td>
</tr>
</tbody>
</table>

BrAC: Breath alcohol content

Compton and Berning 2015
DUI (Driving under the Influence) checkpoints
DUI (Driving under the Influence) checkpoints

- These checkpoints refer to police operations where one or more police cars are standing beside the road and where police officers pull out drivers in order to check whether or not he or she has an illegal blood alcohol level (BAC).

- At these checkpoints, also known as sobriety checkpoints, drivers can be stopped even if they do not give any indication of driving under the influence of alcohol.

- Therefore, by correcting their driving behaviour close to these checkpoints does not necessarily prevent the drivers from being stopped.
DUI (Driving under the Influence) checkpoints

- DUI-checkpoints have been found to reduce crashes involving alcohol (or proxy measures of such crashes) by at least by 17% and all types of crashes are reduced by 10-15%.
- Proxy measures of alcohol-related crashes include night-time or weekend night crashes
- The impact of DUI-checkpoints should not be judged by the initial response when the campaign has just started
- Often in the beginning the intensity of enforcement is high
DUI (Driving under the Influence) checkpoints

• DUI-checkpoints in Australia resulted in the highest reduction in crashes indicating the Australian methods of booze buses and intensive publicity are highly effective

• Booze bus is a police vehicle used for administering blood-alcohol tests (to drivers), generally a mid-size bus converted or fitted out for the purpose

• A similar approach when implemented in New Zealand also found large reductions, thus strengthening the evidence of their effectiveness

• The evidence indicates that highly visible checkpoints where many drivers are pulled out and tested, following the Australian example, are likely to be most effective
Booze bus in New Zealand
Alcohol-related BAC limits, road toll and enforcement measures in selected European countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Legal blood alcohol limit g/L</th>
<th>Police tests per 1,000 inhabitants</th>
<th>Share of alcohol related road fatalities, percent</th>
<th>Share alcohol offenders (above legal limit)</th>
<th>Share respondents who had at least once a week 5 or more drinks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number</td>
<td>Expert estimates</td>
<td>Official statistics</td>
<td>%</td>
</tr>
<tr>
<td>Poland</td>
<td>0.2</td>
<td>47</td>
<td>13</td>
<td>7</td>
<td>9.5</td>
</tr>
<tr>
<td>Portugal</td>
<td>0.5</td>
<td>63</td>
<td>35</td>
<td>6</td>
<td>5.9</td>
</tr>
<tr>
<td>Austria</td>
<td>0.5</td>
<td>87</td>
<td>18</td>
<td>6</td>
<td>5.8</td>
</tr>
<tr>
<td>Spain</td>
<td>0.5</td>
<td>112</td>
<td>NA</td>
<td>31</td>
<td>1.8</td>
</tr>
<tr>
<td>Hungary</td>
<td>0</td>
<td>130</td>
<td>8</td>
<td>31</td>
<td>3.1</td>
</tr>
<tr>
<td>France</td>
<td>0.5</td>
<td>190</td>
<td>29</td>
<td>31</td>
<td>3.3</td>
</tr>
<tr>
<td>Sweden</td>
<td>0.2</td>
<td>287</td>
<td>25</td>
<td>16</td>
<td>0.8</td>
</tr>
<tr>
<td>Finland</td>
<td>0.5</td>
<td>385</td>
<td>24</td>
<td>29</td>
<td>1.3</td>
</tr>
</tbody>
</table>

**NO OF MOTORISTS TO BE CHECKED EVERY DAY IN DELHI**

Swedish level........15,000
Austrian level ........8,000
Speed control

- Speeding is a major risk factor of traffic injuries across the world.
- Higher speed increases the chances of a driver to be involved in a crash.
- A vehicle crashing with a pedestrian at high speed also increases the chances that pedestrian may die from the crash.


Speed limits should be appropriate to the function of the road

<table>
<thead>
<tr>
<th>Type of road</th>
<th>Safe speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads with possible conflicts between cars and unprotected users</td>
<td>30 km/h</td>
</tr>
<tr>
<td>Intersections with possible side-on conflicts between cars</td>
<td>50 km/h</td>
</tr>
<tr>
<td>Roads with possible frontal conflicts between cars</td>
<td>70 km/h</td>
</tr>
<tr>
<td>Roads with no likelihood of frontal or side-on conflicts between road users</td>
<td>≥100 km/h</td>
</tr>
</tbody>
</table>

- In urban areas with pedestrians and cyclists, speed limits should not be higher than 30 km/h
- The control of speed should not be dependent on enforcement alone
- Road design should also support lower levels of traffic speed (e.g. traffic calming measures)

Enforcement should be one of the many measures to control speed of traffic.

Factors affecting speed choice:
- Driver factors
  - Education/promotion
  - Speed zone/limit
  - Enforcement and sanctions
- Vehicle factors
- Road factors
  - Crash and injury risk
  - Traffic conditions

Speed of vehicles controls how soon they can stop after detecting a pedestrian

- Two components of reaction time and braking
- One is biology, other physics
- At 50 km/h, car can stop in time
- At 65 km/h, car will hit the pedestrian at 30 km/h

[Diagram showing distance and speed relationship]


Pedestrian standing 35 metres from a moving car

Speed and Field of Vision

Impact Speed and likelihood of Pedestrian Fatality

HIT BY A VEHICLE TRAVELING AT: 20 MPH
9 out of 10 pedestrians survive

HIT BY A VEHICLE TRAVELING AT: 30 MPH
6 out of 10 pedestrians survive

HIT BY A VEHICLE TRAVELING AT: 40 MPH
Only 1 out of 10 pedestrians survives

Speed is especially lethal for vulnerable users like pedestrians and people biking. The risk of injury and death increases as speed increases.

Source: Base image: mark ashamed. flickr: cc 2.0. Federal Motor Carrier Safety Administration (FMCSA)
Speed control

• Manual speed control usually involves a stationary observation unit (a marked or unmarked police car) equipped with a speed measurement device.

• Further down the road, another police unit tasked with stopping the speeding vehicle and issuing a fine to the driver.

• Automated speed control uses fixed and mobile cameras which may either be visible (overt) or hidden (covert):
  – Fixed cameras are installed in a specific location, usually in a box mounted on a pillar.
  – Mobile cameras are installed in police vehicles, and are operated by trained police officers.
Speed control

• The most common speed enforcement methods are point-based where vehicle speeds are detected at fixed locations on the road.

• With point-based speed enforcement methods, the drivers get familiar with locations of cameras and modify their behaviour only in the immediate vicinity of speed enforcement.

• Hence, innovative approaches were needed to make speed enforcement more effective.
Average speed section control

• This is also referred to as ‘average speed section control’, ‘point to point’, ‘time over distance’ cameras or section control or trajectory control

• This type of enforcement involves the installation of a series of cameras at multiple locations along a road section

• The average speed of a vehicle over a section of a road is calculated by capturing its license plate number at more than one camera locations

• In case this speed exceeds the posted speed limit, the vehicle information is communicated to a central unit

• Almost all current installations throughout the world involve some degree of human verification to assess the validity of detected infringements

• In such a system there are stopping sites for manual enforcement
Average speed control

Stretch of road 2 km

Time

Speed

09:50:00

09:51:00

2 km

1 min

120 km/h

https://www.semanticscholar.org/paper/Safety-Impact-of-Average-Speed-Control-in-the-UK-Lahrmann-Brass%C3%B8e/4ced68618977413affed88fd554d5dfb5a8f072f3/figure/4
Average speed control

- Average speed section control has been found to result in larger reduction in all crashes (30%) compared to speed cameras
- The effect of speed cameras reduce as the distance from the camera increases
- The implementation of speed cameras may be accompanied by crash migration when drivers tend to slow down close to the cameras and then driver faster than they would have otherwise away from the cameras
- The review found no evidence that this phenomenon, known as kangaroo driving, resulted in adverse safety effects
Speed cameras
Speed cameras

Effectiveness: +/- 3 km
Place at high crash locations
To stop speeding NOT punishing
Red-light cameras (RLC)

- If a vehicle enters an intersection any time after the signal light has turned red, the driver has committed a violation.
- Red-light running results mostly in side-(right-angle) crashes which are more severe than other type of intersection crashes.
- In case there is a dedicated signal for the right-turning vehicles (in left-hand traffic such as India), red-light running also results in head-on collisions.

https://mpdc.dc.gov/page/red-light-camera-photos
Types of crashes

Right-Angle crash type.

Typical rear-end crash, both vehicles heading straight.

Typical rear-end crash, leading veh. turning right.

Typical rear-end crash, leading veh. turning left.

Left-Turn crash, second vehicle opposite direction heading straight.

Left-Turn crash, second vehicle perpendicular direction heading straight.

Left-Turn crash, second vehicle perpendicular direction heading straight.

These schematics are for right-hand driving, left-turn will be right-turn in Indian traffic**
Red-light cameras

• The implementation of red-light cameras is also associated with an increase in rear-end crashes resulting from drivers’ tendency to apply break abruptly in order to avoid the fine.

• Since both the head-on and right angle crashes have higher severity than rear-end crashes, even if the number of crashes are cancelled out, the severity level of crashes is still likely to reduce with the implementation of RLCs.

• In some cases, additional time is given to yellow times and successful RLC programmes may include many onsite modifications such as red-light visibility, addition of warning signs, and amelioration of intersections geometry.
Monitoring performance of enforcement measures

• To evaluate the success of enforcement measures a baseline should be established

• This baseline gives the current compliance rate of helmet use, seat belt use, drink and drive, etc.

• The data collection for compliance should be based on a survey of a representative sample of junctions across the city

• To evaluate the effectiveness of enforcement strategies, observational surveys should be repeated at the same locations
Strategic law enforcement integrates four fundamental principles of policing in a multi-dimensional intervention

- **Increased visibility of enforcement.** This includes highly visible, publicly observable and strategically located checkpoints and roadblocks. These must be varied in location, intensity, time of day and night. Visibility includes signage about the enforcement activity, safety vests for police and adequate lighting at night.

- **Repetition of enforcement campaigns.** This indicates to the motorcyclists that the risks of being caught are high – anywhere, anytime.

- **Strict and consistent enforcement.** After an initial public warning period, police enforcement should be strict, non-discriminatory, fair and consistent. If there is no enforcement, there will be limited or no compliance.

- **Well-publicised enforcement.** To achieve maximum effectiveness, compliance driven enforcement must be combined with coordinated education and publicity campaigns involving the continuous engagement of government, local government, the mass media and other agencies. This means conducting publicity campaigns before, during and after policing activities with reinforced safety messages.
WHAT CAN WE DO NOW?

Policing

- Speed control by policing and technical means
- Drinking driving laws, minimum drinking age laws, random alcohol checkpoints everyday
- Enforcing:
  - Seat belt in front and back seat
  - Helmet law
  - Headlight use during daytime for two-wheeler
Where to police

- Select high crash rate locations for more enforcement
- Speed: Certain road lengths and locations that have more crashes
- Exits from bars, parties, weddings
- Enforcement has to be data based
- RANDOMIZE FOR MAXIMUM EFFECTIVENESS
Traffic Stops Also Deter Roadway Crimes

➢ Car Thefts and Car Jacking
➢ Fugitives in Transit (Child Molesters, Killers)
➢ Transporting of Stolen Property
➢ Abused, Kidnapped, Runaway Children
➢ Illegal Weapons
➢ Criminals Fleeing Crime Scenes
➢ Illegal Consumption of Drugs
➢ Criminals on Their Way
➢ Uninsured Vehicles

Source: Muskegon County Sheriff's Office
EFFECT OF PENALTIES

- For the ‘fear of punishment’ to be a deterrent, individuals must believe that probability of getting caught is relatively high
- Stricter punishment not as effective as subjective perception of being caught
- Policing operations should be highly visible, sustained and widespread
- Little evidence that severe penalties reduce violations in traffic, including jail sentences given in isolation
- Announcement of severe punishments can have a deterrent effect over a short period and the beneficial effect disappears over time
The most common type of penalty at the present time, a fine, has been found to have little effect.

When road users consider the **subjective probability** of detection to be sufficiently likely, they will avoid violating a regulation.

Making penalties heavier, as an isolated measure, has been found to have little extra effect.

Frequency, visibility, and unpredictability of inspections are responsible for the general prevention of traffic violations.
EFFECT OF PENALTIES
AUSTRALIA

- Policies that can successfully increase the perceived certainty of detection and prosecution are therefore likely to have a greater impact on offending and, subsequently, road accident rates than those advocating harsher penalties.

- It is suggested that substantial increases in fines and licence disqualifications would have limited potential in deterring recidivist offenders.

- Little evidence for a significant relationship between fine amount and the likelihood that an offender will return to court for a new driving offence.

EFFECT OF PENALTIES
USA

- Speeding citations may not be effective in changing drivers' speeding behavior. Increasing drivers' perception that they are at risk of being caught speeding and awareness of the consequences from receiving points may improve the effectiveness of speeding law enforcement.


Effects of state statutory changes in DUI fine or jail penalties for first time offenders from 1976 to 2002

- The overall pattern of results suggests a possible effect of mandatory fine policies in some states, but little effect of mandatory jail policies

• Stricter punishment not as effective as subjective perception of being caught
• Legislation and enforcement is effective when violations are visible and easy to detect.
• There is little evidence that severe penalties reduce violations in traffic, including jail sentences given in isolation
• Policing operations should be highly visible, sustained and widespread
Thank you!

Please feel free to reach me at rgoel@iitd.ac.in for any query