Presentation Notes:

In this presentation, we shall analyse UK Road Safety (STATS19) Data and RAS50002 derived from [www.data.gov.uk](http://www.data.gov.uk) and check the trends in number of accidents resulting in a casualty. For the sake of analysis, we have joined accident and casualty data for 5 years, from 2016 to 2020. On the basis of the following variables, we shall investigate patterns in casualty counts:

* Based on age bands and casualty class
* Based on severity
* Based on hour per day and days of week
* Based on road type and speed limits
* Based on other factors (RAS50002 data)

Based on age bands and casualty class:

The ages of accident victims in the source dataset is grouped into age bands, starting from 0-5 years to those over 75 years. Similarly, the casualties are also grouped into three classes; namely Drivers/Riders, Passengers, Pedestrians. We use this data to check which age group and casualty class has the highest casualty count. We can identify visually from the bar graph that most of the casualties are drivers/riders and are of age group 26-35. There might be several factors why drivers of this age group is more susceptible to accidents, including drunk driving, weather conditions and improper road conditions. We can also note that most under-aged casualties are either passengers or pedestrians, but we also observe that there are a few drivers/riders who belong to age-group 11-15. This may denote the use of vehicles without a valid driving license by under-aged citizens. An important question that can be asked in this analysis is, what can be done to improve this situation? What measures can be taken to reduce the number of accidents and casualties in this setting? A possible solution is intensifying driving tests and stricter traffic law enforcement including imposing bigger fines. Introducing initiatives to encourage, subsidise and strengthen public transport is yet another solution, thereby pushing citizens to opt for public transport.

Based on severity:

The severity of accidents that result in casualties is categorised as “Slight”, “Serious” and “Fatal”. It is evident from the visualisation that number of fatal accidents are the least and accidents with slight severity are the most. However, it is a matter of relief to see that the casualty count is reducing every year. But we find that the number of serious and fatal accidents remain consistent over the years.

Based on hours in a day and days of week:

Number of accidents also depends on traffic conditions and the time of the day. A busy time of the day means higher chances of accidents happening. We can use this data to think about measures to control traffic during peak hours. We have used two plots to analyse this information; one is a histogram that represents the casualty count in every hour of the day from 2016 – 2020 while the other one is a heat map that visualises the accident count considering the days of week along with the hours in a day. From the first plot, it is evident that casualties peak during the beginning and end of working hours, i.e., at 08:00 hours and at 17:00 hours, which clearly says that majority of the accident victims usually commute during these hours and most likely disregard safety guidelines in that process. We can safely assume that these road users and headed to their place of work.

We can also conclude that the safest time to avoid accidents is early in the morning. The second graph is an extension of the first one. From the second graph, we add an additional factor which are days of the week. For better accuracy, we average the number of accident casualties and this is used in a heat map. What can we infer from this data and what preventive measures can be taken? We observe that number of accidents per day is least in early hours of the day irrespective of the day of week, something we found in the first graph. However, we can note that the number of accidents per day is greater than 35 at 08:00 hours and 17:00 hours of week days, i.e., Mondays to Fridays. This supports our assumption that most accident victims during the above mentioned time period are headed to their place of work.

To improve this situation, a possible solution is to alert the road users by electronic or visual means and make them aware of the intense traffic during busy hours. Road Traffic Police patrolling can be made more frequent and stringent.

Based on road type and speed limits:

The road types from the original data set can be classified as “Single Carriageway”, “Dual Carriageway”, “Roundabout”, “One-way street”, “Slip roads” and “Unknown” roads (which can be either of the above mentioned or other roads). It can be logically inferred that slip roads have the least chance of accidents mainly because it is well-indicated, speed regulated and does not pose the problem of incoming traffic. Similar logical conclusion can be made in the case of one-way streets as well. This is proved in the horizontal bar graph that depicts the number of accidents based on road types and speed limits. We also observe that number of accidents is the largest in single-carriageways, with over 560,000 accidents over the past 5 years. This seems probable because single-carriageways pose the problem of incoming traffic without separating dividers. We also observe that majority of the accidents in single-carriageways are within 30 mph speed limit followed by 60 mph. Though this might seem illogical, a considerable proportion of single carriageway road users are motorcyclists, tractors who travel at speeds less than 50 mph. Also, post-accident scenario in carriageways endangers other road users.

Preventive measures include prompt accident response and installation of speed regulators in vehicles to maintain speeds within the limit. Improved visibility of traffic signs and reflectors can be useful to reduce accident counts.

Based on other factors:

This data is taken from RAS50002 dataset (Contributory factors allocated to vehicles or pedestrians in reported accidents, Great Britain, 2016 - 2020). We consider factor that may cause road accidents such as the drivers being careless, loss of control, exceeding speed limits etcetera. We can observe from the plot that most of the accidents are due to negligence and carelessness; i.e., driver failing to look properly and/or failing to judge other person’s path or speed.