

# *Nigerian\_Road\_Traffic\_Crashes \_2020\_2024*

*By Anumol Issac*

# Objectives

- ❖ Analyse crash trends over time by examining the data on a yearly basis and quarterly (seasonal) basis to identify patterns and seasonal variations.
- ❖ Analyse regional trends in crashes to identify which state experiences the highest and lowest number of crashes.
- ❖ Analyse the severity of crashes (e.g., total injuries and total killed) and how it varies by state or time.
- ❖ Analyse the impact of vehicle involvement on crash severity.
- ❖ Analyse the impact of human and weather factors, including speed violations (SPV), Driving Under Alcohol/Drug Influence (DAD), poor weather (PWR), fatigue (FTQ), and other factors on crash severity

# Analytical Approach

## 1. Data Collection and Loading:

- Acquiring the dataset and loading it into the Jupyter notebook using Pandas for analysis

## 2. Exploratory Data Analysis (EDA):

- i. Basic Dataset Analysis:** Analysing dataset structure, variables and summary statistics
- ii. Handling Missing Values:** Identifying and addressing missing values
- iii. Univariate Analysis:** Analysing individual variables for identify their distribution
- iv. Bivariate Analysis:** Analysing how two variables are related to each other
- v. Multivariate Analysis:** Examining how multiple variables related to each other.

# Data Summary

- **Dataset Overview:**

Total records: 518

Total variables: 11

Missing values: No missing values

- **Data source:** Kaggle

```
****Dataset Overview****
```

```
class 'pandas.core.frame.DataFrame'>
```

```
RangeIndex: 518 entries, 0 to 517
```

```
Data columns (total 11 columns):
```

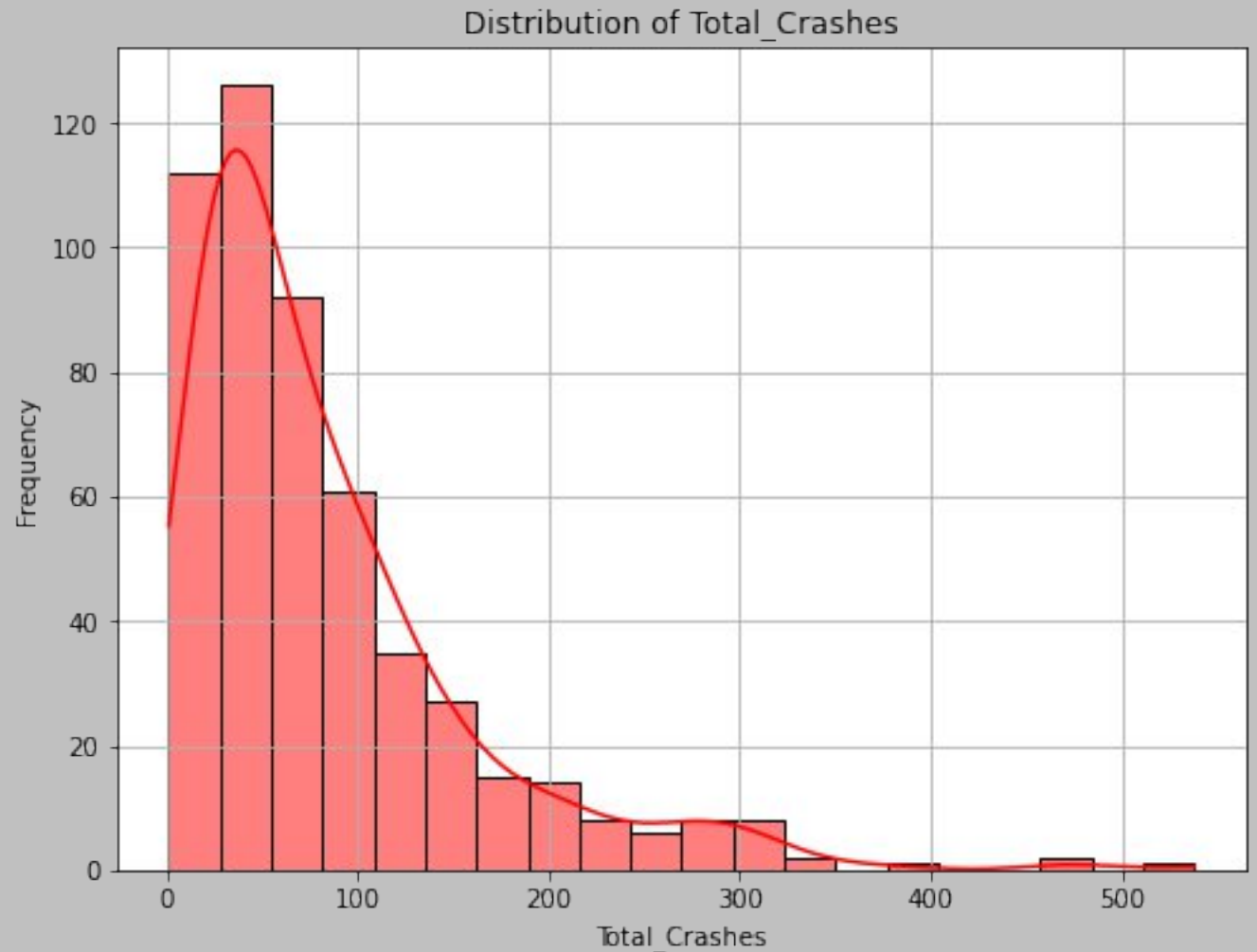
#	Column	Non-Null Count	Dtype
--	-----	-----	-----
0	Quarter	518 non-null	object
1	State	518 non-null	object
2	Total_Crashes	518 non-null	int64
3	Num_Injured	518 non-null	int64
4	Num_Killed	518 non-null	int64
5	Total_Vehicles_Involved	518 non-null	int64
6	SPV	518 non-null	int64
7	DAD	518 non-null	int64
8	PWR	518 non-null	int64
9	FTQ	518 non-null	int64
10	Other_Factors	518 non-null	int64

```
dtypes: int64(9), object(2)
```

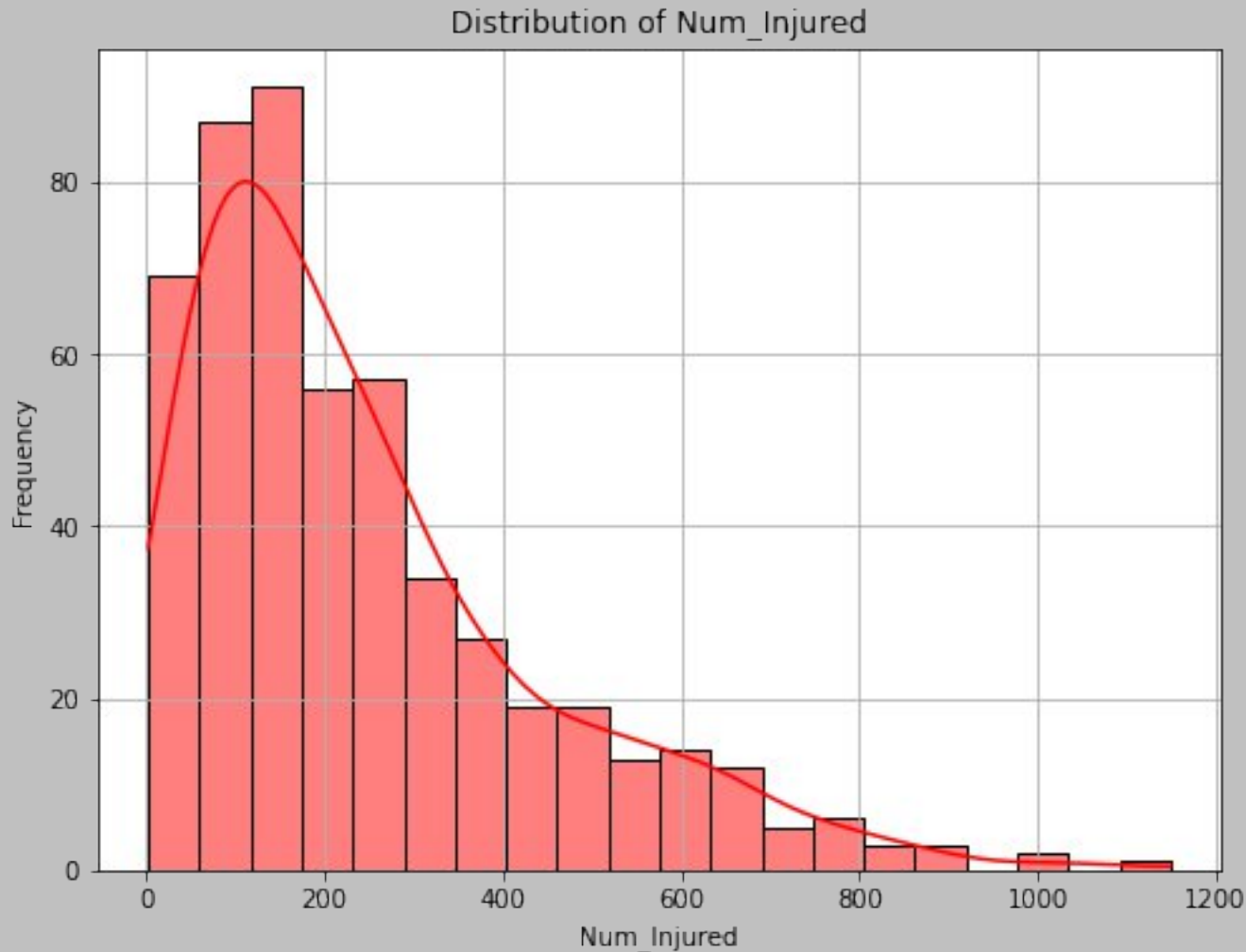
```
memory usage: 44.6+ KB
```

# Distribution Of Total Crashes

➤ Most of the states experience moderate number of crashes in each quarter



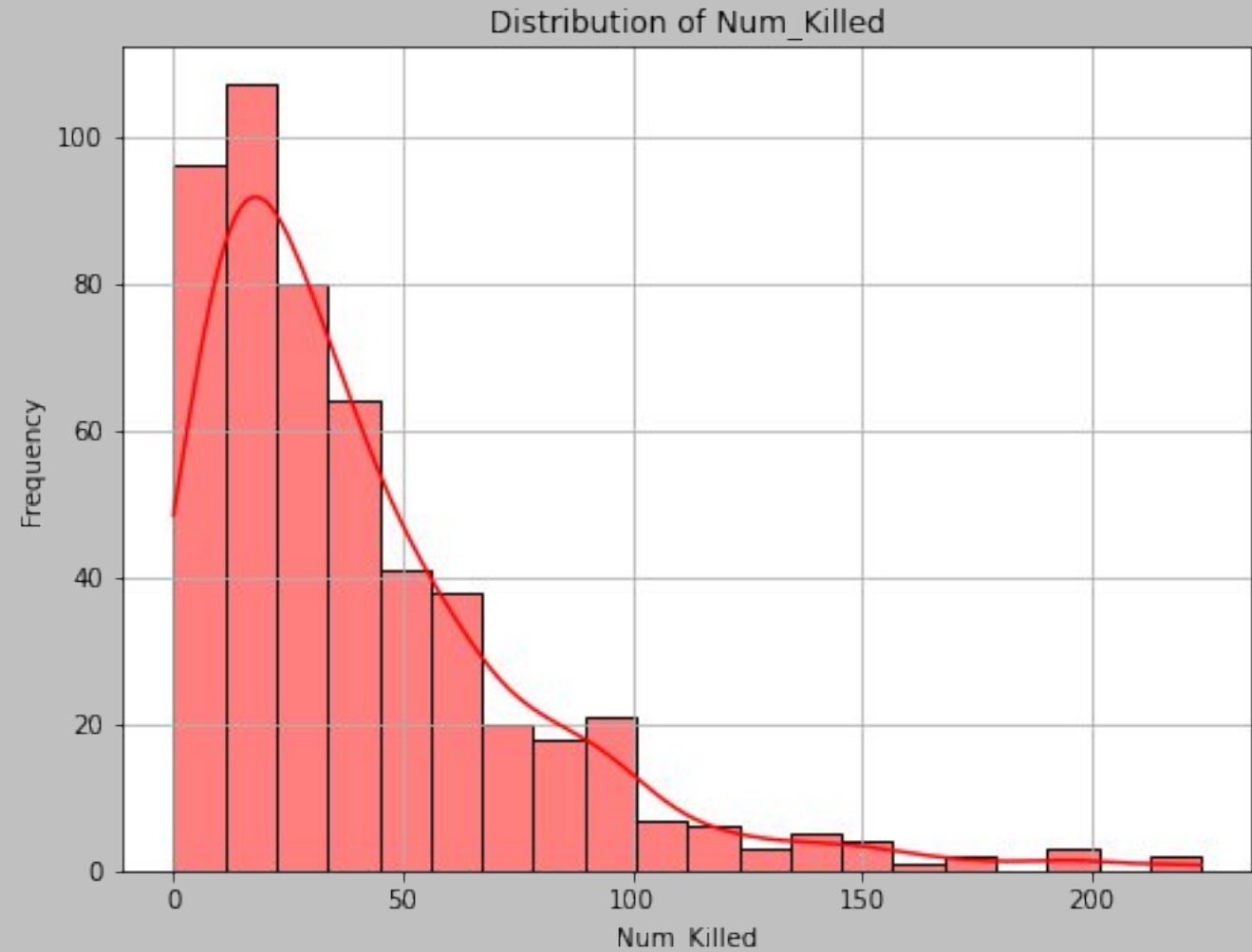
# Distribution Of Injuries



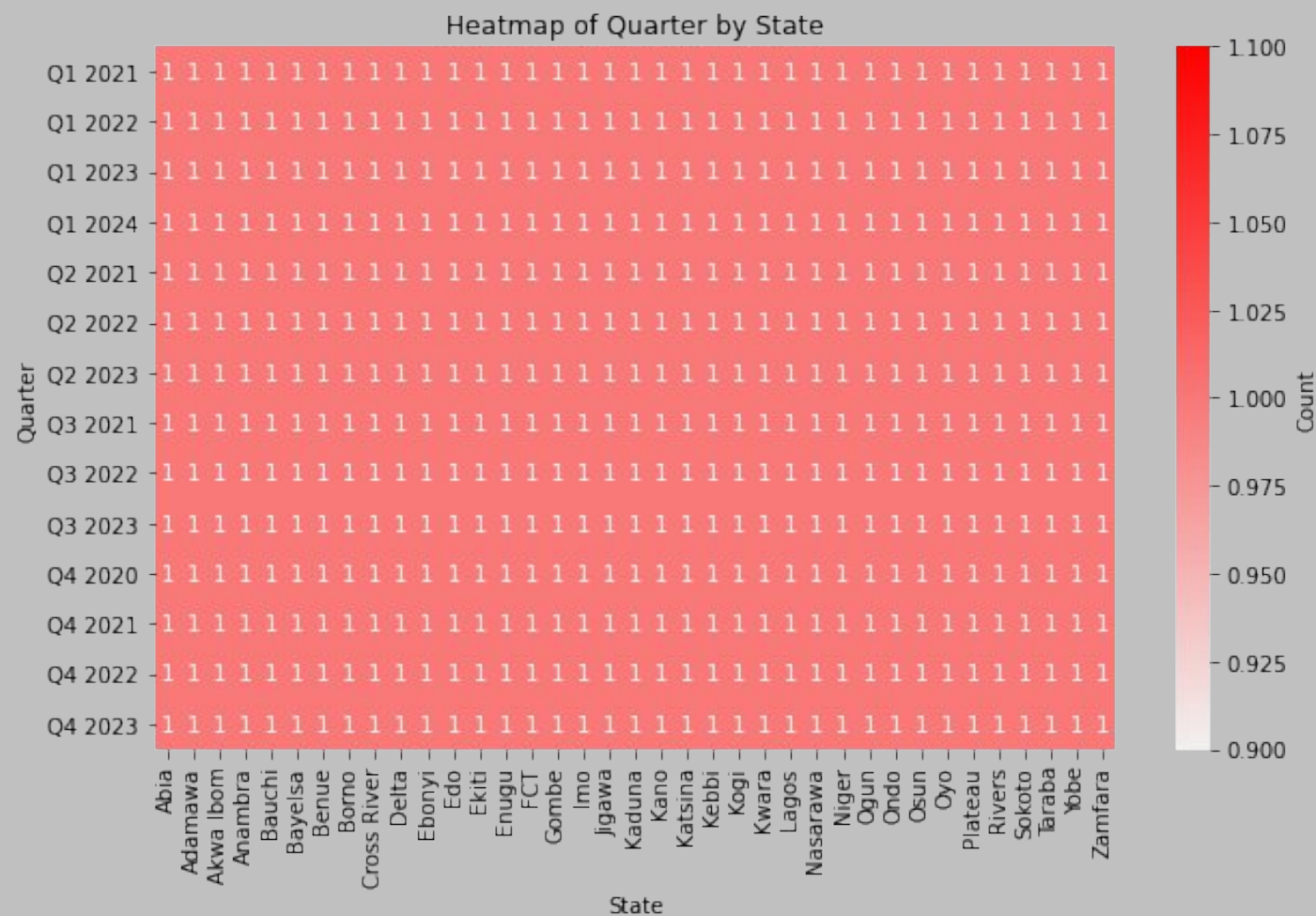
➤ Most of the states experience moderate number of injuries per quarter

# Distribution Of Fatalities

➤ The number of fatalities across states are generally moderate per quarter



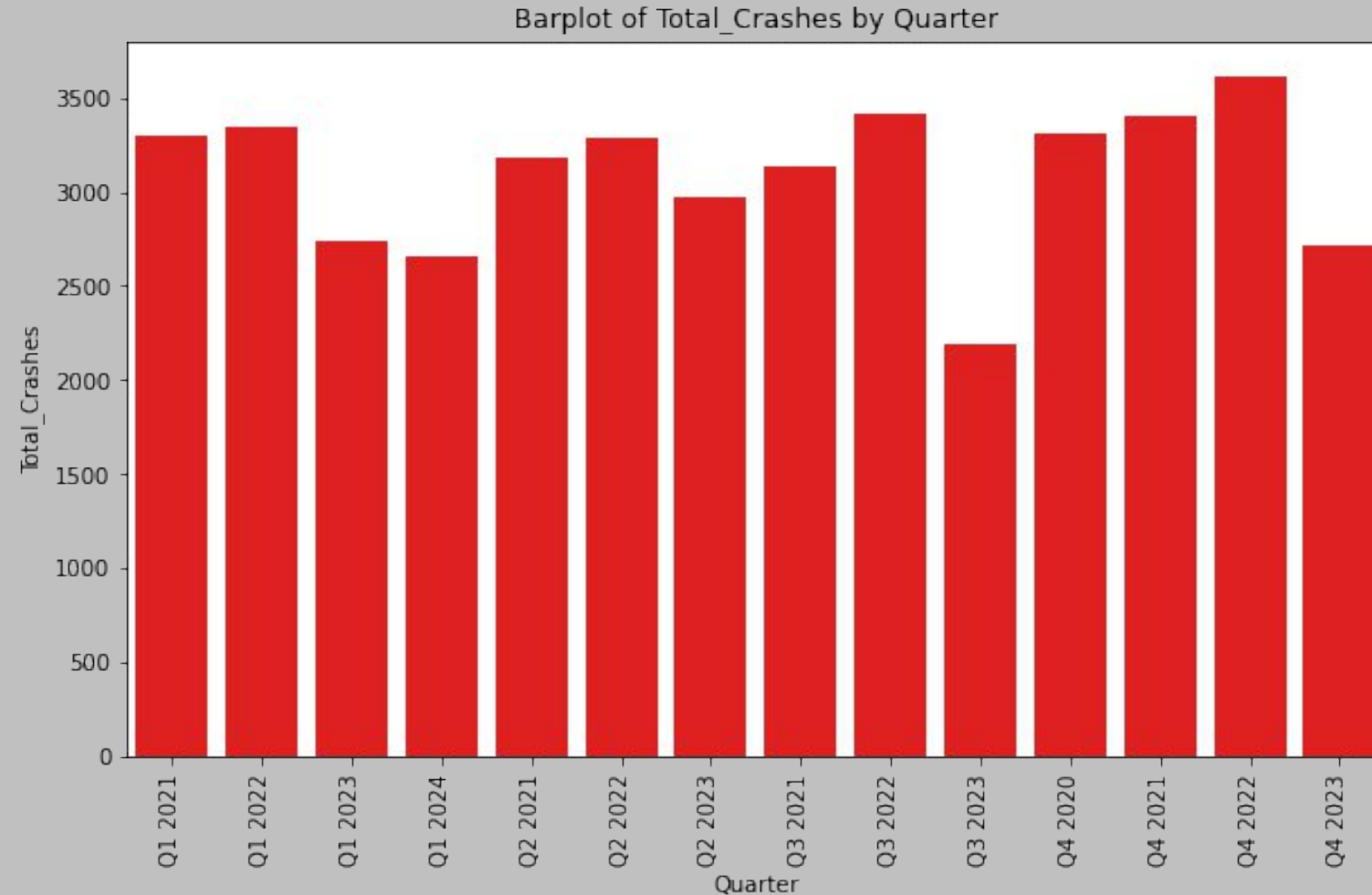
➤ Each Quarter-state combination is unique in this dataset



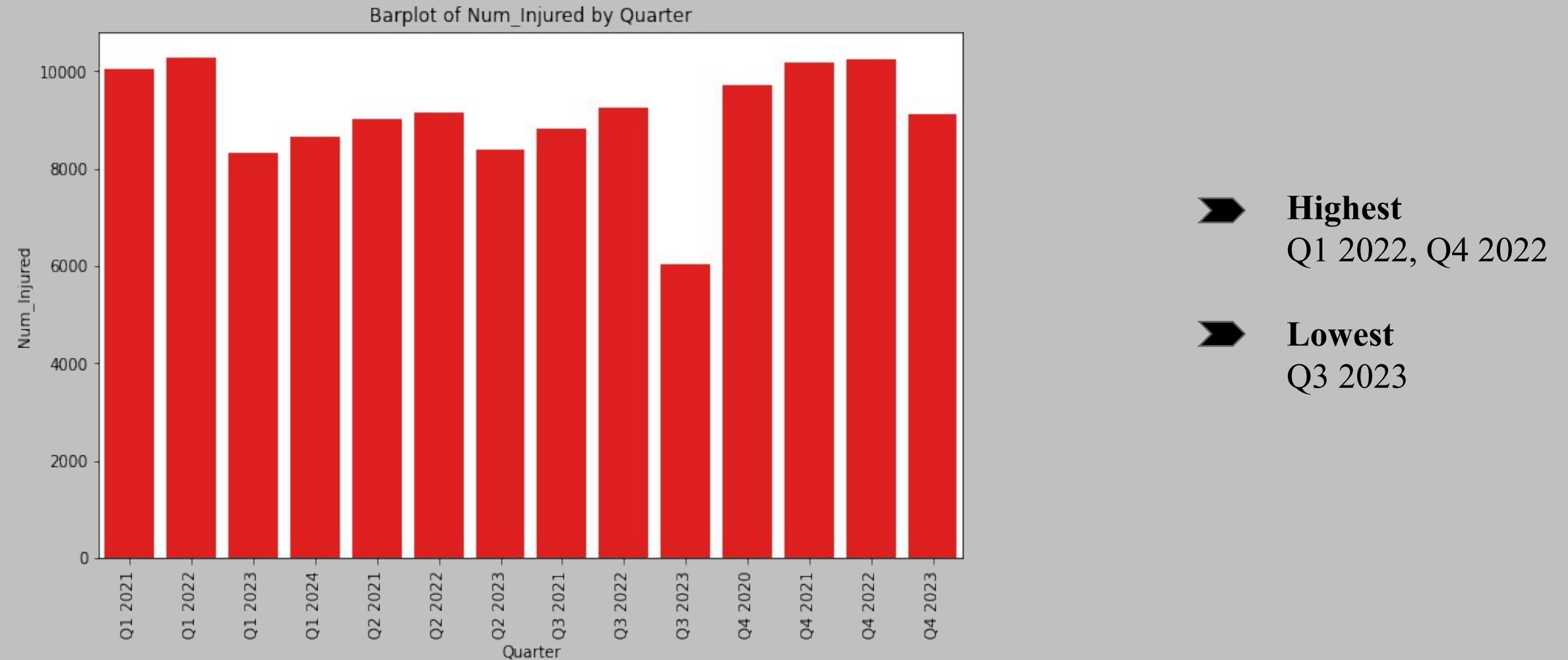


# Quarterly Trends In Total Crashes

- **Q4 2022**  
Highest number of crashes
- **Q3 2023**  
Lowest number of crashes



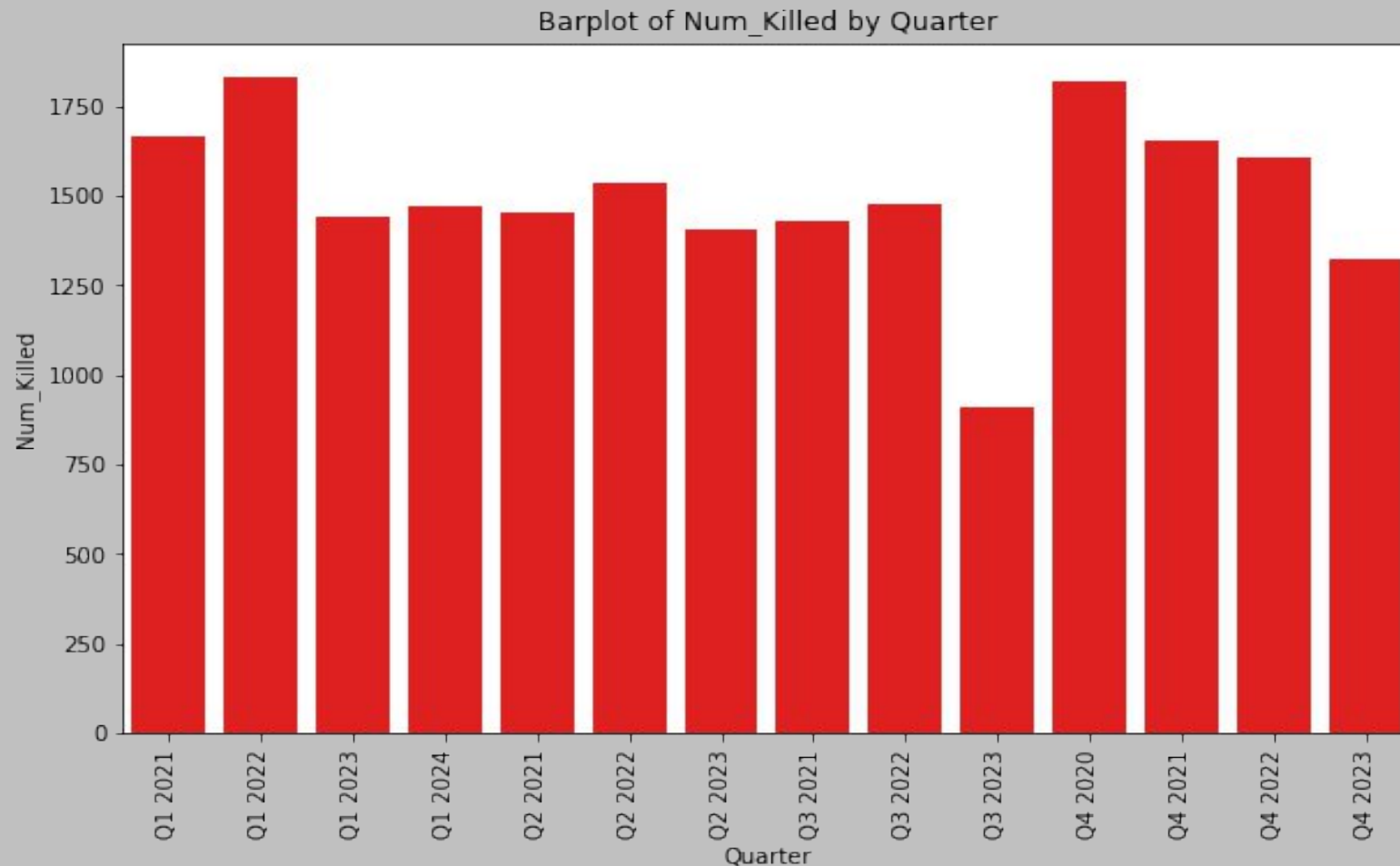
# Quarterly Trends In Number of Injuries



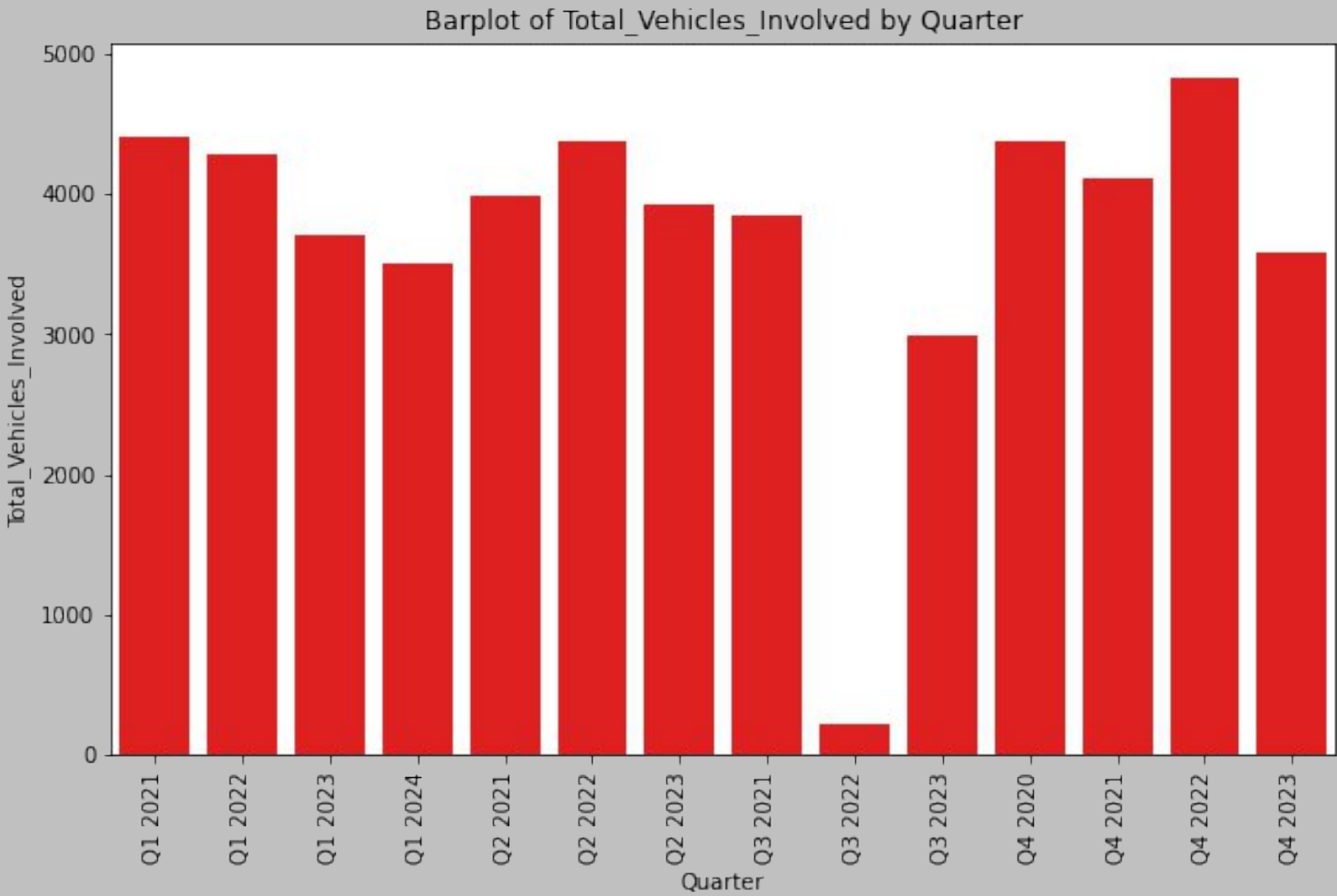
# Quarterly Trends In Number of Fatalities

➤ **Highest**  
Q1 2022,Q4 2020

➤ **Lowest**  
Q3 2023



# Quarterly Trends In Vehicles Involved

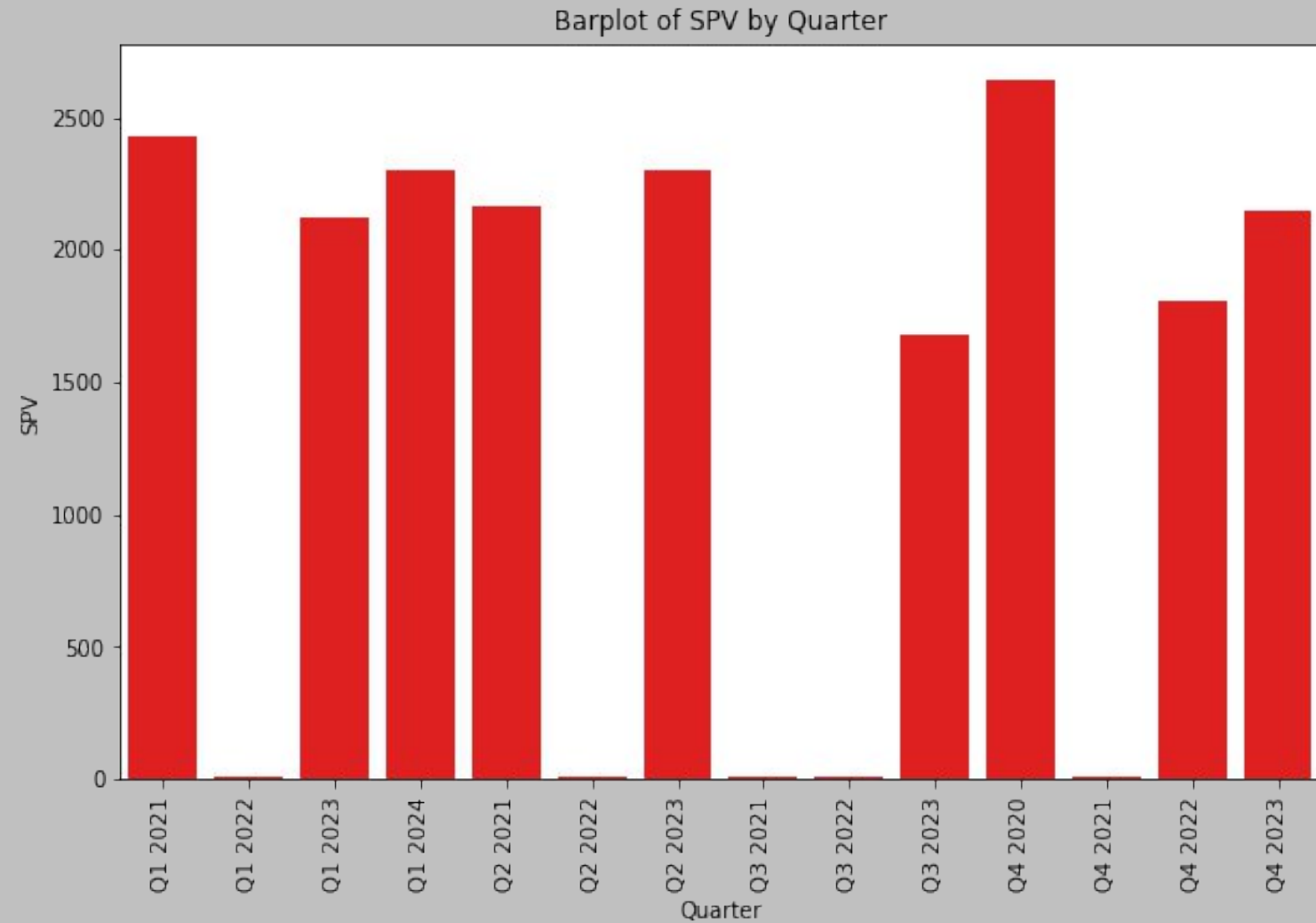


➤ **Highest**  
Q4 2022,Q1 2021

➤ **Lowest**  
Q3 2022

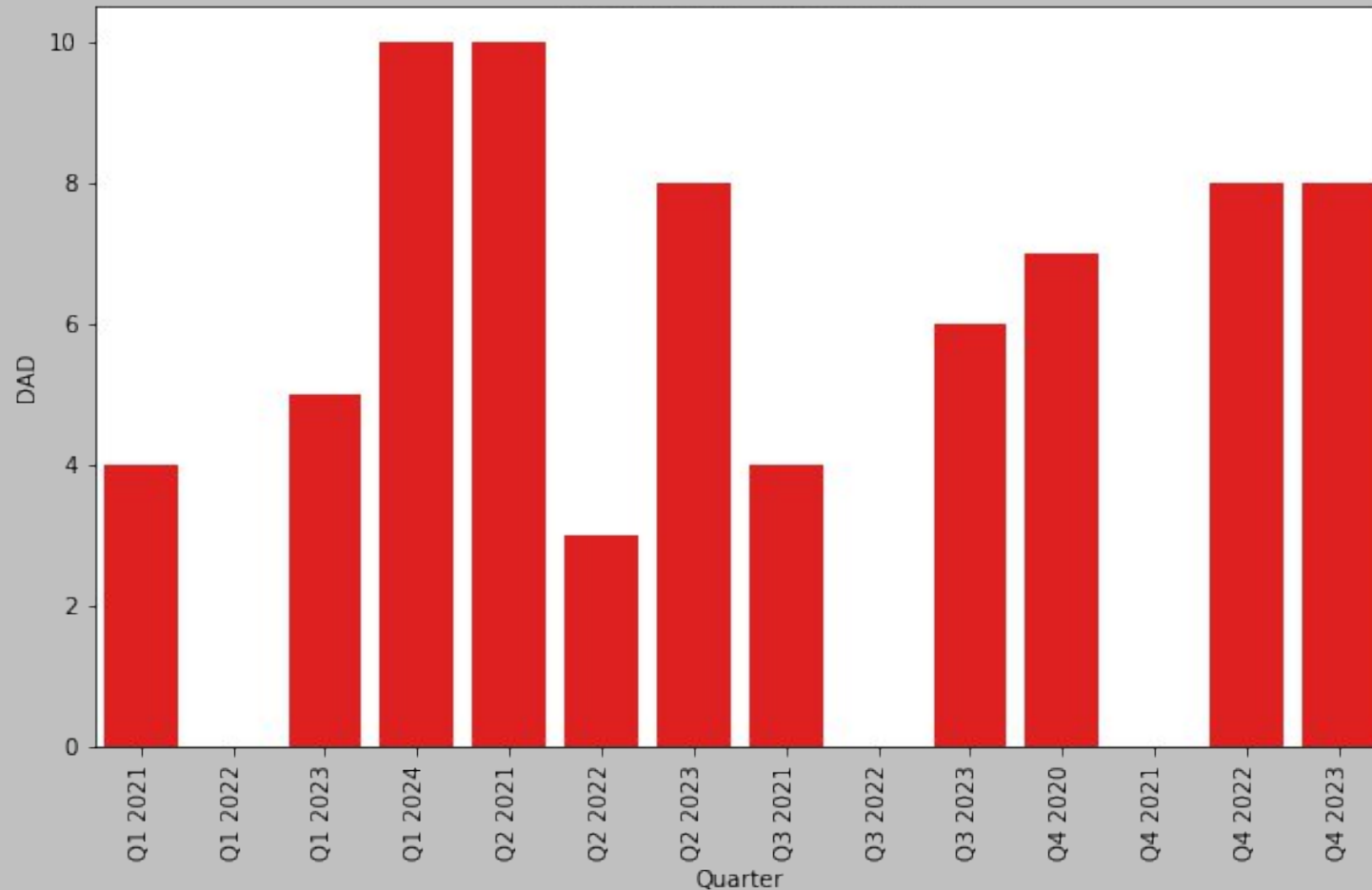
# Quarterly Trends In Speed Violation

- **Highest**  
Q4 2020, Q1 2021
- **Lowest**  
Q1 2022, Q3 2021, Q3 2022, Q4 2021, Q2 2022



# Quarterly Trends In Driving Under Alcohol/Drug Influence

Barplot of DAD by Quarter

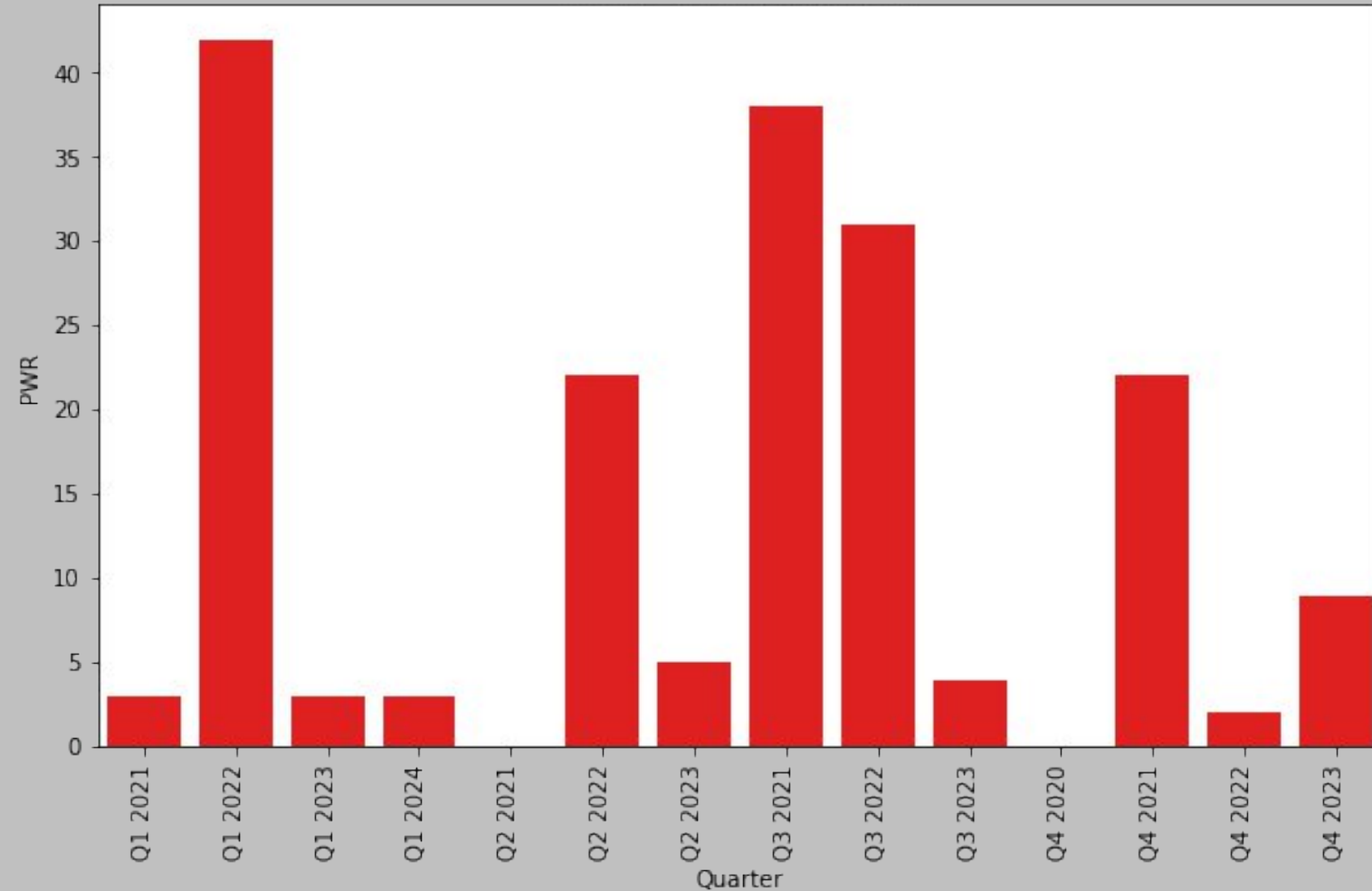


➡ **Highest**  
Q1 2024, Q2 2021

➡ **Lowest**  
Q1 2022, Q3 2022, Q4 2021

# Quarterly Trends In Poor Weather

Barplot of PWR by Quarter

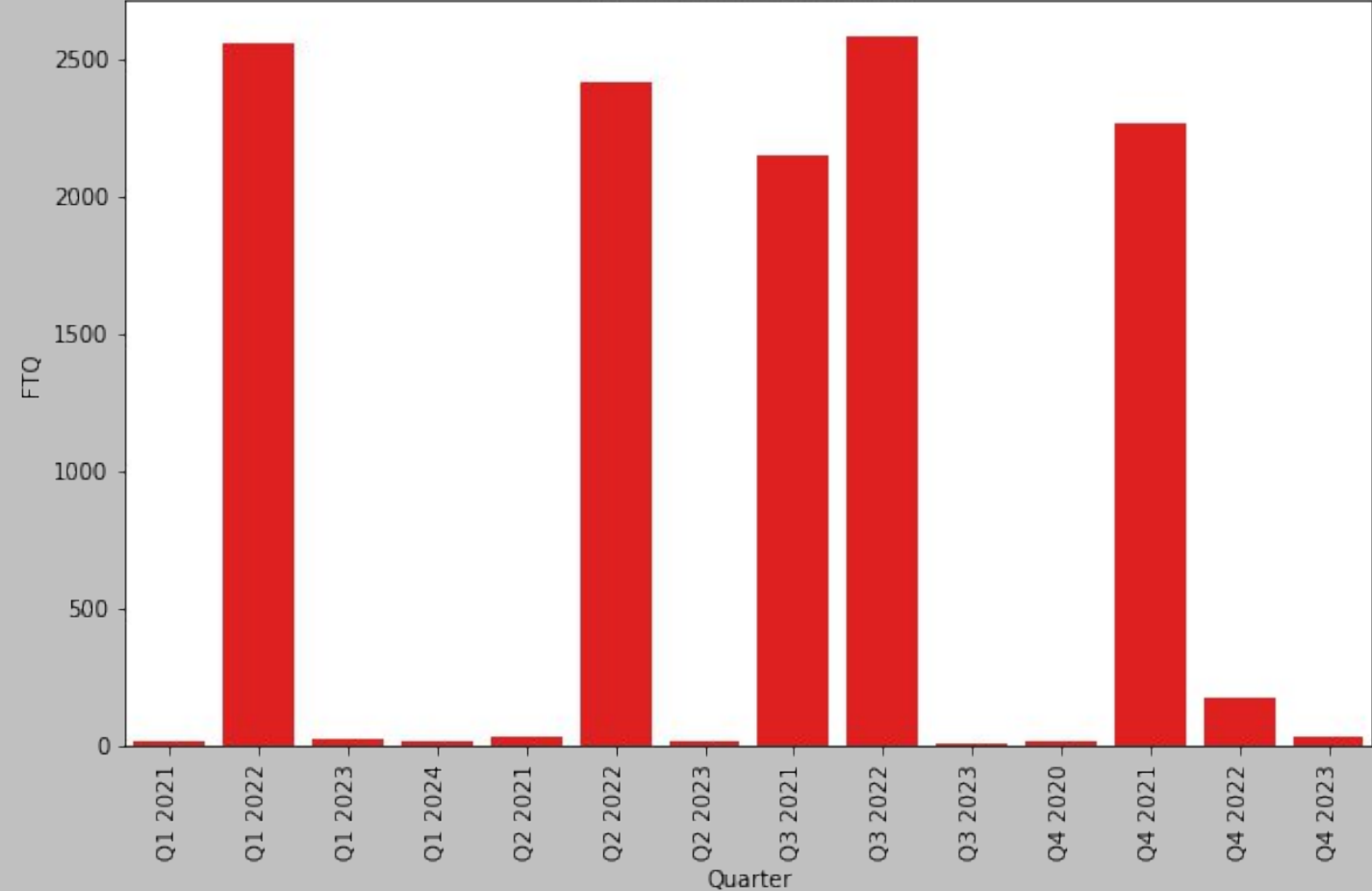


➤ **Highest**  
Q1 2022, Q3 2021

➤ **Lowest**  
Q2 2021, Q4 2020

# Quarterly Trends In Fatigue

Barplot of FTQ by Quarter



➤ **Highest**  
Q3 2022, Q1 2022

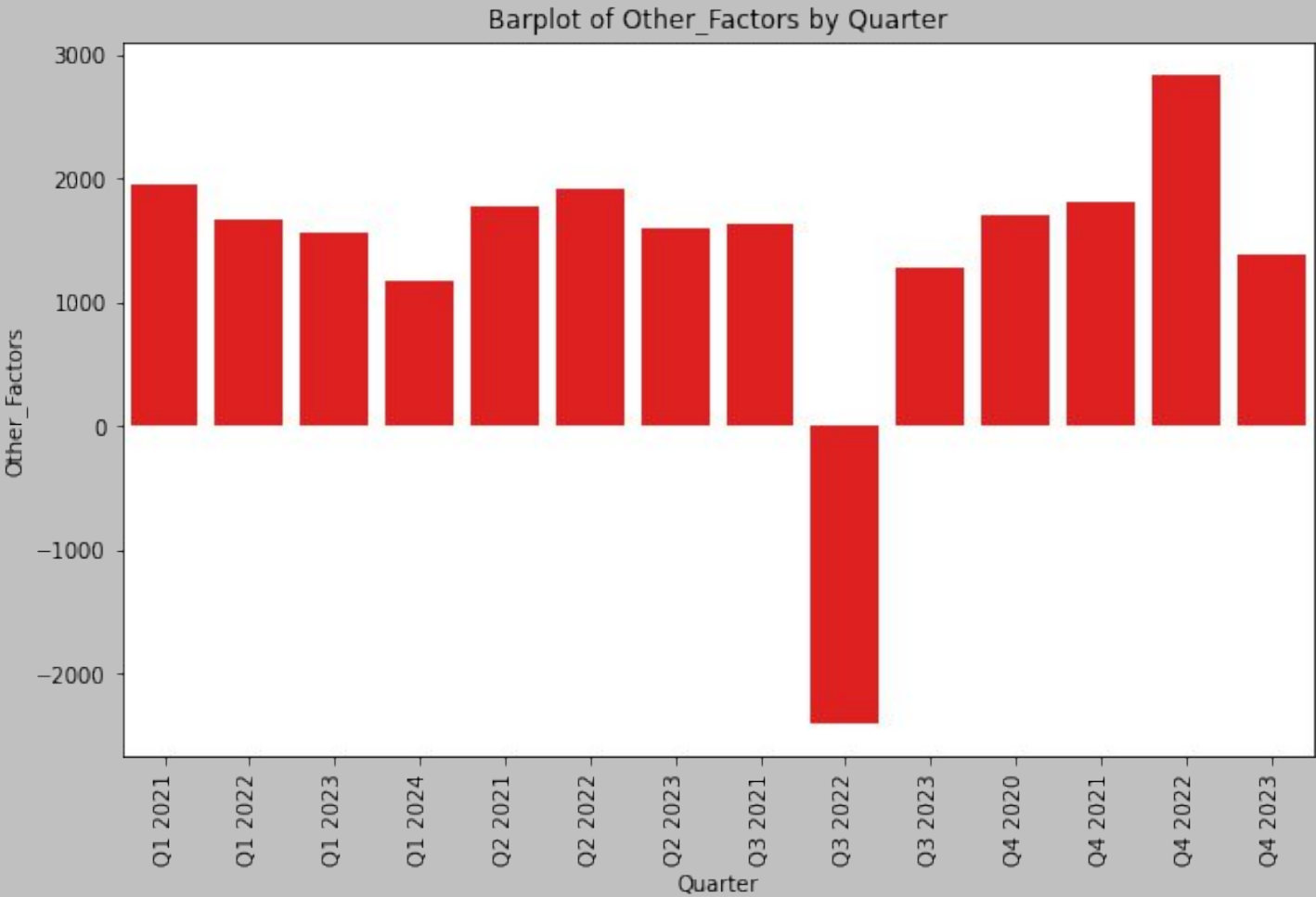
➤ **Lowest**  
Q3 2023



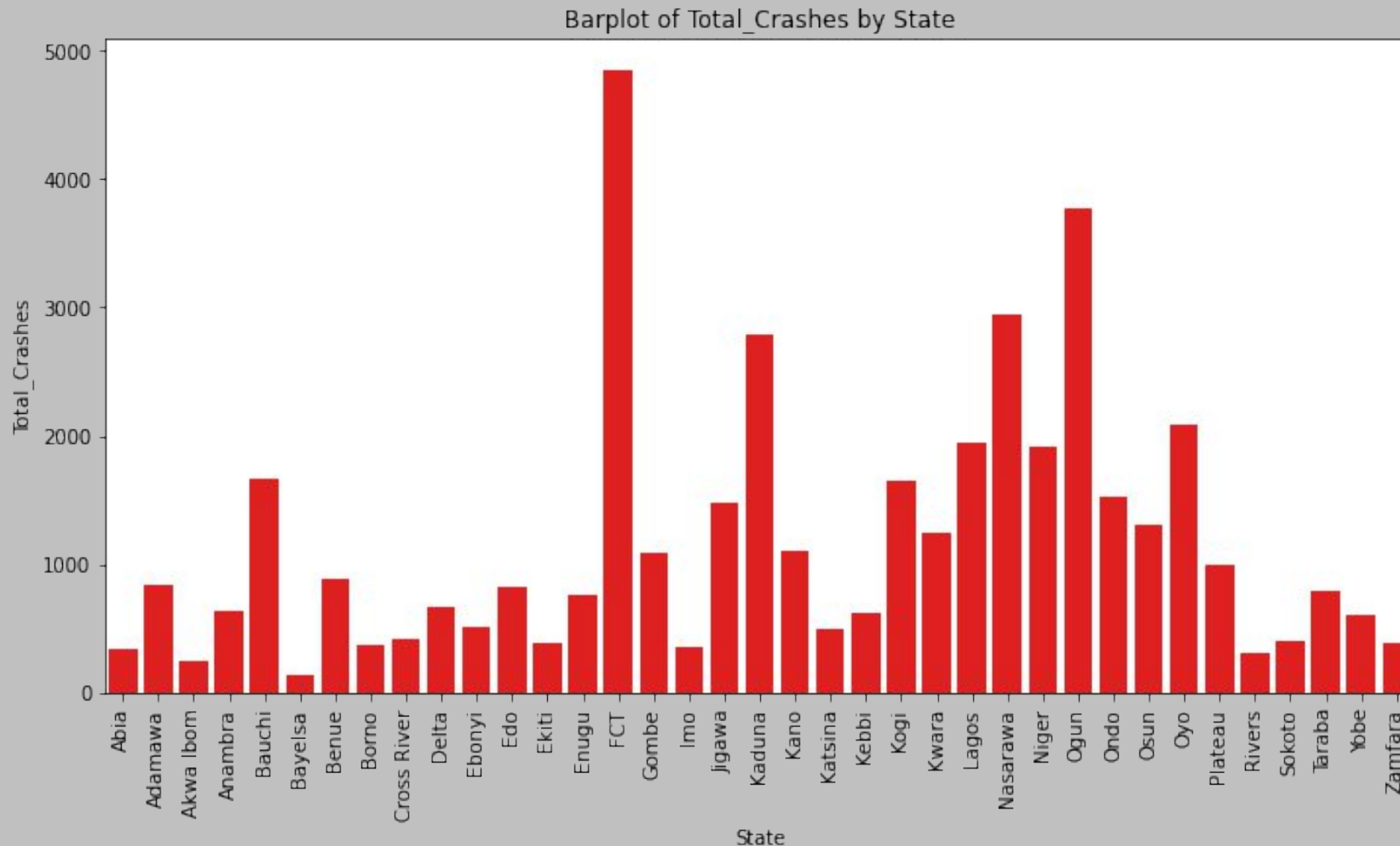
# Quarterly Trends Due to Other Factors



Highest in Q4 2022



# Total Crashes By State



**FCT**

highest number of crashes



**BAYELSA**

Least number of crashes

# Total Injuries By State



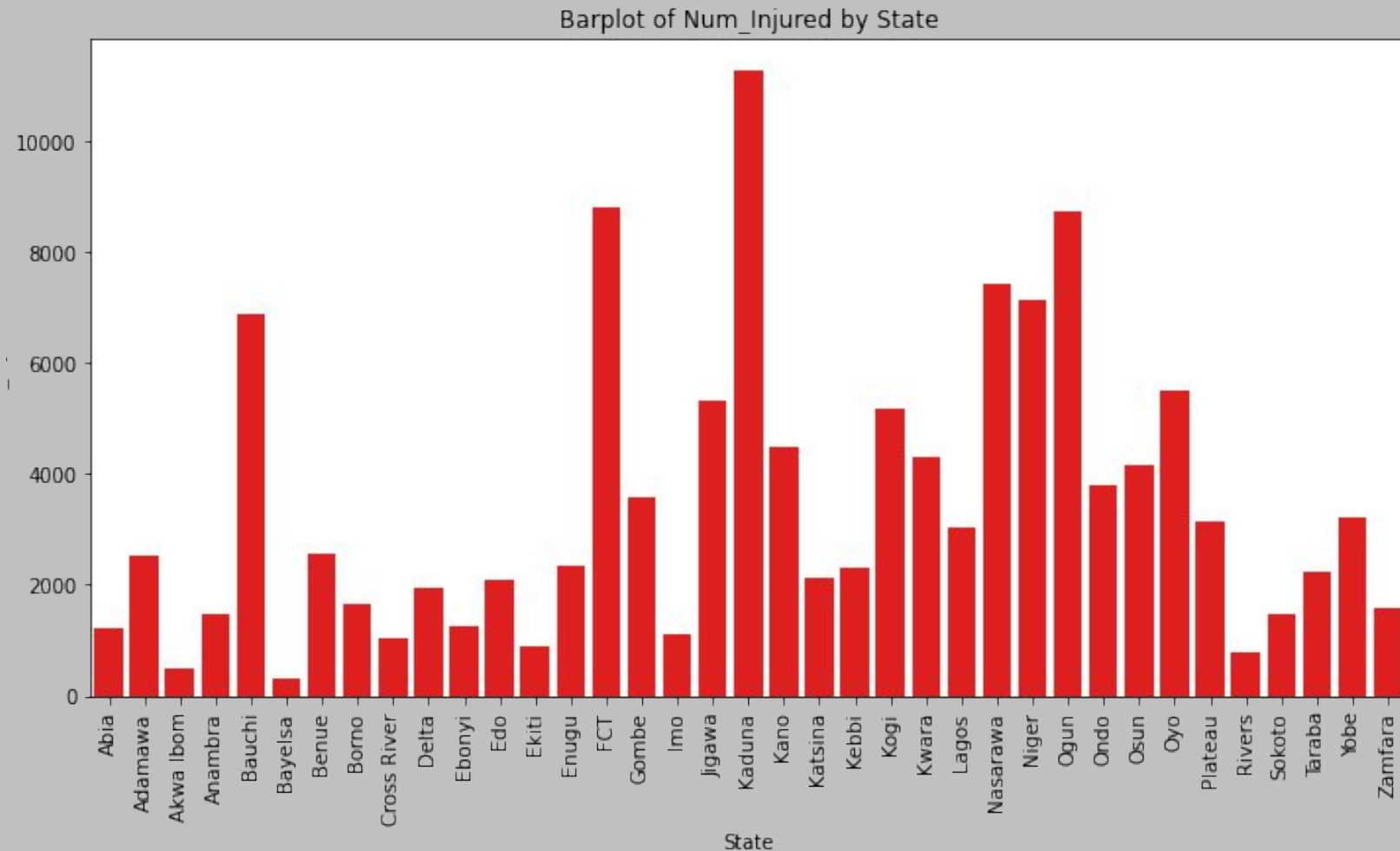
## KADUNA

State having highest number of injuries



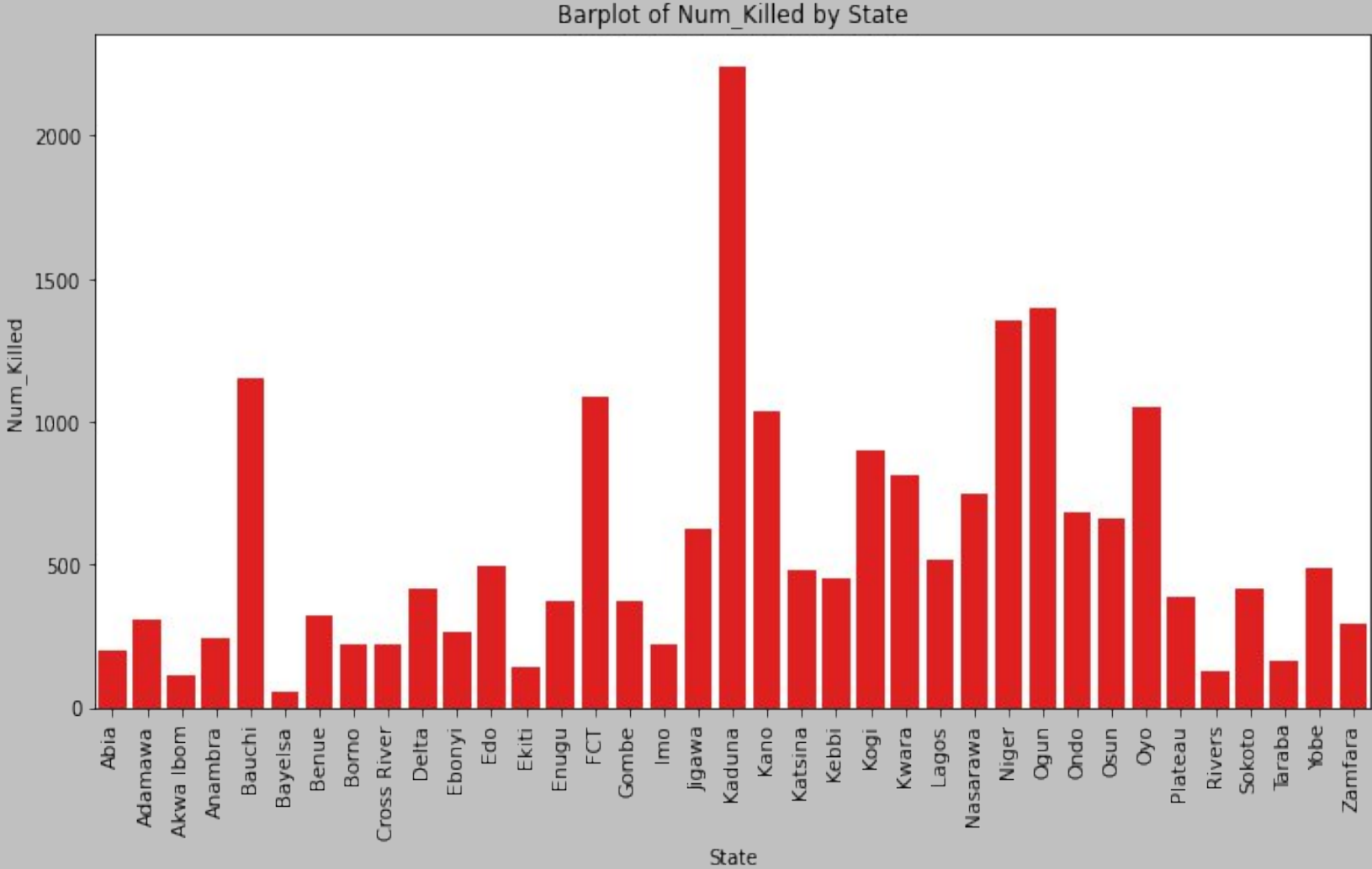
## BAYELSA

State having lowest number of injuries

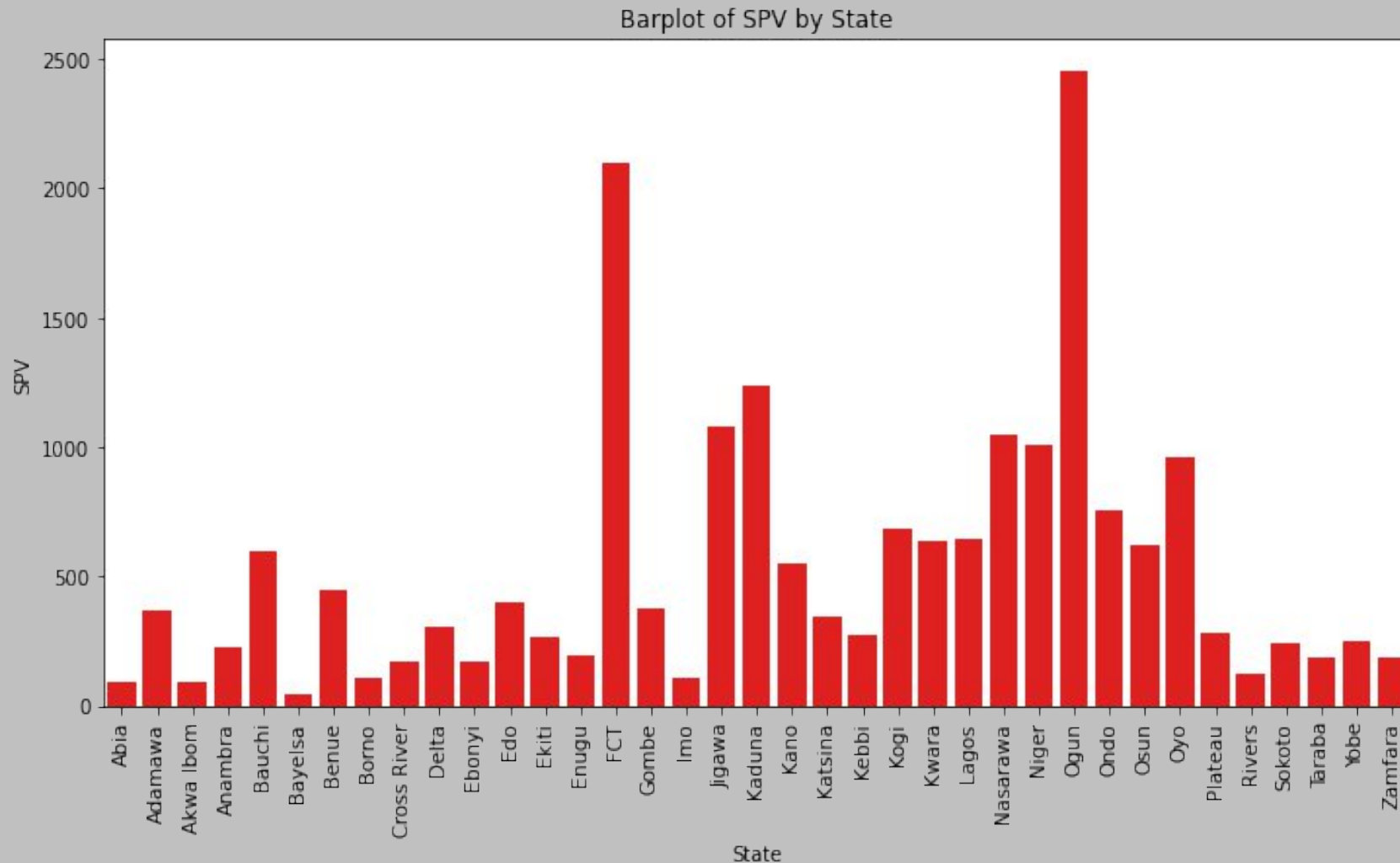


# Total Death By State

- **KADUNA**  
Highest number of deaths reported
- **BAYELSA**  
Lowest number of deaths reported



# Speed Violation (SPV) By State



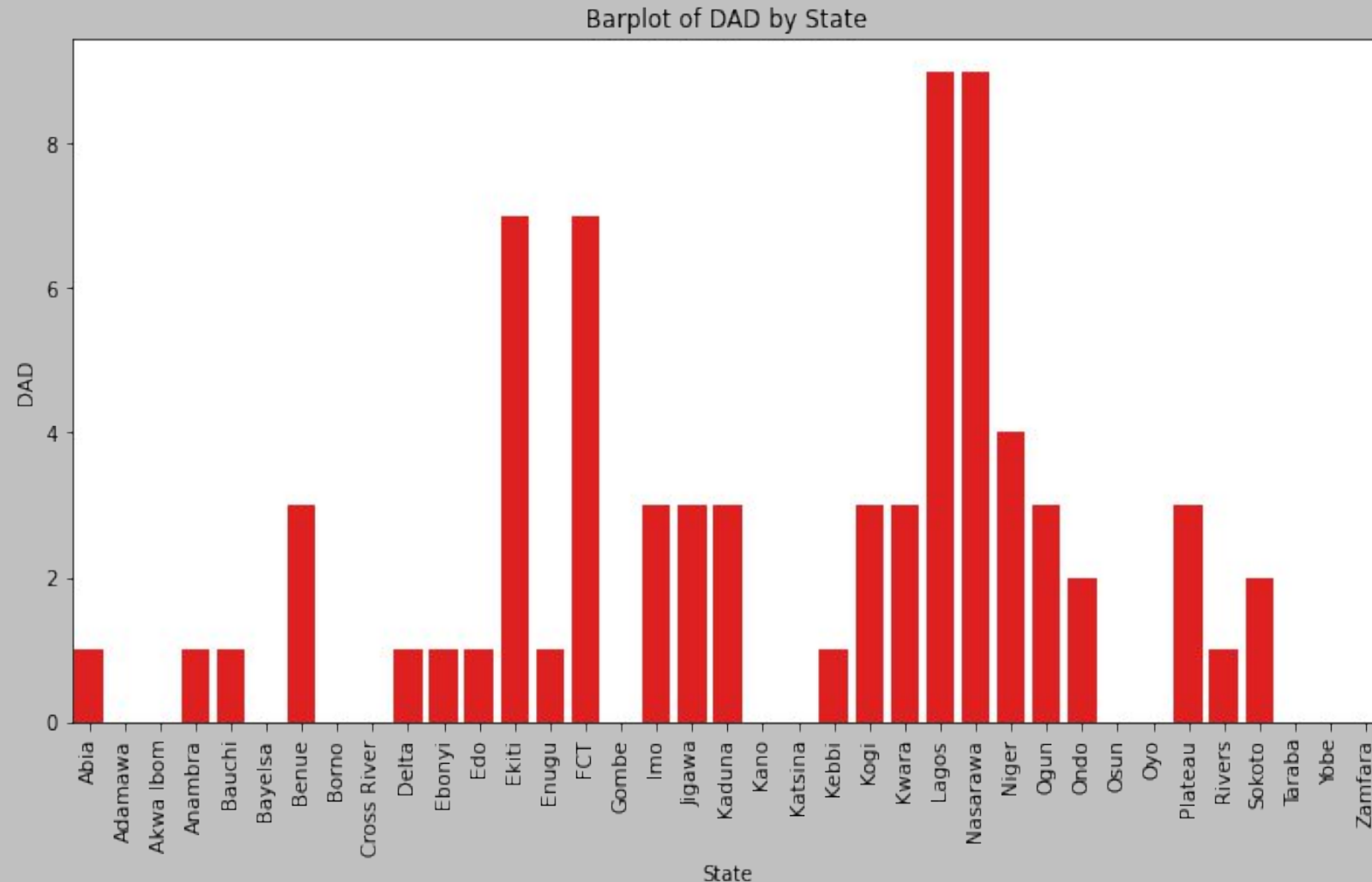
➤ **OGUN**  
Highest number of speed violation cases, followed by FCT

➤ **BAYELSA**  
Lowest number of speed violation cases

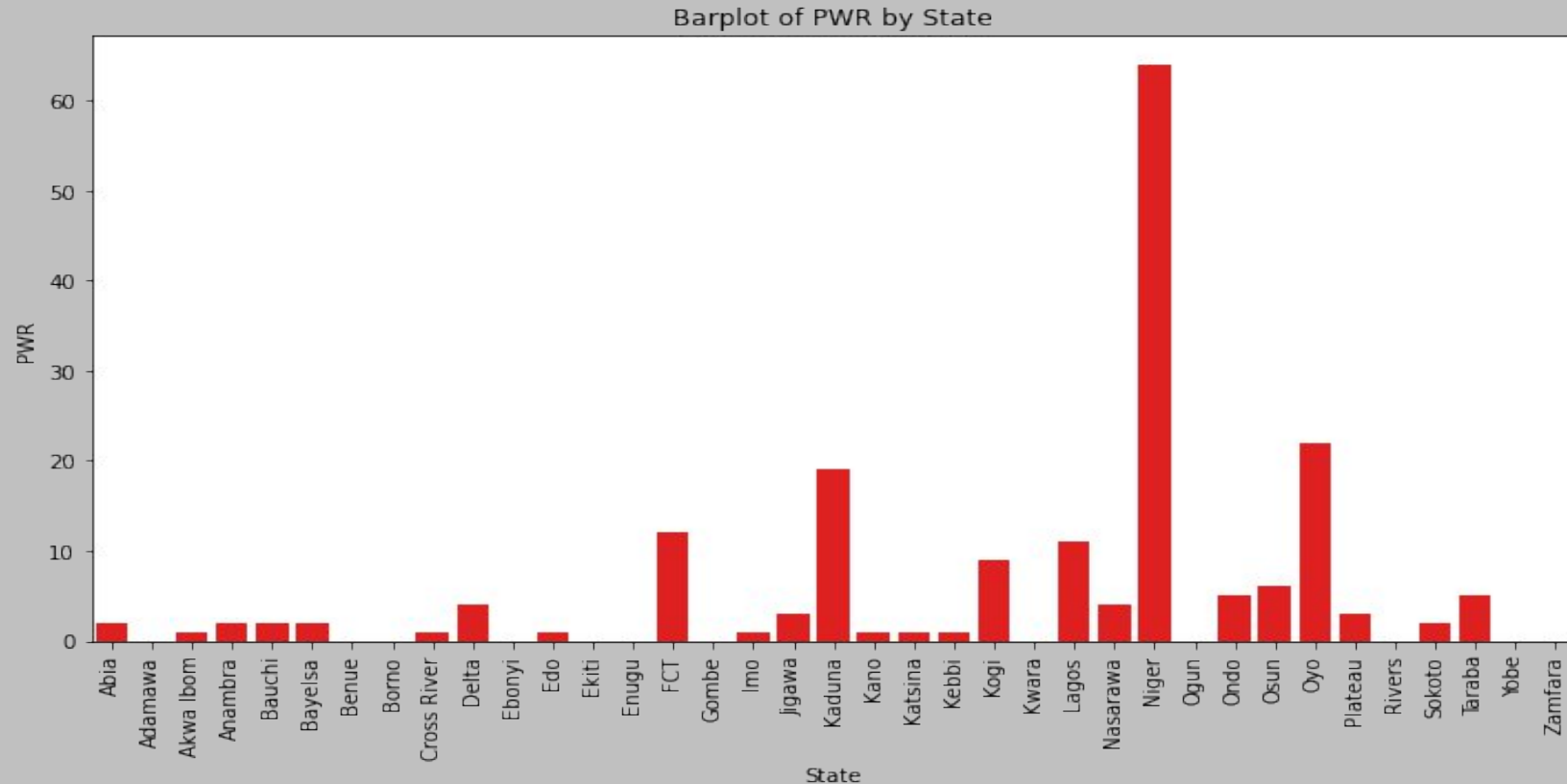
# Driving Under Alcohol/Drug Influence (Dad) By State



**LAGOS & NASARAWA**  
Reports highest number of  
vehicles involved in  
crashes due to DAD,  
followed by FCT and  
EKITI



# Poor Weather By State



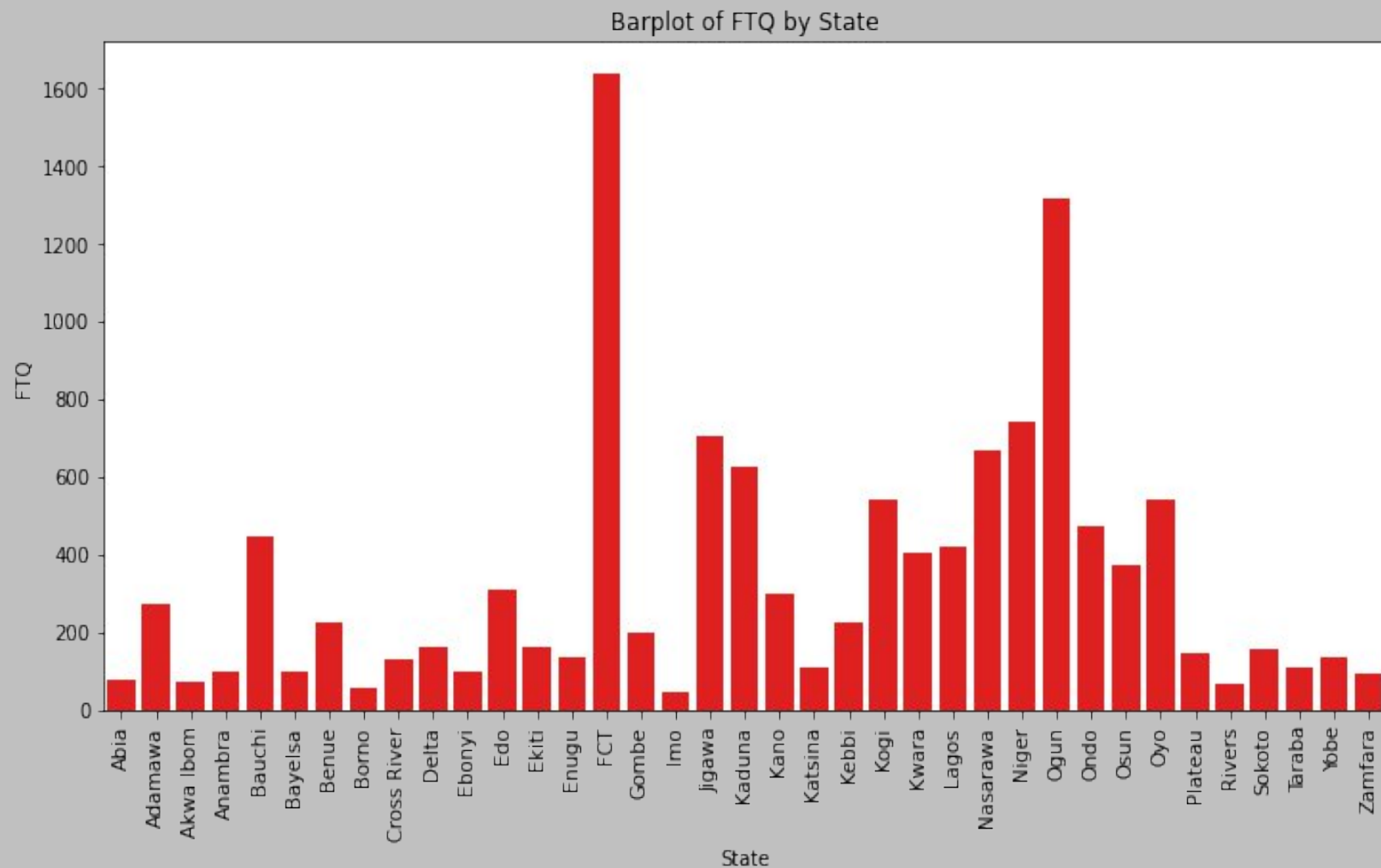
## **NIGER**

Reports highest number of vehicles involved in crashes due to poor weather conditions

# Fatigue By State

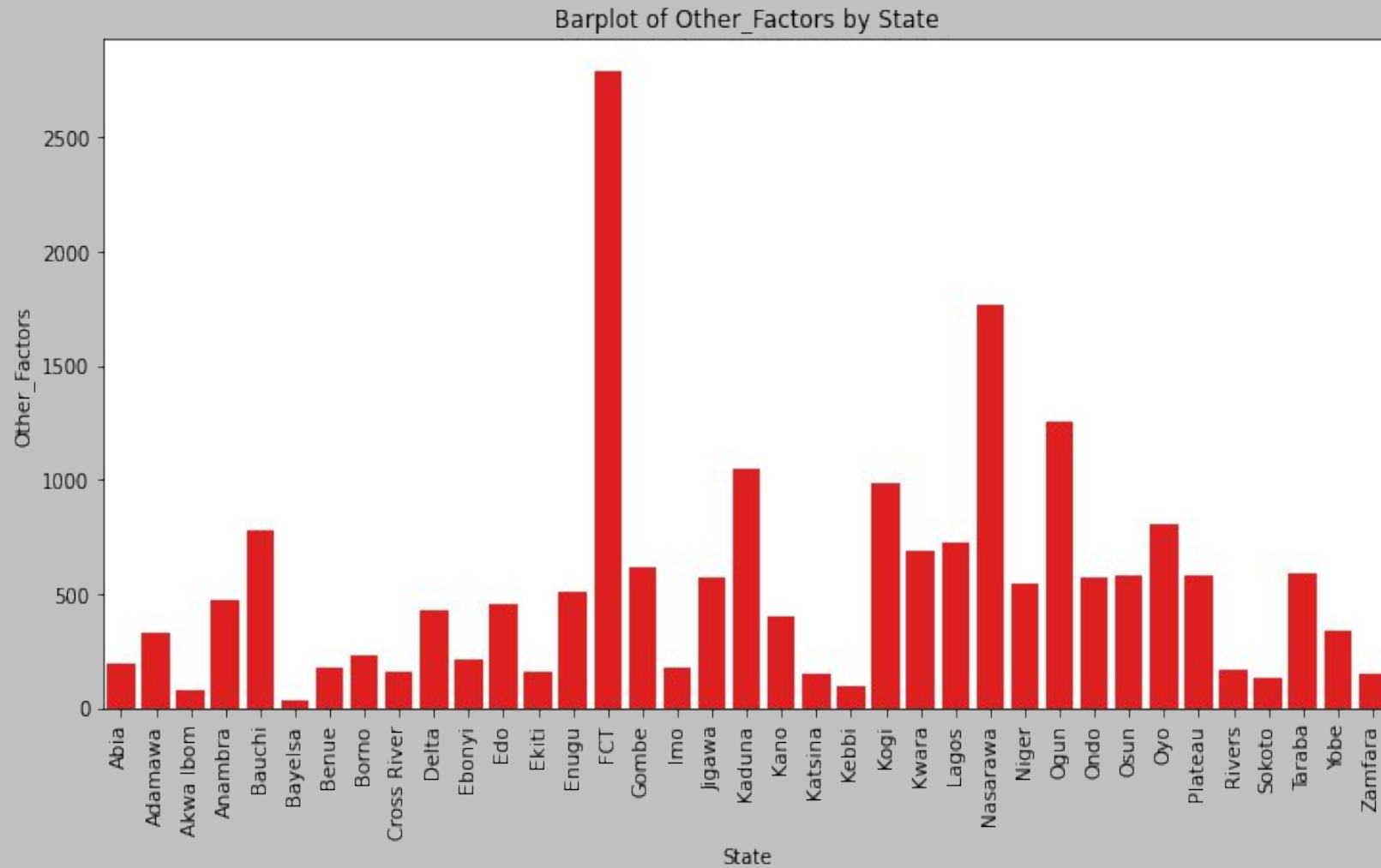
➤ **FCT**  
Highest number of cases reported

➤ **IMO**  
Lowest number of cases reported





# Other Factors By State



**FCT**

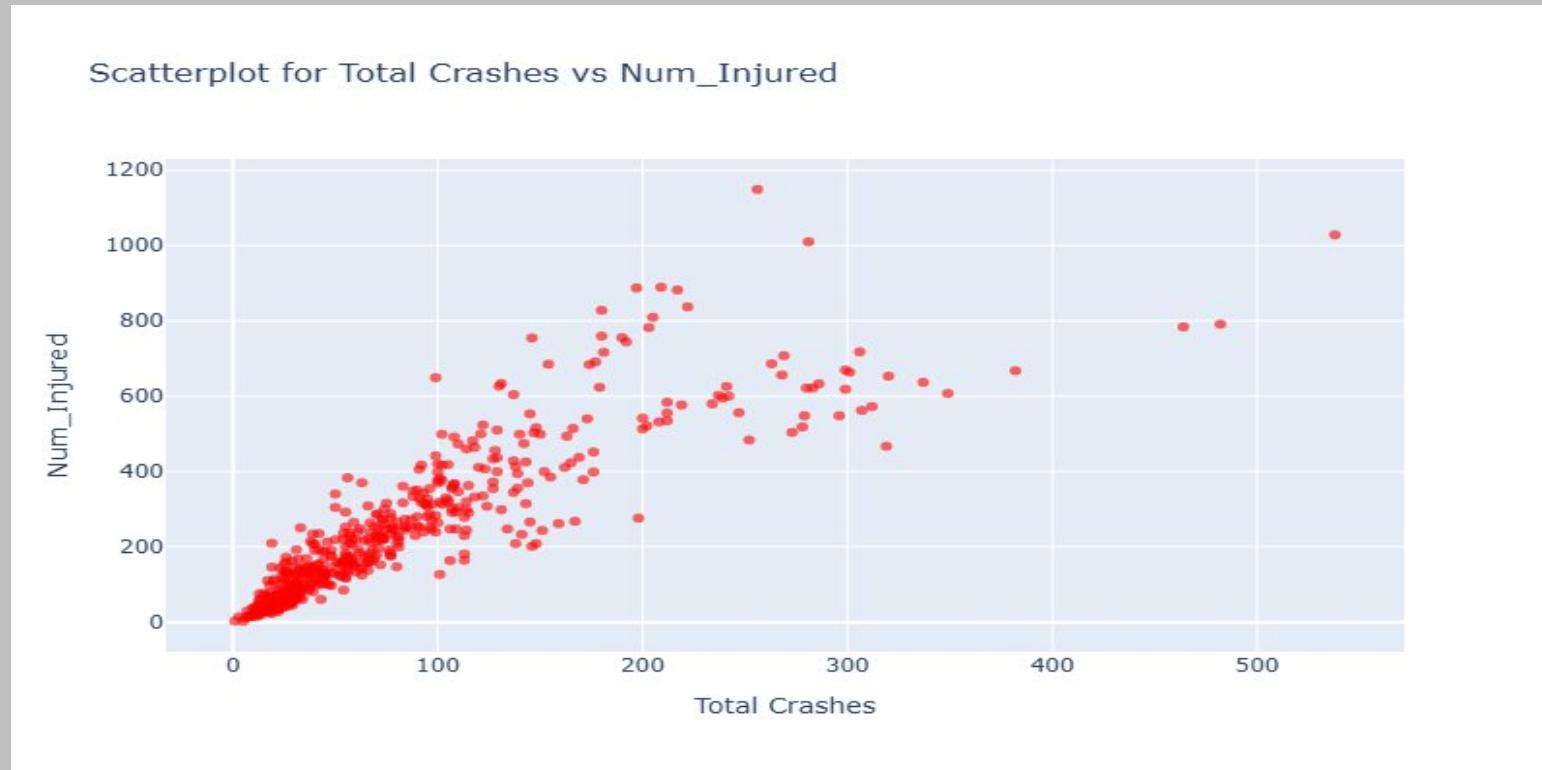
Highest cases of vehicles involved in crashes due to other factors



**BAYELSA**

Lowest cases of vehicles involved in crashes due to other factors

# Total Crashes Vs Injuries

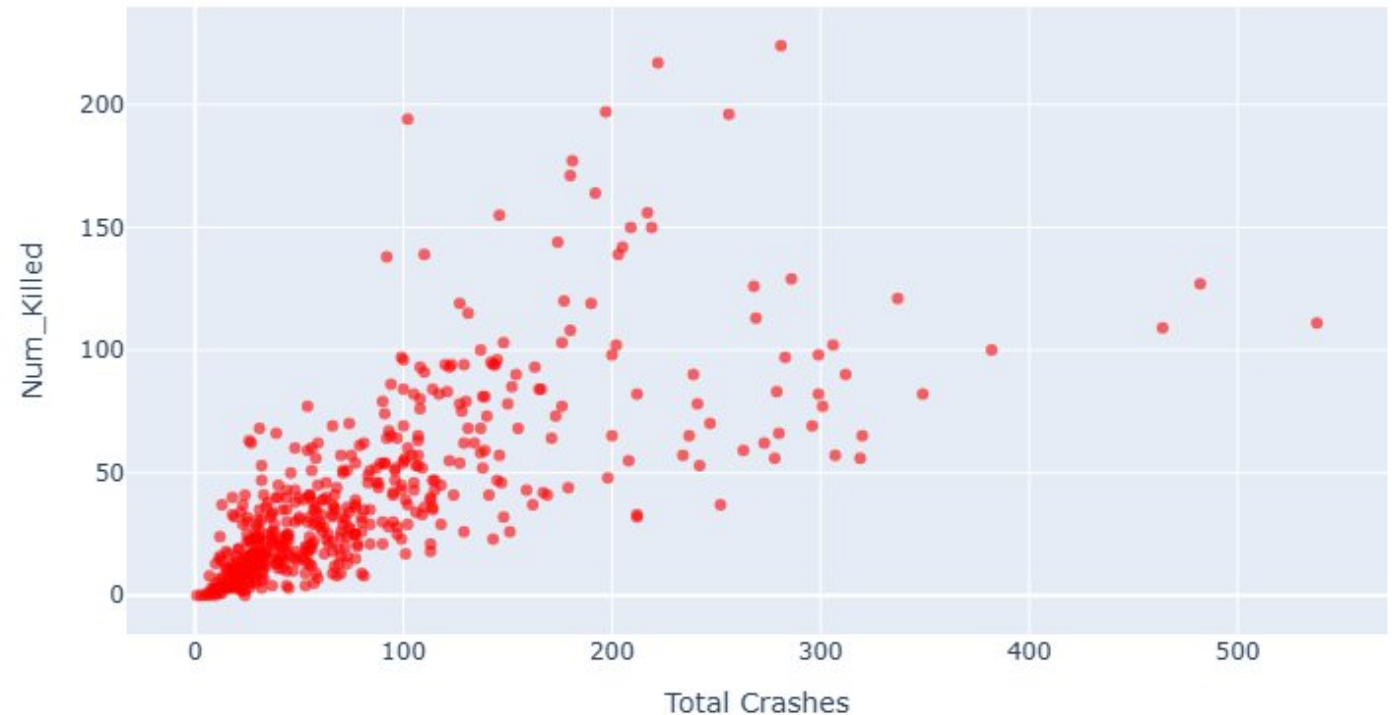


➤ Increase in the number of crashes is leading to a higher number of injuries

# Total Crashes Vs Deaths

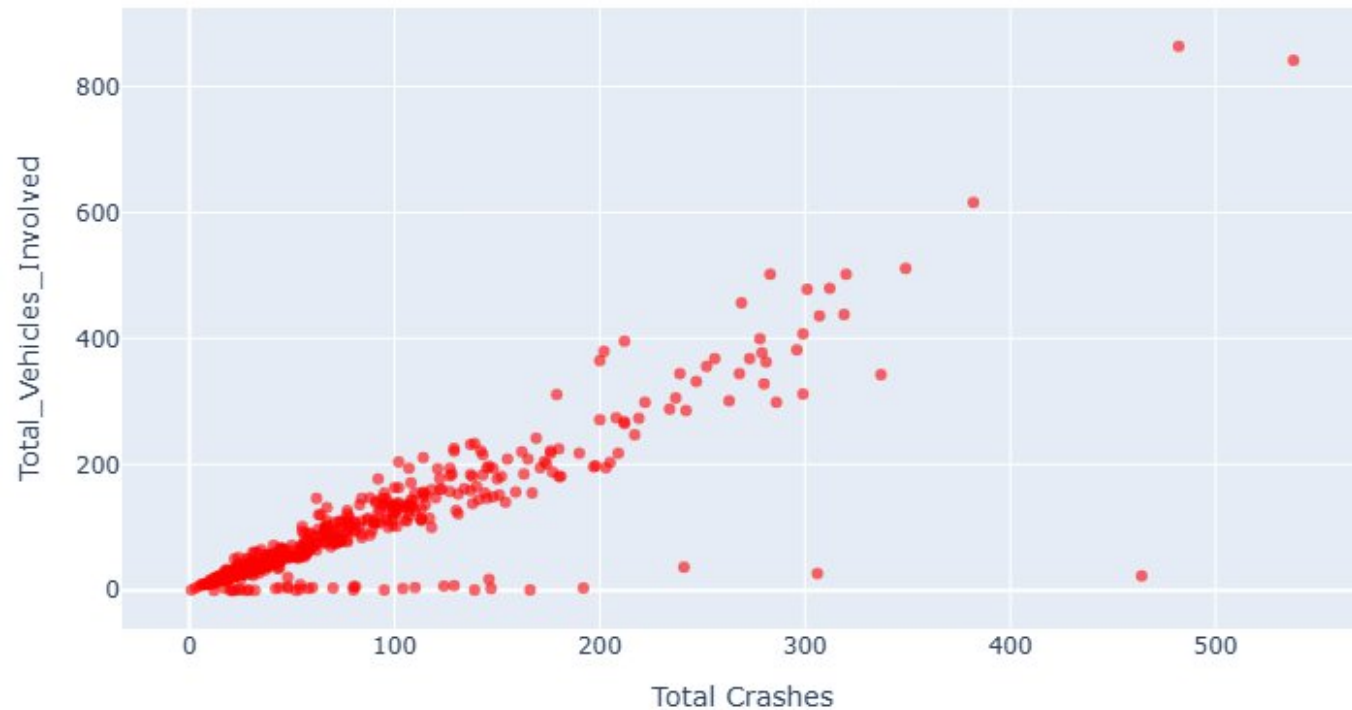
➤ Higher number of crashes generally leads to higher number of fatalities

Scatterplot for Total Crashes vs Num\_Killed



# Total Crashes Vs Total Vehicles Involved

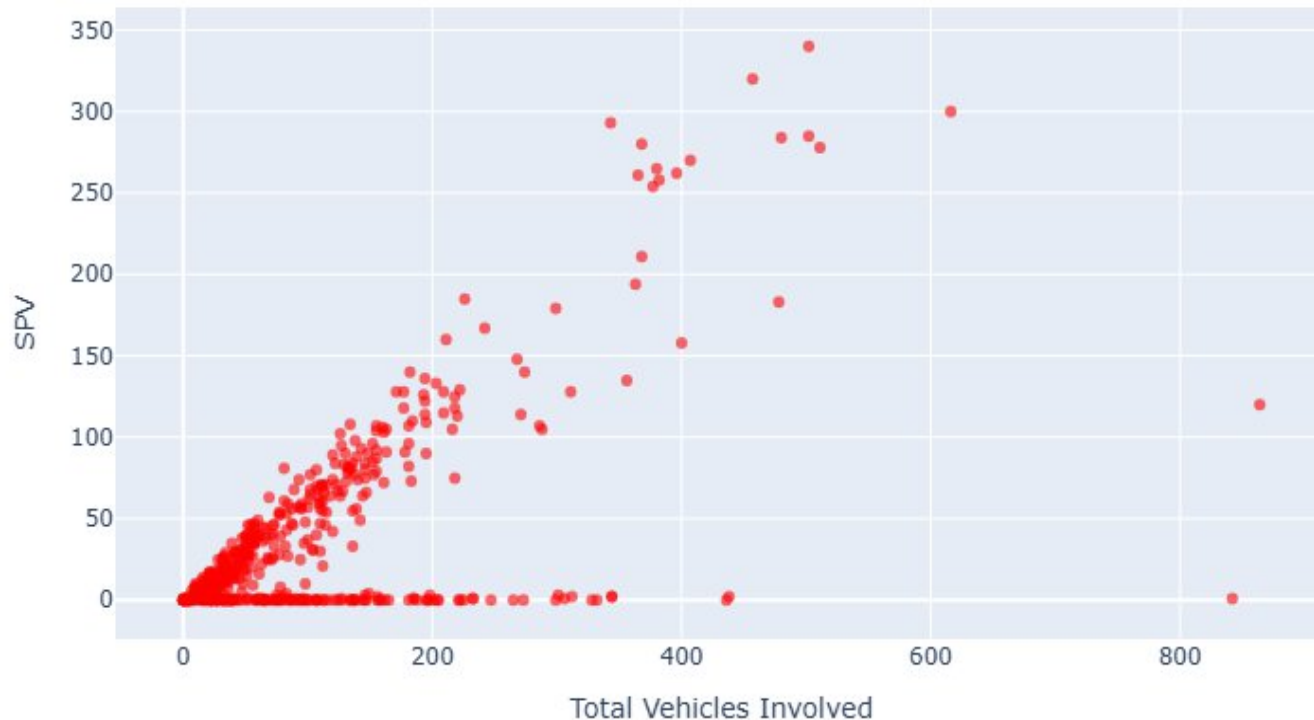
Scatterplot for Total Crashes vs Total\_Vehicles\_Involved



As the number of crashes increases, number of vehicles involved also tends to increase

# Total Vehicles Involved Vs Speed Violation

Scatterplot for Total Vehicles Involved vs SPV

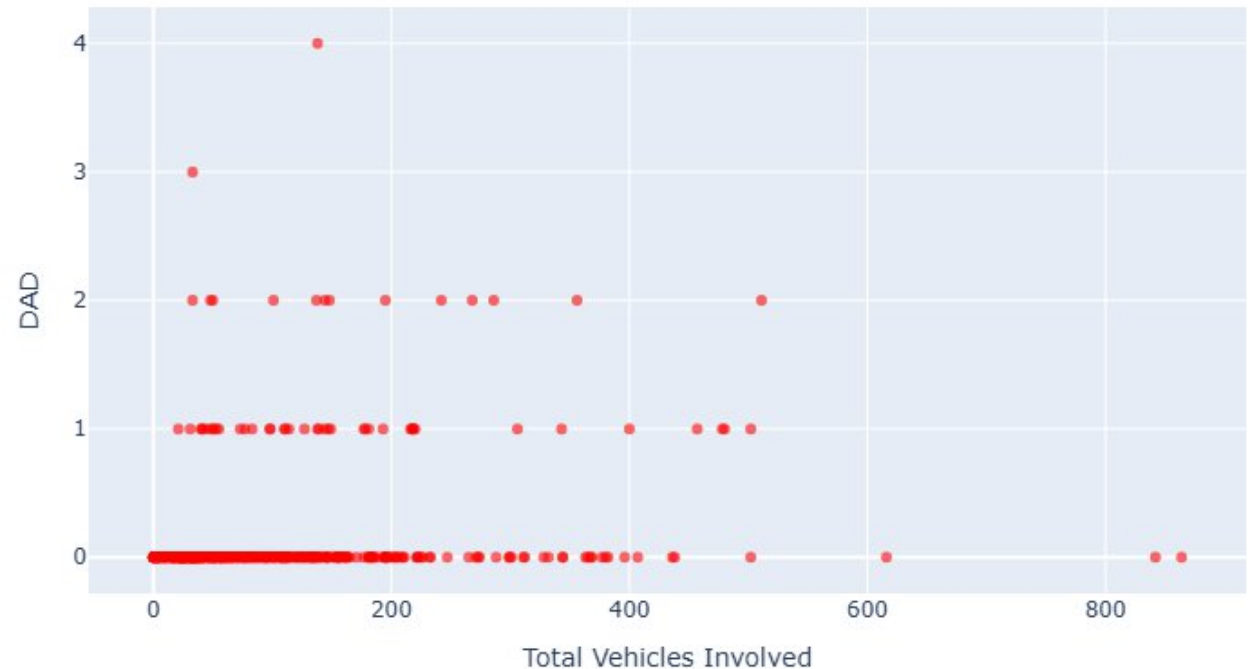


➤ Positive correlation suggests speed violation is a significant factor in vehicles involving crashes.

# Total Vehicles Involved Vs Driver Under Drug/Alcohol

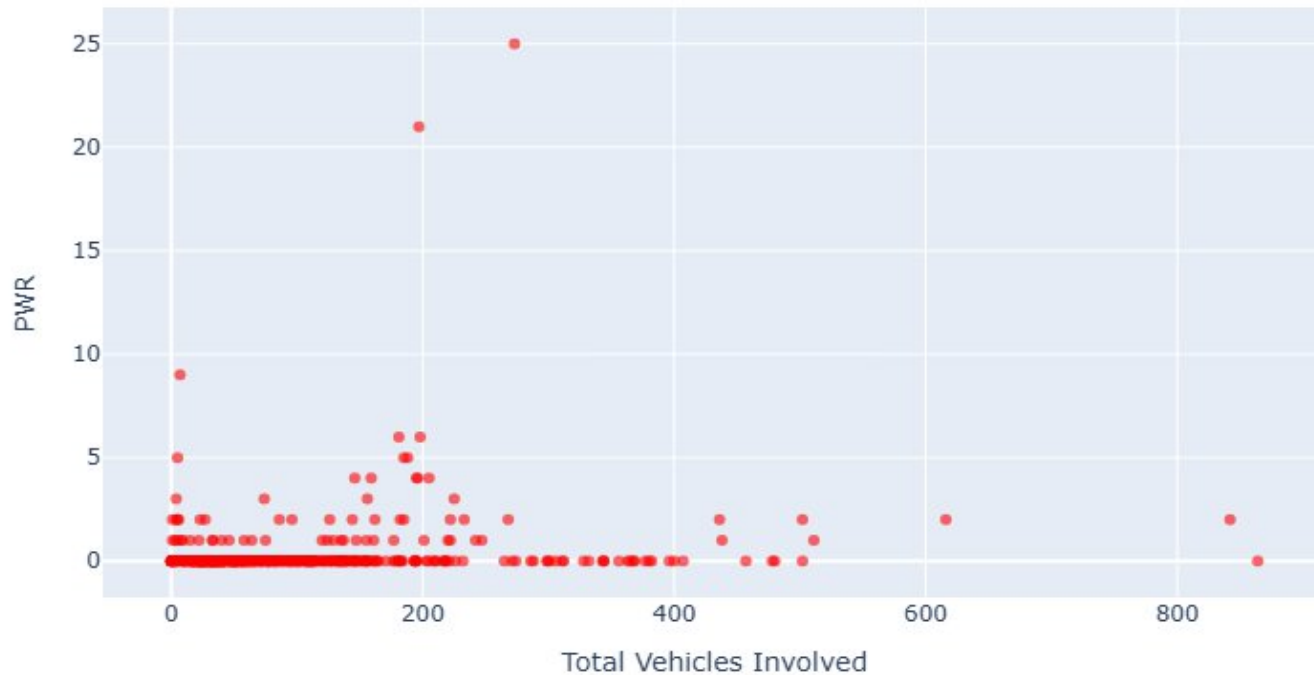
➤ The influence of DAD on the Total Vehicles Involved in crashes is minimal.

Scatterplot for Total Vehicles Involved vs DAD



# Total Vehicles Involved Vs Poor Weather

Scatterplot for Total Vehicles Involved vs PWR

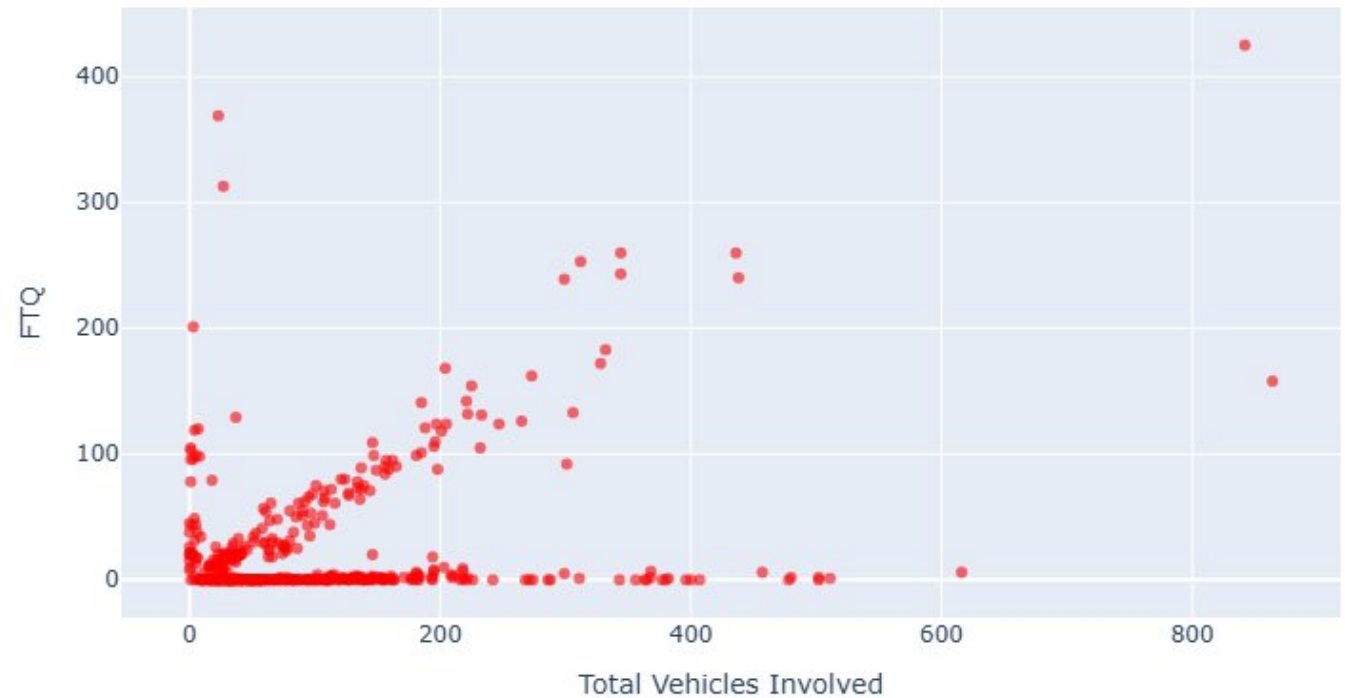


➡ Poor weather does not significantly increase vehicle involvement in crashes.

# Total Vehicles Involved Vs Driver Fatigue

➤ Driver fatigue can be considered as a significant factor in vehicles involved in crashes.

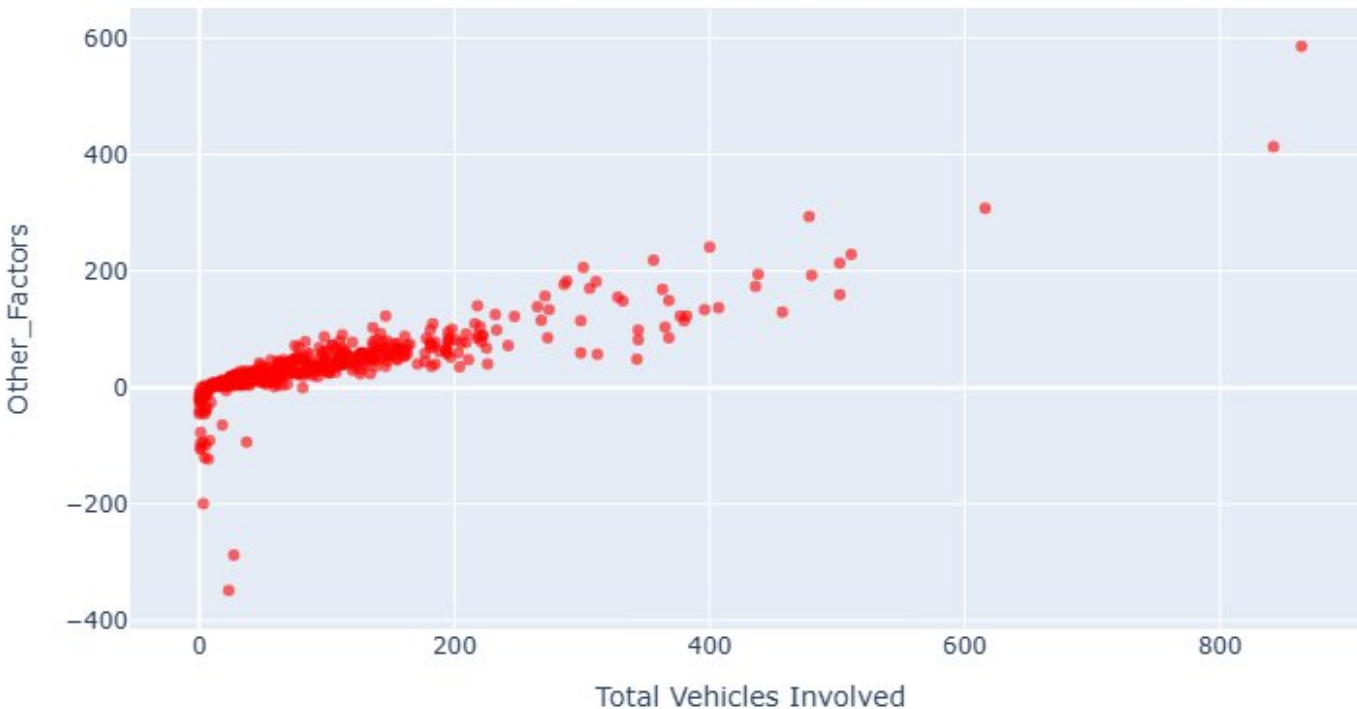
Scatterplot for Total Vehicles Involved vs FTQ





# Total Vehicles Involved Vs Other Factors

Scatterplot for Total Vehicles Involved vs Other\_Factors



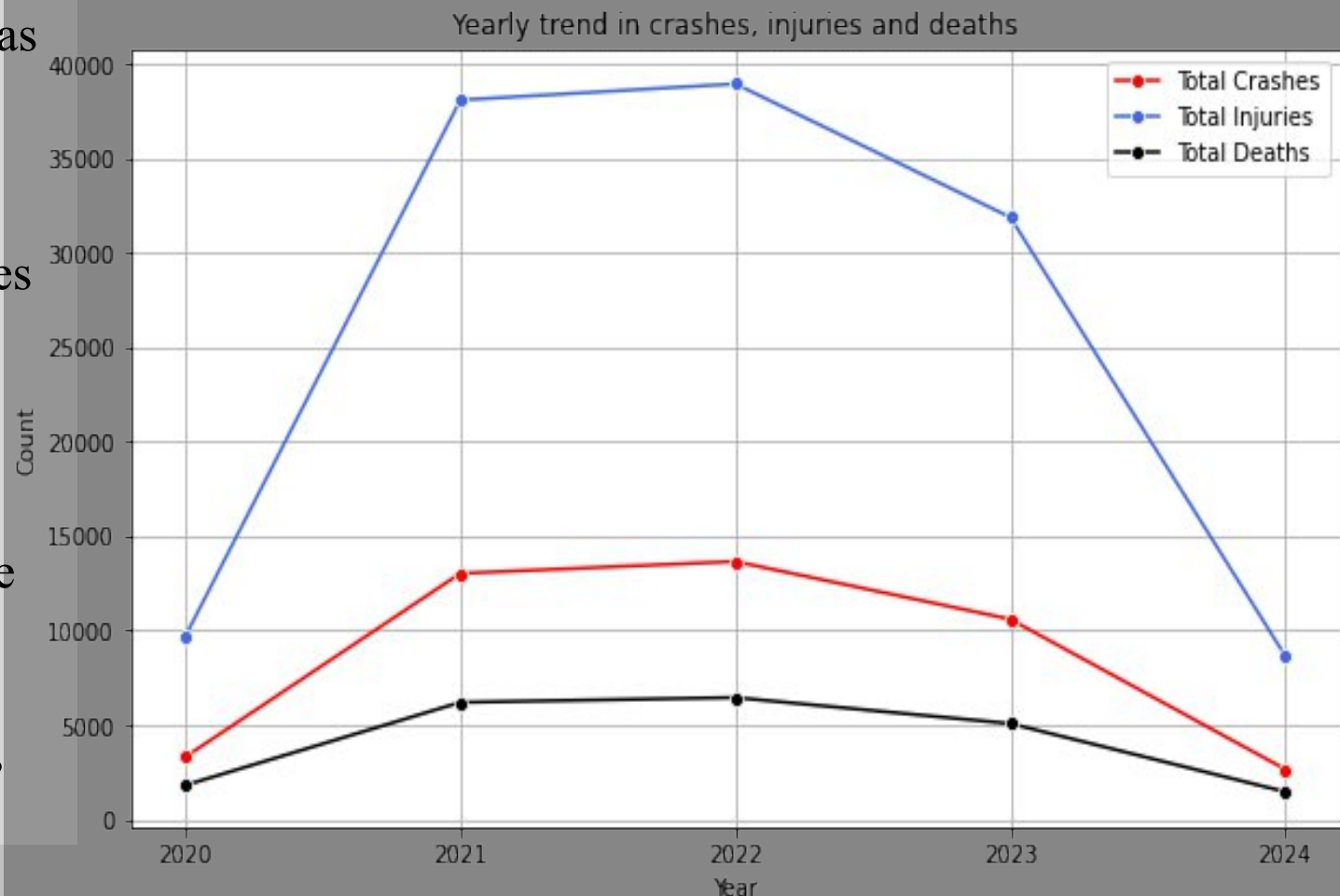
➤ Other factors significantly increase the vehicle involvement in crashes.

# Analysing Crash Trends Over Time



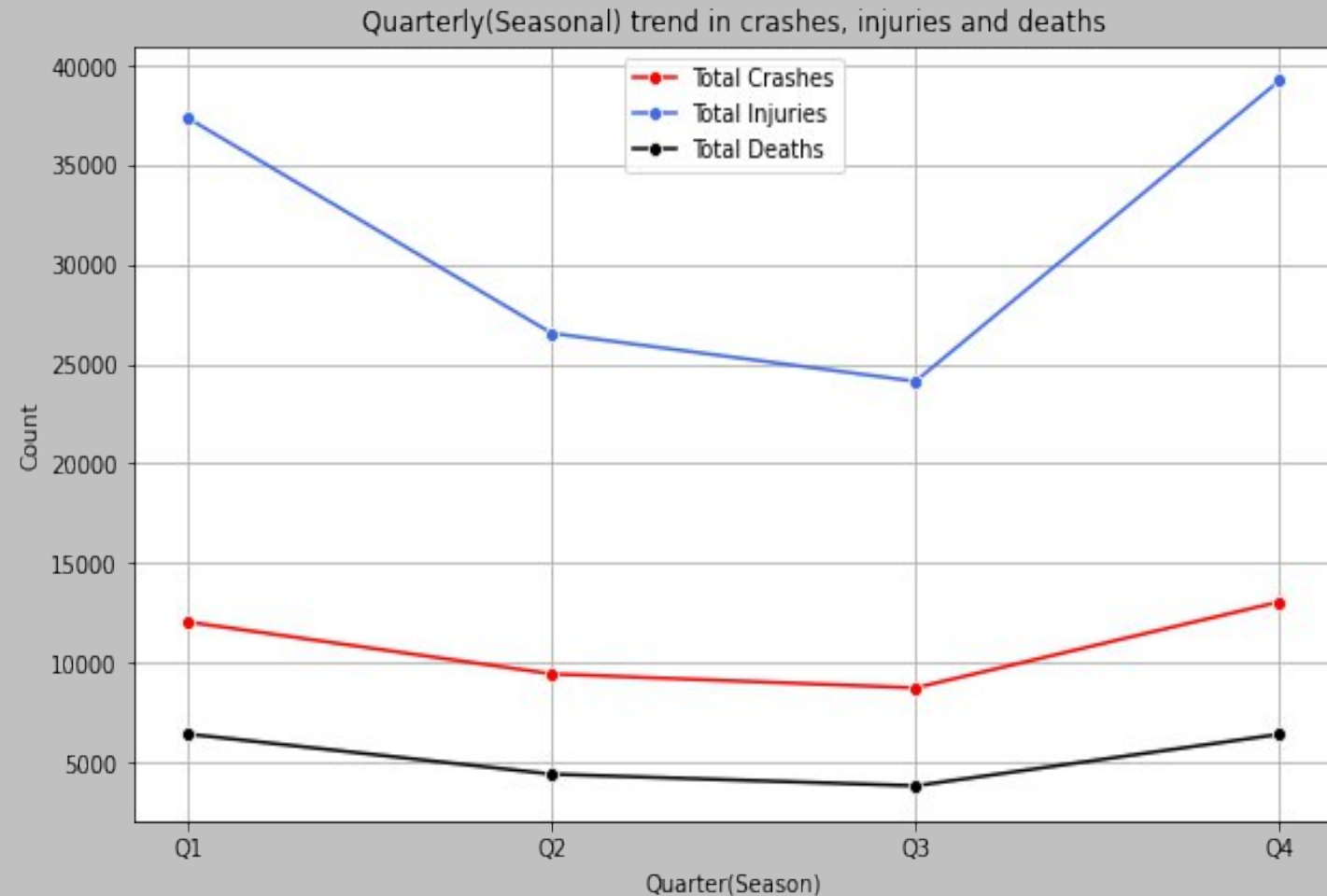
# *Yearly Trend In Crashes, Injuries And Deaths*

- **Total Crashes:** The number of total crashes has been fluctuating over the years, with a peak in 2022 and a significant decrease in 2024.
- **Total Injuries:** Similar to total crashes, injuries have shown a fluctuating trend, with a peak in 2022 and a decline in 2024.
- **Total Deaths:** Deaths have also been fluctuating, with a peak in 2022 and a decrease in 2024.
- Year 2022 recorded the highest crash severity, while 2024 showed a notable decrease



# *Quarterly Trend In Crashes, Injuries And Deaths*

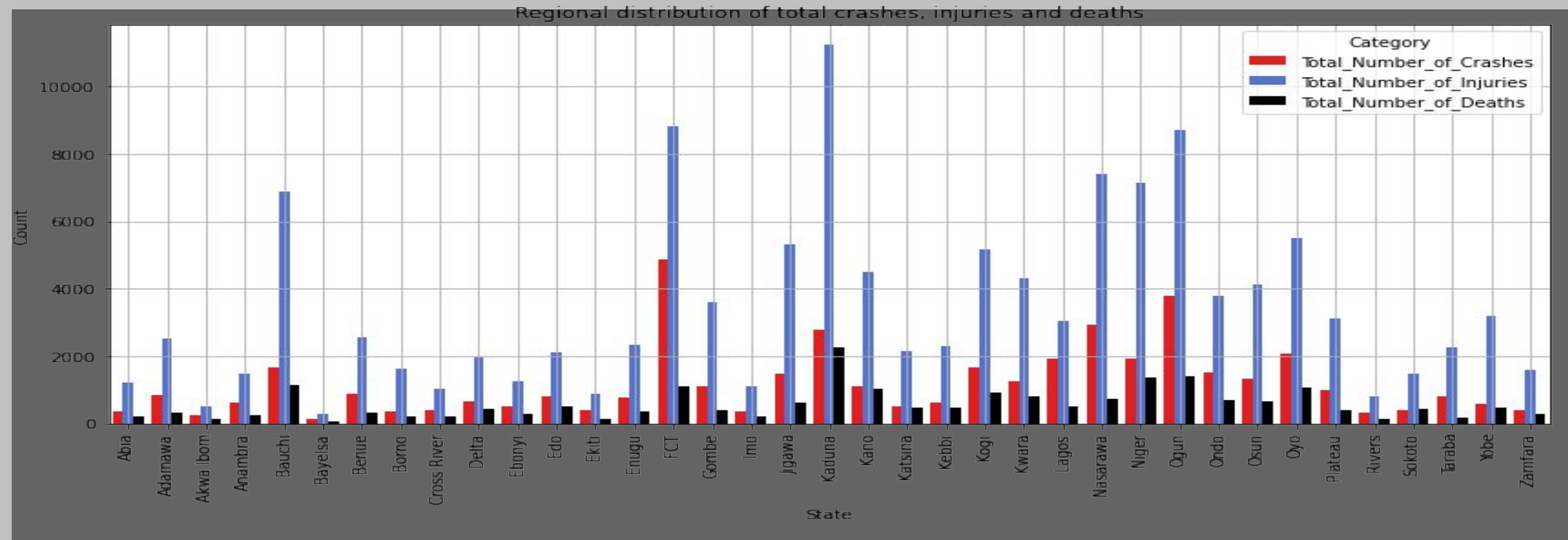
- **Total Crashes:** peaked in Q4, while Q3 experienced the lowest number of crashes.
- **Total Injuries:** peaked in Q4 while while Q3 had the lowest cases.
- **Total Deaths:** Q1 and Q4 reported higher death rates, while Q3 had the lowest.
- Crash severity was higher in Q1 and Q4, likely due to extreme weather and the increased holiday traffic.



# Analysing Crash Trends By Region



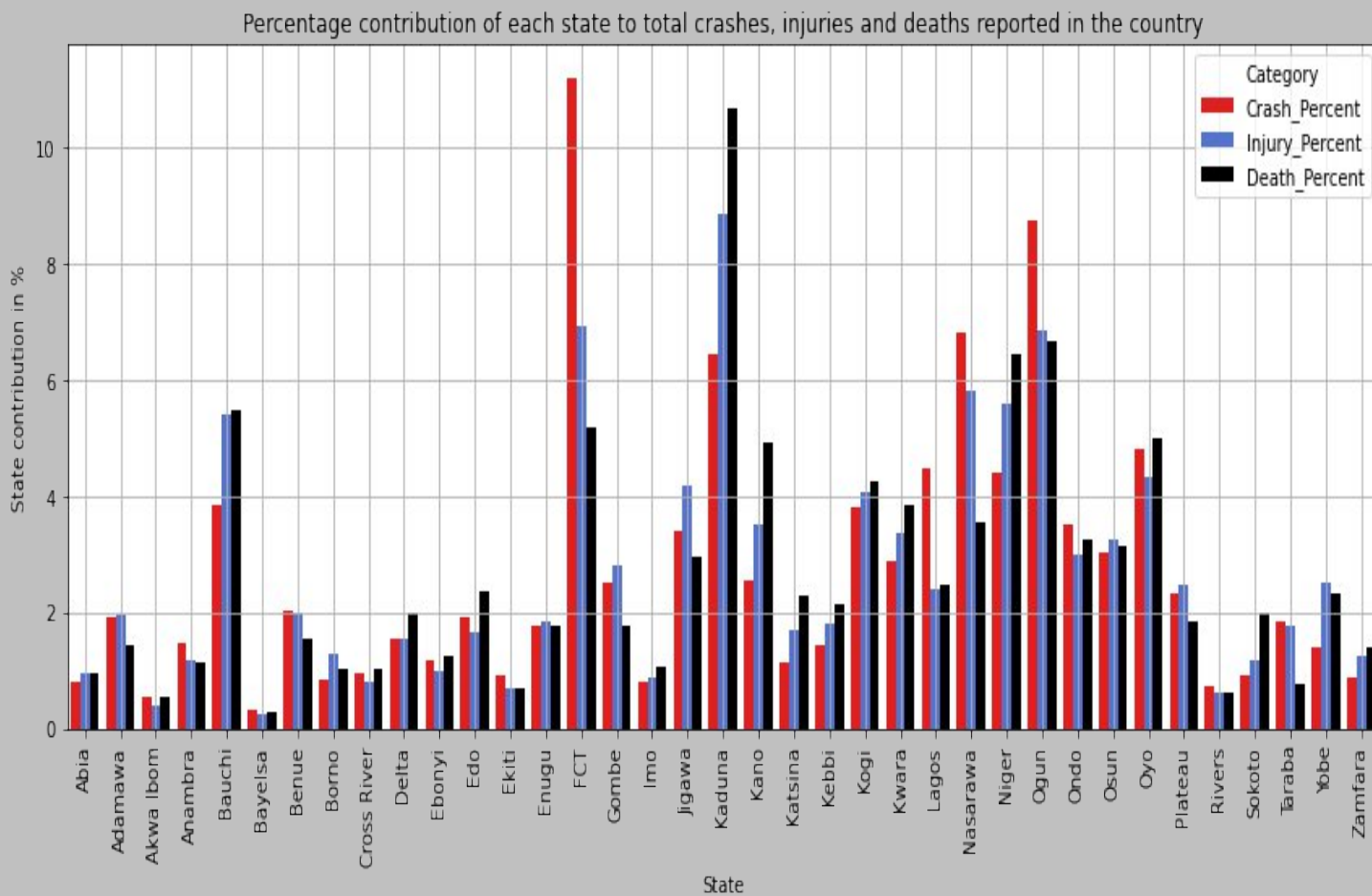
# Regional Crash Impact Based On Total Crashes, Injuries And Deaths



**FCT:** highest number of total crashes  
**KADUNA :** Highest in total injuries and death cases

# Contribution Of Each State To Total Crashes, Injuries And Deaths Reported In The Country

Crash %	Injury %	Death %
FCT(11.2%)	Kaduna(8.8%)	Kaduna(10.6 %)
Ogun(8.7%)	FCT(6.9%)	Ogun(6.6%)
Nasarawa(6.8 %)	Ogun(6.8%)	Niger(6.4%)
Kaduna(6.4%)	Nasarawa(5.8 %)	Bauchi(5.4%)
Oyo(4.8%)	Niger(5.6%)	FCT(5.1%)



# Analysing Severity Of Crashes

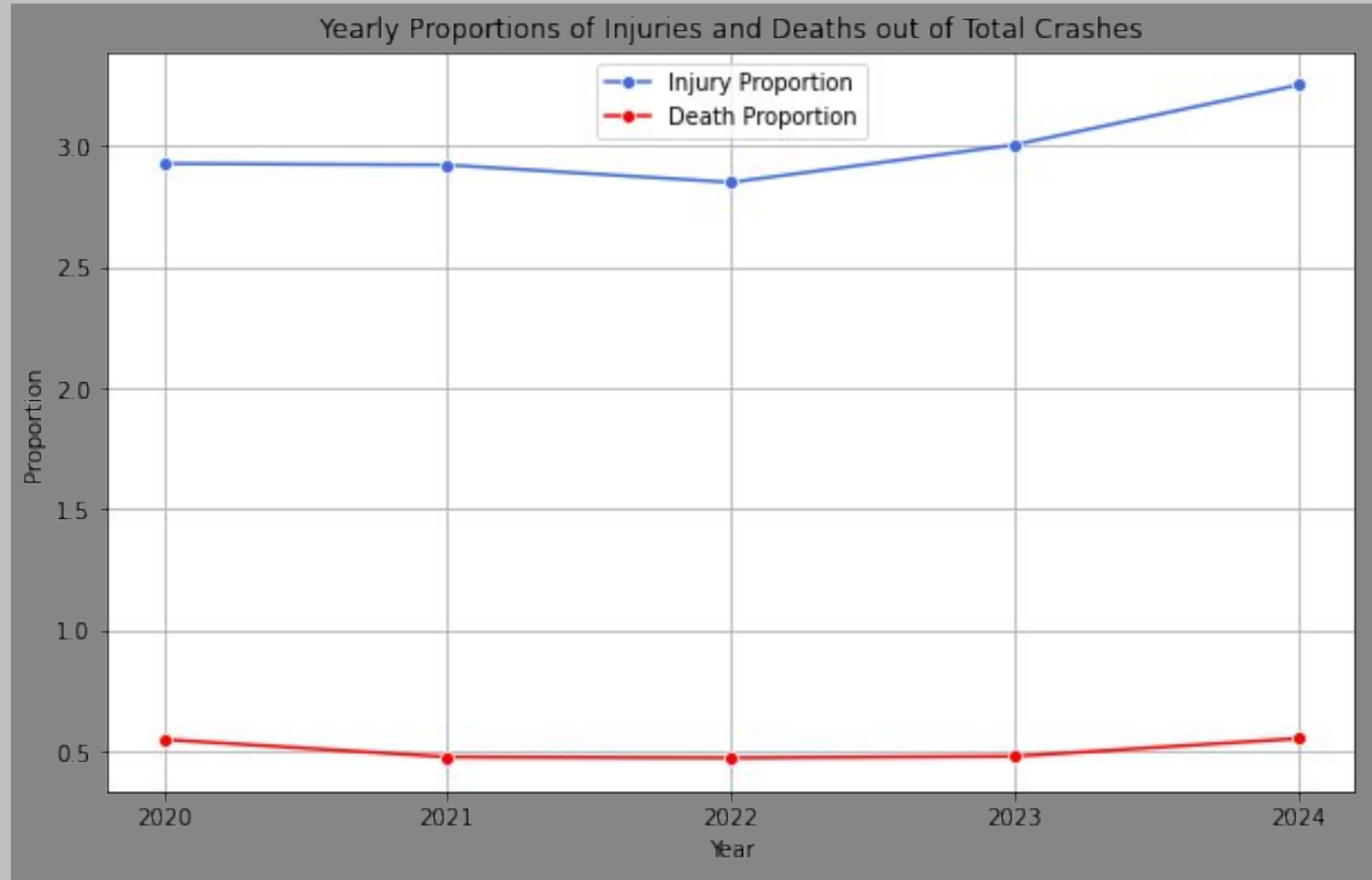




# Crash Severity Over Years

➤ **Injury Proportion:** shows a relatively stable pattern from 2020 to 2022 and slight upward trend from 2022 to 2024.

➤ **Death Proportion:** shows a relatively stable trend over these years and a slight increase in 2024.



# Crash Severity Across States

➤ **Injury Proportion:** Yobe has a high injury proportion, whereas Lagos and FCT have lower values.

➤ **Death Proportion:** Sokoto has a high death proportion, while FCT has lowest.

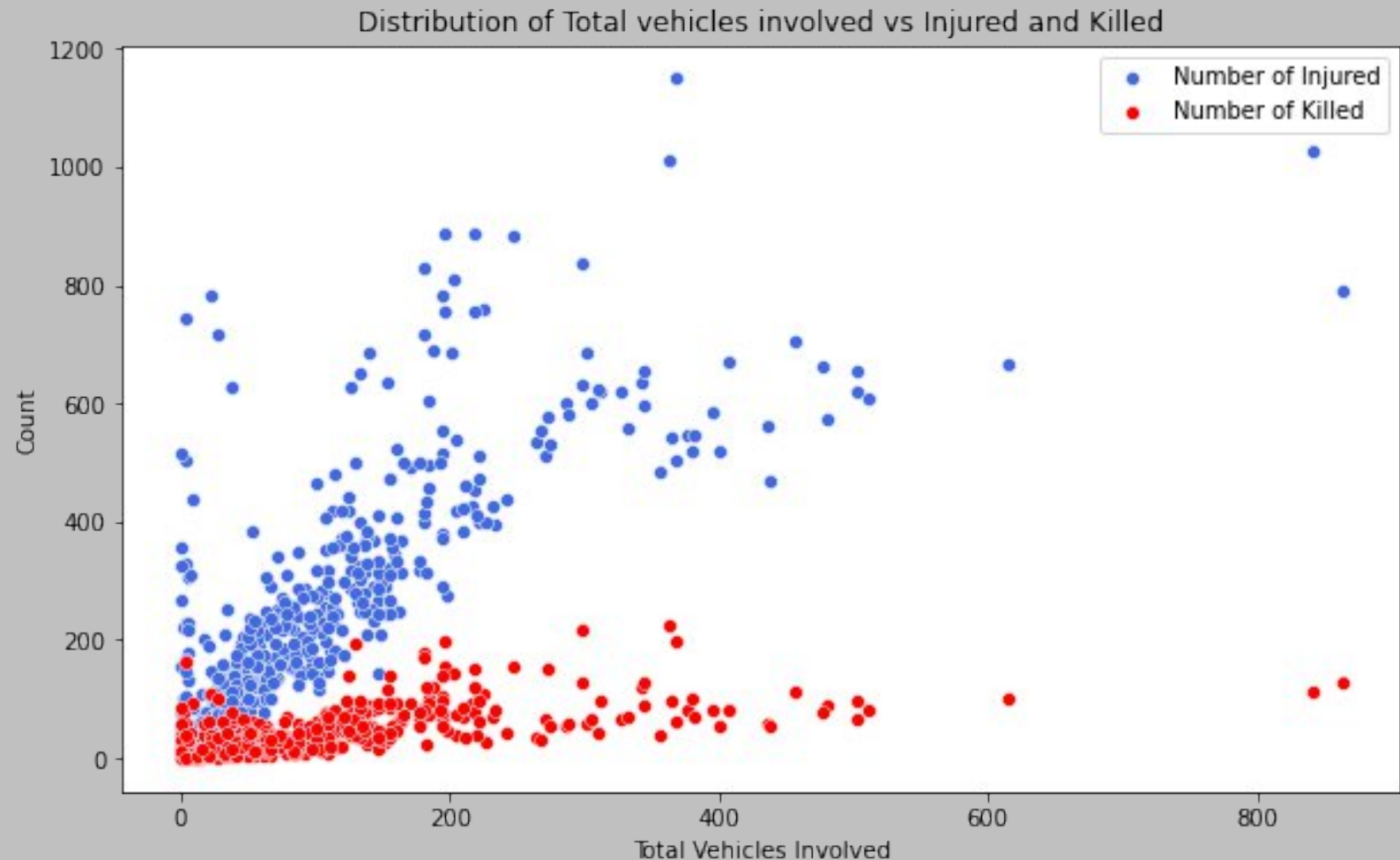


# Analysing The Impact Of Vehicle Involvement



# Relationship Between Vehicle Involvement And Crash Severity

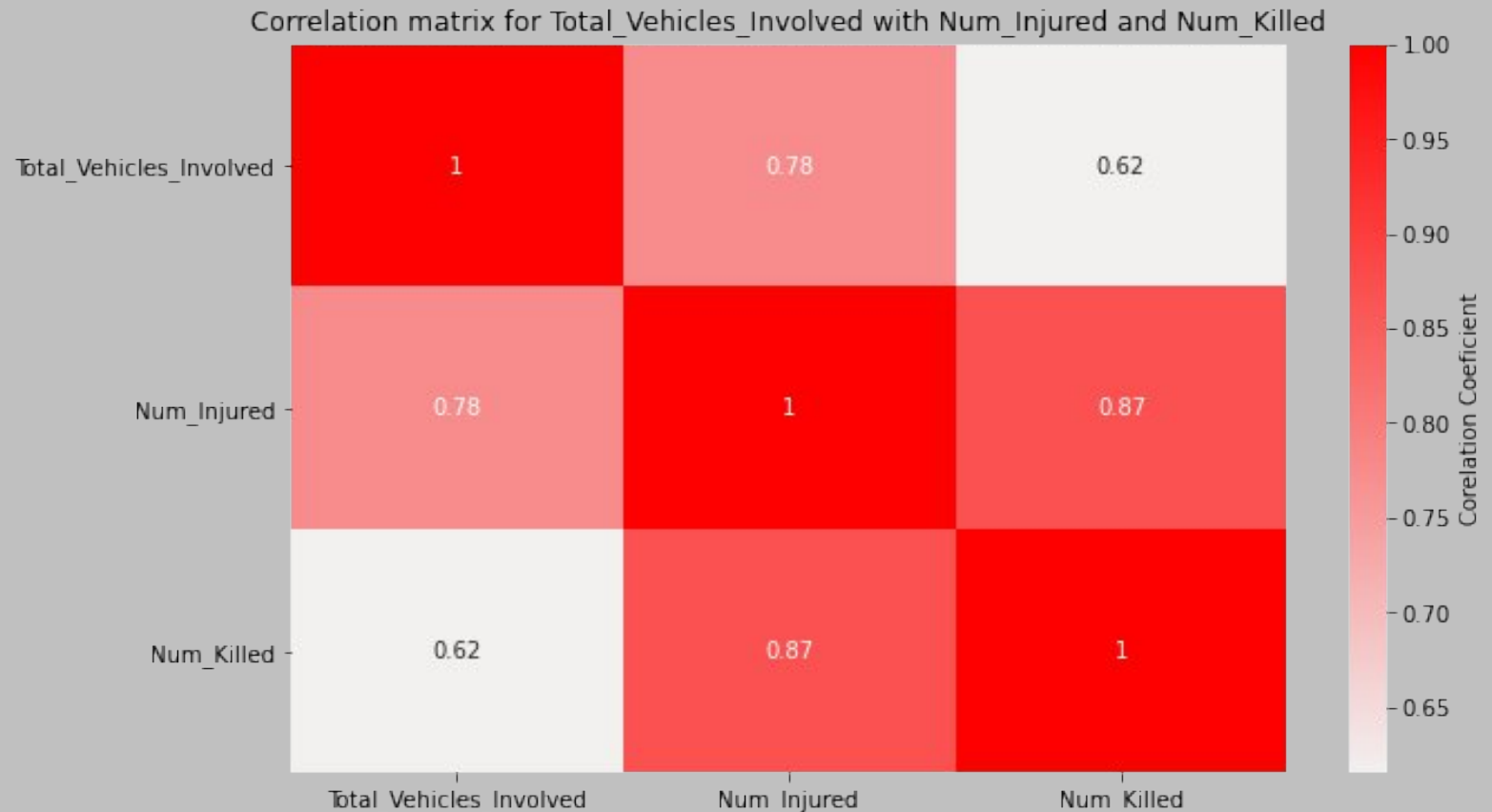
➡ As the number of vehicles involved increases, the likelihood of severe accidents also increases.



# Correlation Between Number Of Vehicles Involved In Crashes With Total Number Of Injuries And Deaths



Strong positive correlation highlights significant impact of vehicle involvement on accident severity



# **Analysing Impact of Human and Weather factors**



# Impact of Human and Weather Factors on Vehicle Involvement Across Top 10 States

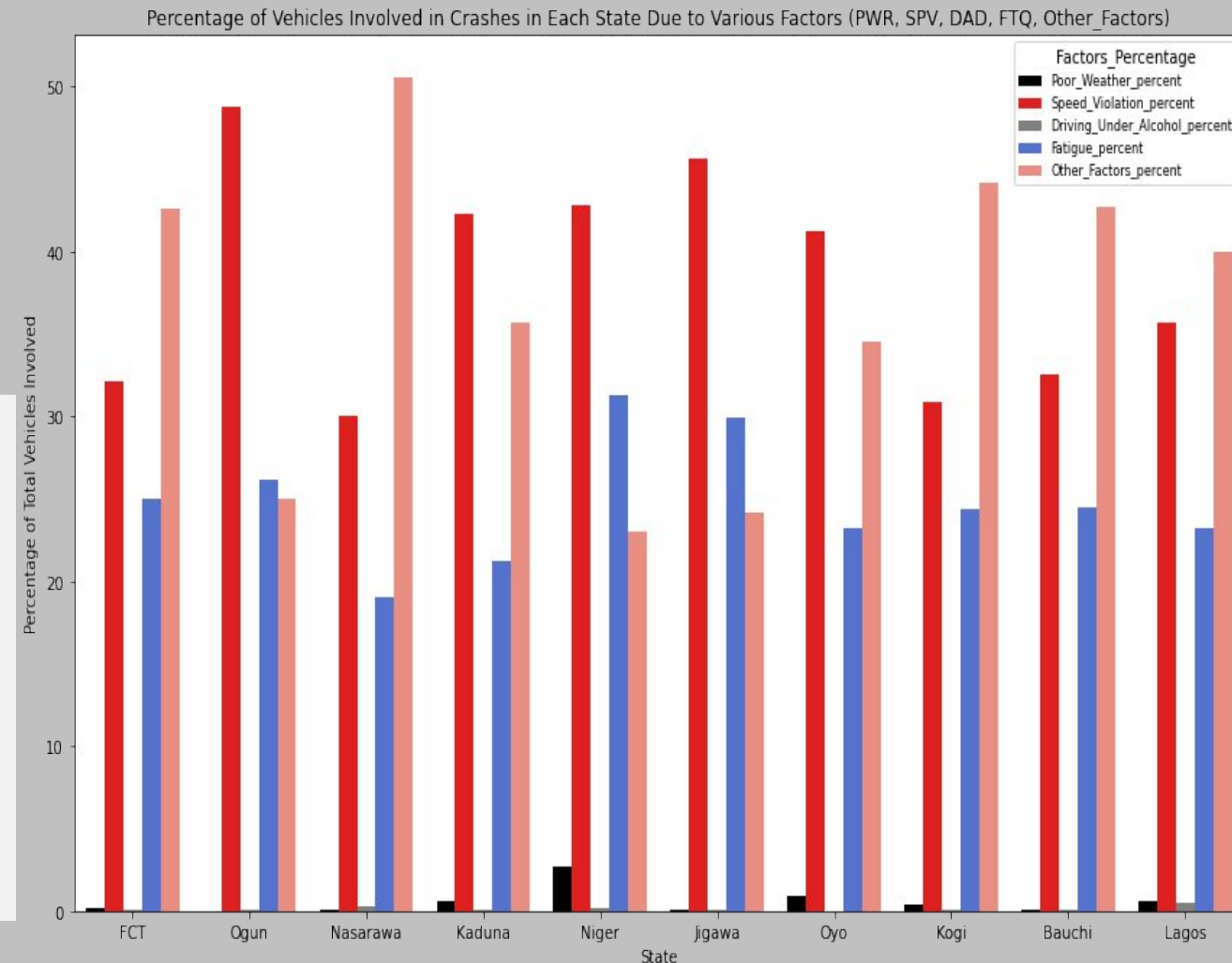
## Significant Contributors To Crashes:

- Speed Violation
- Fatigue
- Other Factors

**Speed Violation**  
Ogun reports nearly 50% of its vehicles involved in crashes due to speed violation

**Fatigue**  
Niger and Jigawa got above 30% vehicles involved in crashes due to fatigue

**Other Factors**  
Nasarawa reports above 50% vehicles involvement due to other factors



# Key Insights

- **High Crash Severity in 2021-2022:** Severity peaked in 2021-2022 but significantly reduced by 2024.
- **Quarterly(Seasonal) Trends:** Q4 and Q1 had higher crash severity, while Q2 and Q3 showed comparatively lower rates.
- **FCT vs. Kaduna:** FCT reported the highest number of crashes, but Kaduna had more injuries and fatalities due to higher speed violations, leading to increased crash severity.
- **Regional Severity:** Despite fewer crashes, Yobe has a higher injury proportion, likely due to higher crash severity and limited safety infrastructure. FCT has more crashes and injuries but a lower injury proportion, indicating better safety measures and emergency response systems.
- **Vehicle Involvement:** Higher vehicle involvement leads to increased crash severity.
- **Major Factors:** Speed violation, fatigue, and other factors are the key contributors to crashes.



# Recommendations

- **Focus on High-Risk Quarters:** Implement measures such as increased traffic monitoring, high penalties for traffic violation and awareness campaigns, during Q4 and Q1 to reduce crash severity.
- **Address Speed Violations:** Strengthen speed limit controls and implement more speed cameras especially in states like Kaduna, to reduce crash severity.
- **State-Specific Strategies:** Focus on safety measures in states like Yobe and Sokoto, where injury proportion and death proportion are higher despite fewer crashes. Promote safe driving practices and improve emergency response.
- **Address Fatigue and Other Factors:** Promote regular rest breaks for drivers and implement regulations to address the other contributing factors.

**THANK YOU**