

**A Statistical Study of Traffic Accidents in the Wilaya of Oran
between 2012 and 2022**

دراسة احصائية حول حوادث المرور في ولاية وهران ما بين 2012 و 2022

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Received: 28/04/2026

Accepted: 31/05/2026

Published: 12/06/2026

Abstract:

This study examines traffic accidents in the city of Oran during the period of 2014–2022. In this work, the concepts directly related to the study are first presented.

This research paper also provides a comprehensive statistical overview of the subject under investigation by examining the extent of evolution

in the number of recorded accidents and the number of civil protection interventions. Moreover, this paper presents a distribution of the studied phenomenon across demographic and social variables.

Keywords: traffic accidents; traffic problems; roads; human and material losses.

1. INTRODUCTION

The city of Oran is considered one of the Algerian cities most affected by traffic accidents, as this phenomenon has become among the most prominent contemporary challenges and is difficult to confront despite all the means and measures mobilised to limit it or, at the very least, mitigate its severity. In this context, it is worth noting that the geographical location of the city of Oran, the nature of its terrain, and its population density, which reached approximately 685.6 inhabitants per km² according to the penultimate General Census of Population and Housing, are based on data from the National Office of Statistics, in addition to the intensity of movement and commercial activity given that Oran constitutes a major economic hub at both the national and regional levels, in one way or another, leading to the

recording of striking figures regarding traffic accidents. In 2008, approximately 1,282 interventions by Civil Protection services were recorded, whereas in 2022, nearly 2,579 traffic accidents were documented. This represents an alarming increase, which further exacerbates the seriousness of the traffic situation in the city of Oran. This calls for an examination of the circumstances and details of this issue through the investigation of its causes, the nature of the recorded human and material losses, as well as the presentation of statistics relating to the demographic characteristics of the victims and the identification of effective mechanisms for the prevention and control of this phenomenon.

2. Research Methodology:

2.1 Research Problem:

Due to the importance of the study of road traffic accidents in the Wilaya of Oran, the difficulties that this phenomenon causes to road safety, and the availability of official statistical data over a large period of time, it is necessary to adopt a rigorous scientific approach that allows a systematic analysis of these data. The examination of the temporal evolution of traffic accidents is not limited to a simple description but seeks to interpret the observed changes over the years and to identify the general patterns and trends that underlie this phenomenon. This approach helps to have a better and objective understanding of road traffic accidents in the Wilaya of Oran.

In this context, the main research problem of the study can be formulated as:

What has been the evolution of road traffic accidents in the Wilaya of Oran during the period 2012-2022? What are the main temporal trends and variations that can be identified on the basis of the available statistical data?

2.2 Research hypotheses:

- Road traffic accidents in the Wilaya of Oran exhibit a progressive temporal evolution during the period 2012–2022
- Road traffic accidents in the Wilaya of Oran show noticeable annual variations during the period 2012–2022
- Road traffic accidents are associated by several factors, including road type , time of occurrence and vehicle type during the period 2012-2022

2.3 Research Aim:

The objective of this work is to study the temporal evolution of road traffic accidents in the Wilaya of Oran over the period 2012–2022 and to indicate the main trends that can be observed on the basis of statistical evidence.

The secondary aims of the study:

- To investigate the evolution of road traffic accidents in the Wilaya of Oran for the period 2012-2022.
- To study annual variations in key indicators such as interventions, deaths and injuries.
- To determine the main temporal trends of road traffic accidents in the study period.

2.4 Source of data and Methodology:

This study uses a descriptive statistical approach to analyse the evolution of road traffic accidents in the Wilaya of Oran. The analysis uses official data from the Civil Protection services over a ten-year period (2012-2022). These data are considered reliable for scientific analysis.

The dataset contains several indicators related to traffic accidents, such as the number of interventions, number of fatalities, number of injuries, and context information related to accident conditions.

The data were processed and analysed by descriptive statistical techniques, calculating mainly the annual variation and evolution rate. This enables the identification of temporal trends and fluctuations in accident occurrence over time. In addition, the study uses a comparative temporal analysis to further understand the evolution of the phenomenon and highlight significant changes within the study period.

3. Theoretical Framework of the Traffic Accident Problem

3.1 Traffic Accident:

A traffic accident may be defined as an incident that results in death, injury, or property damage without prior intent caused by vehicles, their loads, or their movement. This also includes incidents of vehicle fires occurring while in motion on public roads (Bouhara, 2017). It is also defined as any event that may lead to the loss of life, bodily harm, or damage to an individual's property as a result of movement, presence in a stationary position, or due to a vehicle, provided that it occurs on the road (Djenidi & Hamza Cherif, 2019; Boutebal, 2014).

3.1.1.Types of Traffic Accidents:

Collision accident: An accident caused by a collision between two vehicles or a vehicle and an object, solid or moving, that occurs while the vehicle is in motion and that results in material or bodily damage.

Rollover accident: This is when a vehicle loses its balance, goes off its path and overturns, causing bodily injuries.

Run-over accident: This is when a vehicle hits a human being or an animal, causing physical injury and possibly resulting in death.

Hit-and-run accident: This is when the driver leaves the scene of the accident, this may be related to the psychological condition of the driver or to an unlawful legal situation (Derkaoui, 2011, p.20)

3.2 Traffic Problem

It may be defined as a multidimensional issue of a social, economic, and security nature that is “closely linked to the lives of all people without exception. Its severity has increased with ongoing development, urban expansion, the increase in the number of vehicles, and pedestrian movement. It is characterised by the multiplicity of its causes, which necessitates a comprehensive programme to address it” (Haddadi, 2018, p. 141).

3.3 Types of Roads:

A road is any type of ground infrastructure that is constructed in such a way as to allow the movement of vehicles and pedestrians in a safe and organised manner. It is arguably one of the most important components of economic, social and urban life due to its critical role in regulating human mobility and enabling the movement of people (Souli, 2022,p.31)

- motorways are considered one of the most important types of highways. Their separation from other roads, railroad tracks, and pedestrian crossings is another characteristic that sets them apart.
- Provincial roads are designed to improve connections between a province's different areas by facilitating mobility and transit inside the province's boundaries.
- Secondary roads with little capacity are known as municipal roads. However, they make a substantial contribution to the development of rural communities by improving their infrastructure and reducing the isolation of marginalized areas (Benchenna, 2023 ,p.62)

3.4 General causes of road traffic accidents:

The foundation of road safety is a systemic approach that incorporates human error into the transportation system's design in order to reduce fatal accidents and serious injuries.

The frequency and severity of traffic accidents are significantly influenced by speed. There is a 4% increase in fatal crashes and a 3% increase in crashes with serious injuries for every

km/h increase in average speed. Furthermore, between 50 and 65 km/h, the risk of death for a pedestrian struck from the front by a car increases dramatically, multiplying by 4.5. At a speed of 65 km/h, the occupant fatality risk in side-impact collisions between two vehicles reaches 85%. (World Health Organization [WHO], 2023)

The risk of a collision is greatly increased when driving while under the influence of alcohol or other psychoactive substances. Even at low blood alcohol concentrations, this risk manifests, and for drivers, it becomes significant at levels ≥ 0.04 g/dl. When compared to non-users, the risk of fatal crashes is roughly five times higher when substances like amphetamines are used. Another significant contributing factor is the failure to use safety devices. Wearing a helmet lowers the risk of brain damage by 74% and the risk of death by more than six times. Child restraint devices lower infant mortality by 71%, while seatbelt use lowers the risk of death by up to 50%. Due to decreased reaction time and compromised vehicle control, driver distraction, especially when caused by cell phone use, increases crash risk by a factor of four. (World Health Organization [WHO], 2023)

3.5 Economic and social impacts of road traffic accidents:

Social impacts

Individuals, families, and society at large are all negatively impacted by traffic accidents. They lead to fatalities, which causes severe psychological suffering, including trauma and grief.

Due to the disruption of income and the diminished capacity to handle household duties, the loss of the primary provider or an active family member can cause the family to disintegrate and disturb its social and economic stability. Additionally detrimental to a child's upbringing, this circumstance frequently leads to behavioural deviance, poor academic performance, and school dropout. (Mekaideche, 2019)

Traffic accidents also exacerbate living burdens and lead to a rise in widowhood rates. They could also lead to a family member being imprisoned or having a permanent disability,

which would complicate the social situation even more. In general, these mishaps result in diminished economic performance, permanent disabilities, and the loss of productive human resources, all of which threaten social stability and cohesion. (Mekaideche, 2019)

Economic impacts:

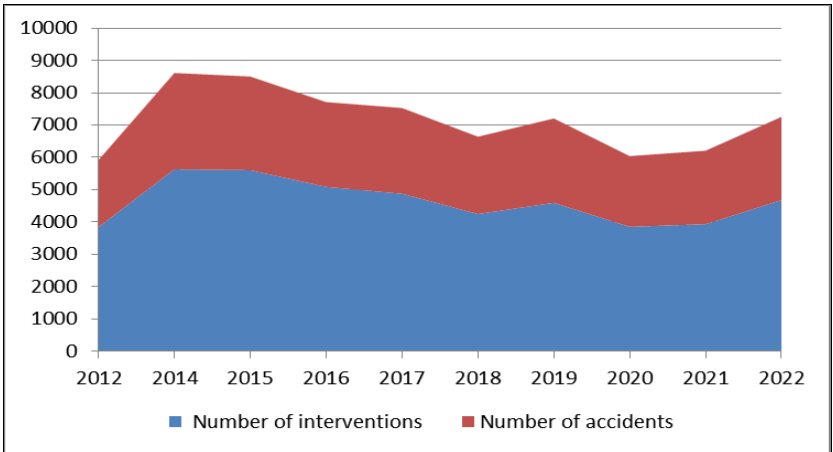
The costs of treating road traffic injuries encompass all impacted categories of road users, namely drivers, passengers, and pedestrians. These costs comprise medical expenses incurred in hospitals, clinics, and private healthcare institutions, as well as home-based care. Such expenditures are paid by both the state and society.

These costs are difficult to estimate effectively because to their multidimensional nature, particularly in connection to the assessment of lost time during treatment and recuperation periods, during which wounded workers are unable to fully or partially execute their task. This leads to a loss in production. Moreover, the impact of road traffic accidents extends to professional performance even after recovery, as injuries may leave enduring repercussions that limit individuals' functional capacities.

The total material losses impacting both public and private property, including vehicles, facilities, and infrastructure, are used to calculate the damages caused by traffic accidents. Restoring the functionality of the impacted assets necessitates repair or rehabilitation procedures, which may be partial or comprehensive. Along with the time and effort needed to complete these procedures, there are additional expenses related to evaluation and restoration actions. (Mekaideche, 2019 ;Benchenna, 2023)

4. Statistical Overview of the evolution of the Total Number of Traffic Accidents in Oran During the 2012–2022 Period

Figure 1. The Total Number of Traffic Accidents between 2012 and 2022



Source: Directorate of Civil Protection of the Wilaya of Oran, Prevention Department, Statistics Office

During the decade 2012–2022, the city of Oran experienced a concerning increase in recorded traffic accidents, from approximately 2,076 in 2012 to nearly 2,579 in 2022. With respect to the interventions of the Civil Protection units in the Wilaya of Oran, a rise of approximately 1.21 times was recorded, increasing from 3,841 to 4,676 interventions during the same period. Notably, the highest total was recorded in 2014, with approximately 2,982 traffic accidents, corresponding to nearly 5,631 interventions by Civil Protection services. However, from 2015 to 2018, a decline in recorded traffic accidents was observed, from 2,899 in 2015 to 2,394 in 2018. This contributed to a reduction in Civil Protection interventions of approximately 1,385, equivalent to a decrease of 1.32 times, from 5,631 to 4,246 interventions between 2015 and 2018, respectively. The figures subsequently began to rise again in 2019, during which approximately 2,614 traffic accidents and approximately 4,591 interventions by Civil Protection services were recorded.

5. Human Losses resulting from Traffic Accidents between 2014 and 2022 in the City of Oran

5.1 The Number of Injuries and Fatalities resulting from Traffic Accidents

Table 1. Evolution of Traffic Accidents According to the Number of Injuries and Fatalities

Years	Injuries	Fatalities
2014	3031	85
2015	3104	57
2016	2685	48
2017	2538	60
2018	2191	57
2019	2369	62
2020	1895	34
2021	2114	62
2022	2583	88

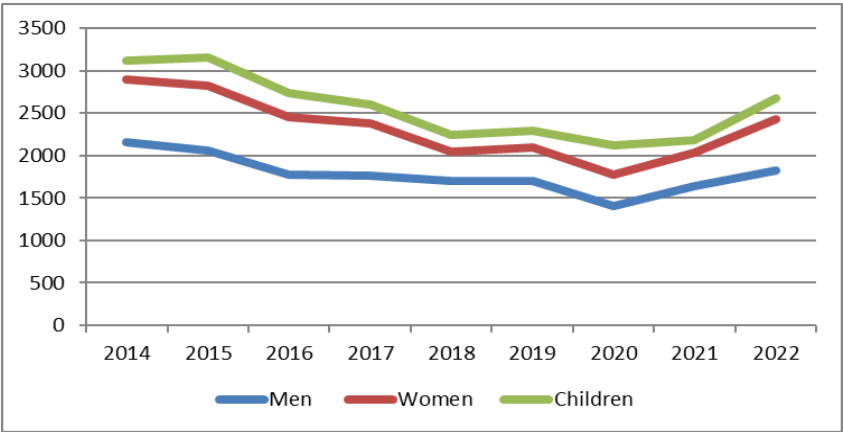
Source: Directorate of Civil Protection of the Wilaya of Oran, Prevention Department, Statistics Office

Despite the recorded figures, the number of injuries resulting from traffic accidents in the city of Oran improved: the number of injured individuals decreased from 3,031 to 2,583 between 2014 and 2022, representing a reduction of approximately 1.17 times. In contrast, during the same period, the number of fatalities from traffic accidents increased by approximately 3 statistical units, increasing from 85 to 88 deaths between 2014 and 2022, respectively. The highest number of victims was recorded in 2015, with approximately 3,104 injuries and 57 fatalities. The remaining years within the period under study, as presented in the table below, showed fluctuations between increases and decreases in the recorded figures, with the lowest number recorded in 2020: approximately 1,895 injuries and 34

fatalities. Nevertheless, combating traffic accidents remains among the most challenging issues faced by societies, particularly urban ones.

5.2 Distribution of Traffic Accident Victims by Gender

Figure 2. Distribution of Traffic Accident Victims by Gender



Source: Directorate of Civil Protection of the Wilaya of Oran, Prevention Department, Statistics Office

With respect to the number of traffic accident victims by gender for the period 2014–2022, a total of approximately 16,030 male victims were recorded, with the highest number observed in 2014 at approximately 2,086 men. Thereafter, the statistical data tended to decrease until 2020, when approximately 1,373 male victims were reported. However, from 2021 onwards, the situation reversed significantly, with an increase of approximately 208 statistical units, bringing the number of male victims to approximately 1,581. This upwards trend continues in 2022, reaching approximately 1,757 victims.

For women, the overall trend markedly decreased, with a reduction of approximately 152 statistical units over the represented period, declining from 736 female victims of traffic accidents to approximately 585 in 2022. Nevertheless, the overall period of 2014–2022 was characterised by certain fluctuations, alternating between increases and decreases in the number of female victims. In 2015, for instance, approximately 20 more women were

recorded, increasing from 736 to 756 between 2014 and 2015. Similarly, in 2019, approximately 392 female victims were recorded, representing an increase of approximately 51 statistical units compared with that in 2018, in which approximately 341 victims of the same sex were registered.

This considerable disparity in the number of traffic accident victims between genders may be explained by the fact that the majority of drivers in Algerian society are men, in addition to their higher frequency of daily mobility than women do, as well as the tendency for women to be more cautious and less prone to risk-taking while driving.

Regarding children, the statistics are concerning. In 2015, approximately 128 more child victims were recorded than in 2014. This was followed by 2019, with approximately 322 child victims of traffic accidents, representing an increase of approximately 127 statistical units, which is equivalent to 1.65 times that in 2018, when the number of child victims reached 195. In 2022, approximately 251 child victims were recorded, corresponding to an increase of approximately 1.84 times compared with 2021, when approximately 136 child victims were registered.

Over the few years from 2017 to 2023 road traffic accidents have hurt men more than women and children. Men had the injuries, with the lowest number being 1,373 in 2020 and the highest being 1,757 in 2022. This shows that men are more likely to get hurt in road traffic accidents probably because they use cars and other vehicles often and drive to work every day.

When we look at women we see that they had injuries than men with numbers ranging from 350 to 645 over the same period. Some years had the same number of injuries. This means that women are less likely to get hurt in accidents, which could be because they travel differently or do not drive much as men.

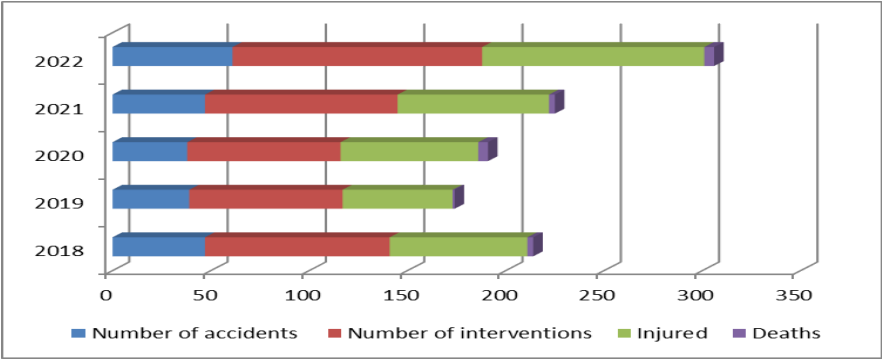
As for children they had injuries than men but the numbers changed a lot from year to year. Some years, like 2019 and 2023 had a lot of injuries, with 322 and 297 cases respectively. This shows that children are also very vulnerable and need to be protected and taught about road safety especially when crossing the road or near traffic.

5.3 Distribution of traffic accidents by type of road

Motorway

With respect to motorway traffic accidents, approximately 127 interventions by civil Protection services and 61 traffic accidents were recorded in 2018, resulting in 113 injuries, ranging from minor to severe and 5 fatalities. The same number of traffic accidents was recorded in both 2019 and 2020, totaling approximately 78. In terms of human losses, approximately 56 injuries and one fatality were recorded in 2019, whereas approximately 70 injuries and 5 fatalities occurred in 2020. In the same context, it is worth noting that in 2019 and 2020, the number of interventions by Civil Protection services was very similar, at approximately 39 and 38, respectively.

Figure 3. Traffic Accidents Recorded on the Motorway

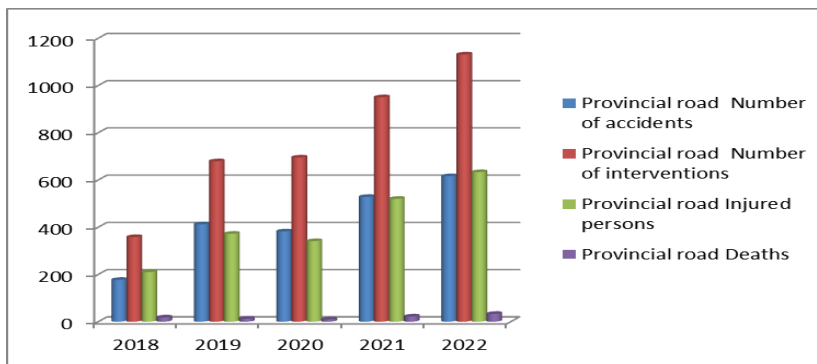


Source: Directorate of Civil Protection of the Wilaya of Oran, Prevention Department, Statistics Office

Wilaya Road

The number of traffic accidents on wilaya-classified roads during the period of 2018–2022 tends to increase from approximately 177 statistical units in 2018 to nearly 616 in 2022, a nearly 3.5-fold increase. This resulted in a rise in the interventions of the Civil Protection services of the Wilaya of Oran, which increased from 358 to 1,131 between 2018 and 2022, an increase of approximately three times over five years.

Figure 4. Traffic Accidents Recorded on the wilaya road

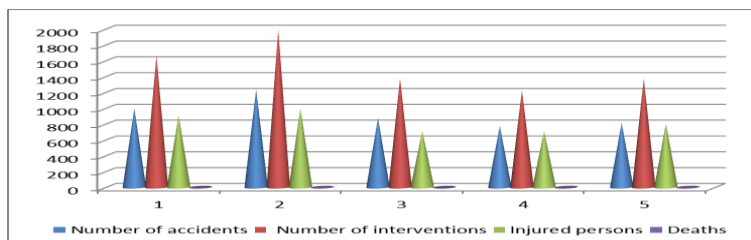


Source: Directorate of Civil Protection of the Wilaya of Oran, Prevention Department, Statistics Office

With respect to the number of injuries and fatalities on wilaya roads, 201 injuries and 18 deaths were recorded in 2018. In 2020, approximately 341 injuries and 10 fatalities were reported, whereas in 2022, approximately 633 injuries and 33 deaths were recorded.

Municipal Road:

Figure 5. Traffic Accidents Recorded on the municipal road



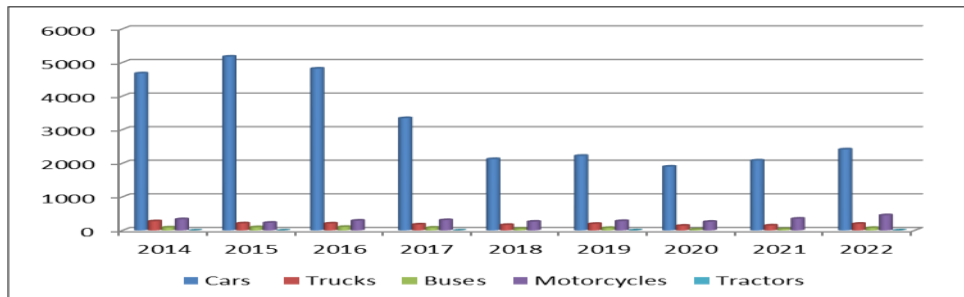
Source: Directorate of Civil Protection of the Wilaya of Oran, Prevention Department,
Statistics Office

During the period of 2018–2022, the number of traffic accidents associated with the municipally classified roads decreased. The total number declined from 995 traffic accidents, corresponding to 1,665 interventions by Civil Protection services, to approximately 876 traffic accidents and 1,375 interventions in 2020. In 2022, approximately 814 accidents were recorded, with approximately 1,374 interventions by Civil Protection agents. With respect to human losses, approximately 906 injuries and approximately 9 fatalities were recorded, followed by approximately 710 injuries and 10 fatalities in 2021. In 2022, approximately 803 injuries and 15 fatalities were recorded.

6. Material Losses resulting from Traffic Accidents between 2014 and 2022 in Oran

The period between 2014 and 2022 witnessed numerous material losses. Cars recorded the highest figures throughout the period, with approximately 4,677 vehicles in 2014, compared to 275 lorries, 90 buses, 335 motorcycles, and one tractor. In the same context, 2015 experienced a notable increase, with losses estimated at approximately 5,175 cars and 98 buses, whereas material losses concerning lorries and motorcycles declined, with 212 and 230 statistical units, respectively, recorded.

The lowest level of material loss was recorded for the year 2020, according to the statistical data presented, with approximately 1,901 cars, 142 lorries, 32 buses, and 259 motorcycles, with no recorded losses for tractor-type vehicles. In 2022, material losses were estimated at approximately 2,414 cars, 199 lorries, 77 buses, 453 motorcycles, and approximately 3 tractors.

Figure 6: Distribution of Traffic Accidents by Type of Vehicle between 2014 and 2022

Source: Directorate of Civil Protection of the Wilaya of Oran, Prevention Department, statistics office

7.Temporal distribution of road traffic accidents in Oran by days and months

Table 2. Traffic accident distribution by day of the week in Oran

	2020			2021		
	accidents	fatalities	injuries	accidents	fatalities	injuries
Sunday	22	4	25	35	19	53
Monday	6	4	13	28	9	39
Tuesday	18	8	30	24	6	29
Wednesday	15	4	15	28	5	39
Thursday	18	8	28	30	8	43
Friday	17	10	28	43	16	75
Saturday	15	6	26	26	13	30
Total	112	44	165	214	76	308

Source: Territorial Brigade of the National Gendarmerie (Oran)

In 2021, all other indicators rise by a considerable amount compared to 2020. The number of accidents increased by more than twofold from 2020. The number of deaths and injuries

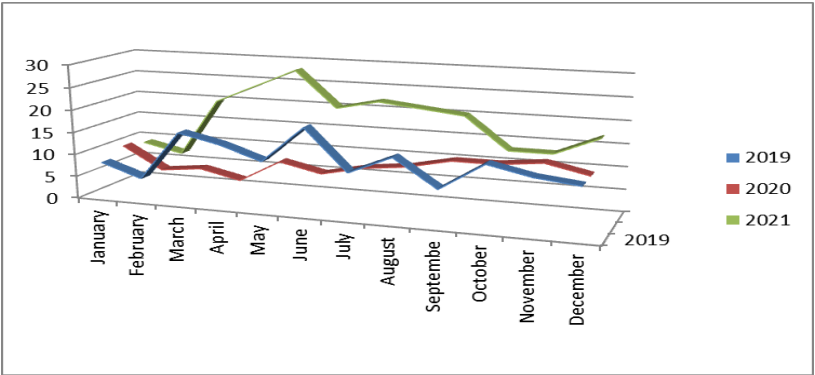
increased by a significant amount. It suggests that road safety may be declining due to improved mobility or reduced attention to traffic rules.

Although the number of accidents across all of the days of the week is not uniform, the most fatal and injury-inducing day is Friday in both years, which may be due to the larger number of accidents, fatalities, and injuries on Friday. This is likely because of the higher traffic volume, the end of week travel, and cumulative fatigue among drivers, all of which have been recognized as risk factors in road safety studies.

Conversely, the beginning of the week, particularly Monday and Tuesday, exhibits relatively lower accident frequencies. This may reflect more stable traffic conditions and reduced travel intensity.

Also, the increase in 2021 was observed on almost all days of the week, indicating that the increase in road accidents is not restricted to specific days. But, it is concentrated at the end of the week.

Figure 7: Distribution of Traffic Accidents by Type of Vehicle between 2014 and 2022



Source: Territorial Brigade of the National Gendarmerie (Oran)

Overall, it is important to mention that 2021 is an extremely high year. The values are higher almost everywhere, so it is not surprising that road safety was worse in this year. Traffic was becoming more dangerous, or even sedentary, and accidents increased not just in one month but across the board.

In contrast, 2020 is calmer. Again, the numbers are lower, especially in the middle of the year where many months are quieter, giving the impression that road usage has reduced or drivers have been more careful. The curve for 2019 falls somewhere between and can be considered a kind of reference year, with moderate fluctuations but no extremes.

Look at the shape of the curves again, and we see that accidents don't happen every year. There are peaks in the middle months of the year, suggesting that certain times of the year are more dangerous than others. This could be due to more travel, holidays, or more traffic during that time.

What is also striking is that 2021 doesn't just show higher numbers—it also shows more variation. The curve goes up and down more sharply, which means the situation is less stable and more unpredictable compared to previous years.

8.CONCLUSION:

In conclusion, it must be noted that during the study period (2012–2022), statistical data on traffic accidents in the city of Oran were recorded, particularly regarding human losses. This necessitates the adoption of urgent decisions to establish a well-structured, effective strategy to combat this phenomenon, which has severe consequences, and to reduce it. This can be achieved through promoting traffic awareness within society, particularly among children, and through the organisation of awareness campaigns, as well as the enactment of deterrent laws to control this issue to a significant extent, with economic, social, and even religious implications

9.Bibliography List :

- 1.Benchenna, A. (2023). Traffic hazards in Algeria: Indicators, causes, and impacts. A field study of Constantine Province (Doctoral thesis, University of Constantine 3).

2. Bouhara, H. (2017). A study on the causes of involvement in traffic accidents: A field study from the perspective of taxi drivers. *Dirassat & Abhath: The Arabic Journal of Human and Social Sciences*, 9(27) 344-359
3. Boutebal, S. (2014). Personality traits and their impact on committing traffic violations among drivers. *Journal of Social Studies and Research, University of El Oued*, (4), 139–157.
4. Derkaoui, A. (2011). Econometric study of road accidents in Algeria using the Box–Jenkins methodology (1970–2009) (Magister thesis, Abdelhamid Ibn Badis University of Mostaganem).
5. Djenidi, H., & Hamza Cherif, A. (2019). The use of GIS in the study of social variables of traffic accidents in Algeria (Sétif, Djelfa, Tiaret). *Humanization Journal for Researches and Studies*, 10(2), 28–44.
6. Haddadi, W. (2018). The traffic problem in Algeria: Causes and prevention methods. *Journal of Human Sciences, University of Mohamed Khider Biskra*, (50), 139–157.
7. Mekaidche, I. H. (2019). Communication strategy and traffic accident crisis management in Algeria: Case study of the National Center for Prevention and Road Safety from 2013 to 2017 (Doctoral thesis, University of Algiers 3).
8. Souli, S. (2022). National Road 27 and the prospects of urban growth in the municipality of Grarem Gouga, Mila Province (Doctoral thesis, University of Constantine 3).
9. World Health Organization. (2023). Road traffic injuries. <https://www.who.int/news-room/fact-sheets/detail/road-traffic-injuries>
10. Directorate of Civil Protection of the Wilaya of Oran, Prevention Department, Statistics Office.

11.Territorial Brigade of the National Gendarmerie (Oran)