



Regional disparities in Road Traffic Injuries and their determinants in Tunisia

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Tunisia

- Tunisia has a population of 12.1 million.
- 80% of its population is concentrated near its 1,300 km of coastline, mainly in the eastern part, between Bizerte and Sfax.
- In 2021, 70% of Tunisia's total population lived in urban areas and cities.
- Tunisia has strong economic inequalities between tourist and industrial coastal regions (gouvernorates) and more agricultural and desertic inland regions.



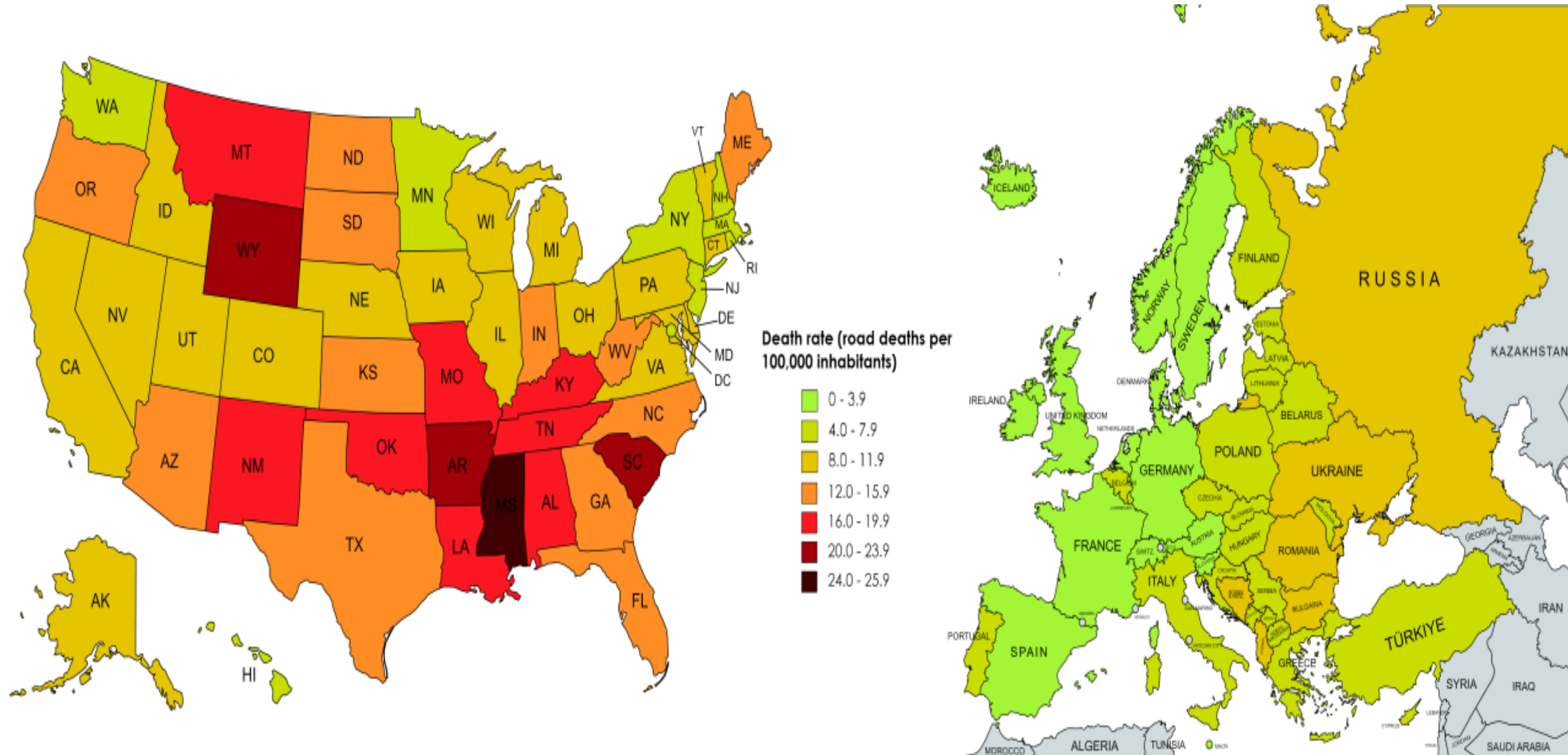
Summary

1. State of the art
2. Context
3. Regional disparities in Tunisia
 1. Data and methods
 2. Risk modelisation
4. Discussion
5. Conclusion

State of the art

- In terms of road safety, territorial disparities are very strong, whatever the level of economic development of the country.
- These disparities are often even greater within the territories of a country than between neighboring countries.
- The urban or rural character of a territory is not enough to explain these disparities.
- We must also take into account the geographical, demographic and economic diversity of the territories.
- At different territorial level : regions, districts ...

Fig. 1: Road Safety level differences are greater between USA States than between European countries, 2021

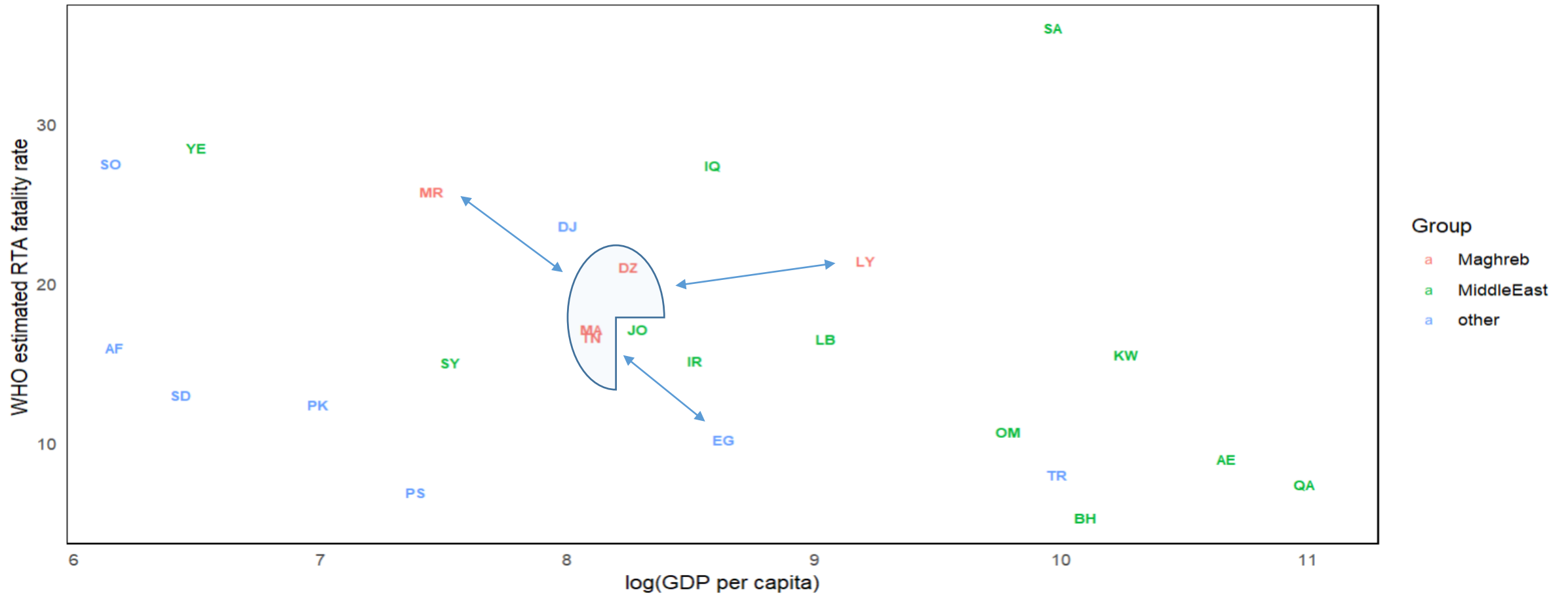


Context

- Few research works on road safety are listed in Tunisia or in Maghreb in general. As a result, a low production of scientific articles.
- According to WHO reports, Tunisia is in the group of MIC countries with high road risk
- Tunisia experiences a medium level of road safety, just like the other Maghreb countries.
- Results of a recent tunisian research (supported by WHO): NRSO reported a total of 1421 road traffic fatalities in 2019, while the total number of deaths observed after combining data from five different sources increased to 2273 victims.
- The improvements of recent years do not match the commitments made with regard to:
 - The WHO: halving the number of deaths in the space of the decade 2010-2020.
 - The UN: within the framework of the SDGs, halving the number of deaths and serious injuries by 2030.

Inter-Regional disparities in the MENA region

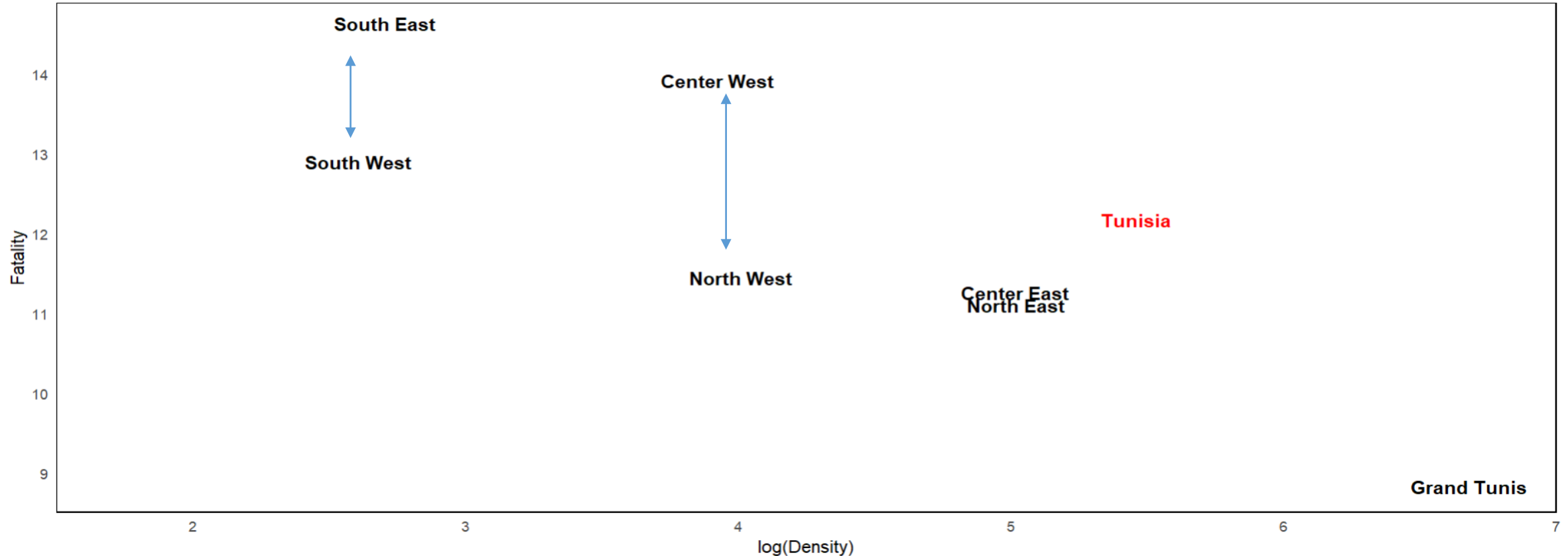
Fig.2 : WHO Estimated Fatality rate vs Log(GDP per capita), MENA Region, 2019



More marked differences between the other countries of the MENA region than between the Maghreb countries.

Road Safety regional disparities in Tunisia

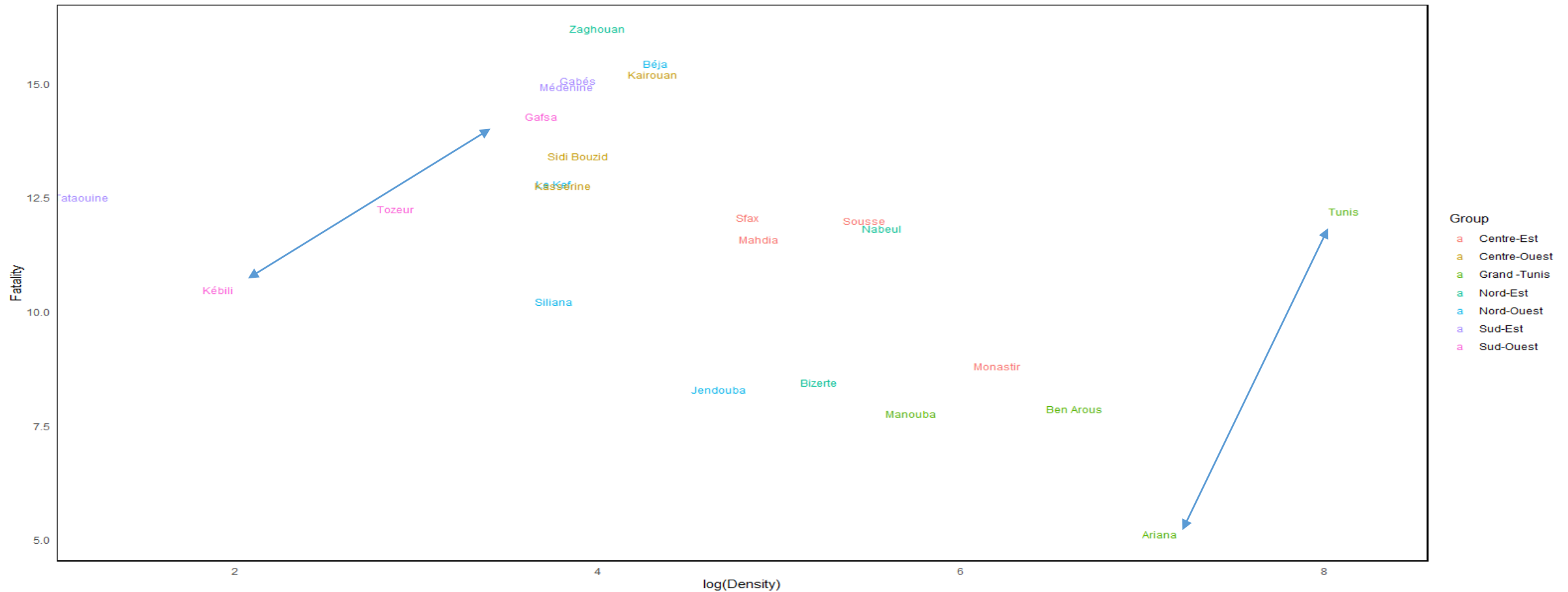
Fig.3 : Average Reported Fatality rate vs Log(density), Tunisie Region, 2011-2021



Overall, there is a gradient between the density and the level of road safety. The most urbanized coastal regions are the safest ones.

Road safety is a multi-sectoral issue !

Fig.4 : Average Reported Fatality rate vs Log(density), Tunisie Governorates, 2011-2021



Differences between the governorates of the regions as strong as between the regions.

Development of a typology of the governorates

Taking into account the characteristics of the governorates:

- Rurality, density or urbanisation rate
- Geographical situation: Coastal or Interior, mountainous, desert or plain
- Type of economy: Touristic, industrial, agricultural
- Unemployment rate
- Proximity to a post-trauma care center

We used a Component Analysis to define four groups of governorates:

- Greater Tunis,
- Other Coastal governorates,
- Agricultural governorates,
- Industrial governorates.

Data and methods

- Data from the Tunisian National Road Safety Observatory
 - Data file for the years 2017-2019
 - Data from Police units in urban areas
 - Data from National guard units in rural areas
 - Per year: 10,000 road traffic casualties including 10% killed
- Risk measure : road traffic fatality versus road traffic injury
- Method : Multivariate logistic model taking into account
 - Risk factors related to the accident
 - Risk factors related to the casualties
 - Risk factors related to the territory

Selection of road traffic risk factors, 2017-19

Table 1 : Accident risk factors

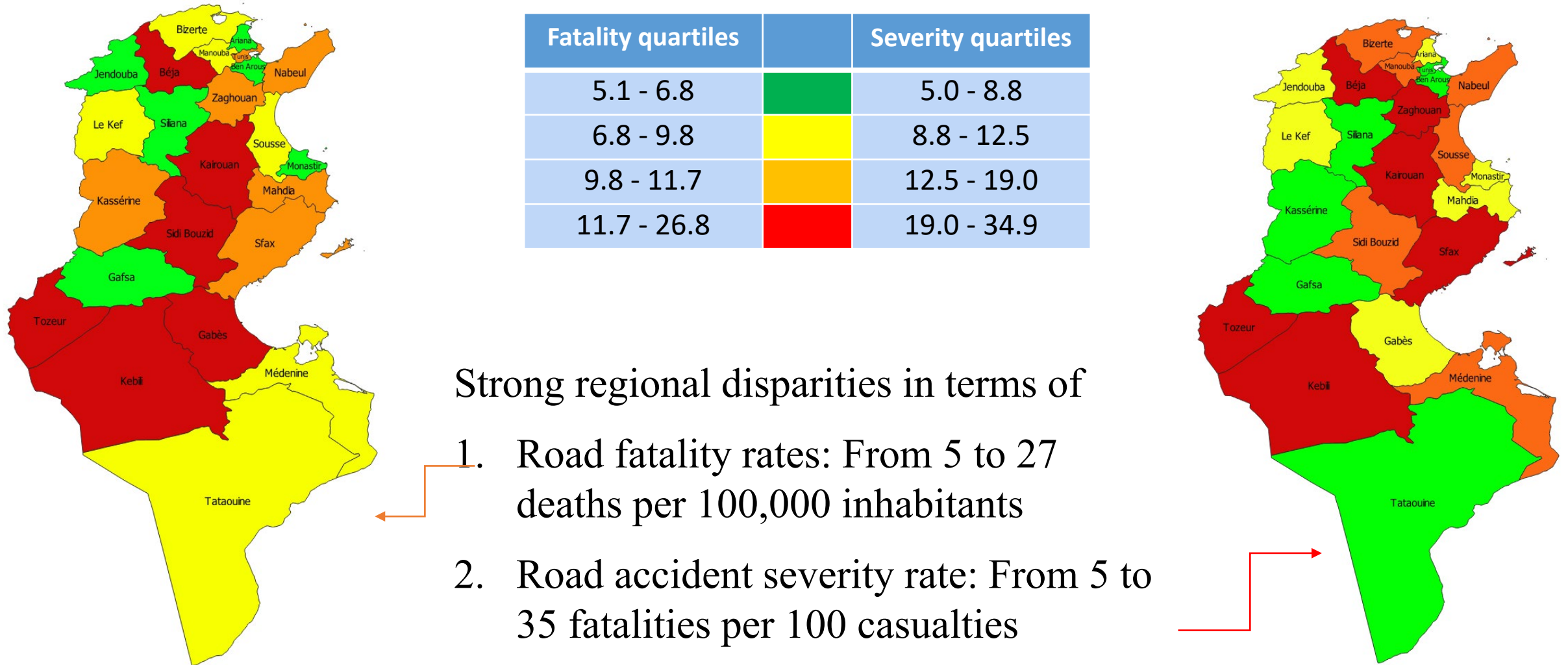
| Variables | Modalities | Odds ratio | C.L. (95%) |
|--------------------|--------------------|------------|--------------|
| Road user category | Pedestrian | 5.16 | 1.57 – 16.90 |
| | Motorcyclist | 4,00 | 2,78 - 5,89 |
| | Cyclist | 3,85 | 0,58 – 25,50 |
| | Heavy Good Vehicle | 0,51 | 0.17 – 0.73 |
| | Car User | 1 | |
| Day | Night | 1.67 | 1.47 – 1.91 |
| | Day time | 1 | |
| Day of week | Week-end | 1.16 | 1.02 – 1.32 |
| | Weekday | 1 | |
| Saison | Fall | 1.40 | 1.16 – 1.68 |
| | Spring | 1.30 | 1.08 – 1.56 |
| | Summer | 1.25 | 1.05 – 1.49 |
| | Winter | 1 | |

Selection of road traffic risk factors, 2017-19

Table 2 : Contextual risk factors

| Variables | Modalities | Odds ratio | C.L. (95%) |
|--------------------|---------------------------|-------------|--------------------|
| Data Source | Guard unit | 2.63 | 2.27 - 3.13 |
| | Police unit | 1 | |
| Road category | Highway | 5.06 | 3.52 – 7.29 |
| | National road | 2.82 | 2.30 – 3.45 |
| | Regional road | 2.46 | 1.99 – 3.04 |
| | Local rural road | 1.83 | 1.47 – 2.27 |
| | Urban road | 1 | |
| Gouvernorate group | Govt. Interior industrial | 1.78 | 1.42 – 2.23 |
| | Govt. Rural non-tourist | 1.37 | 1.10 – 1.71 |
| | Govt. Costal | 1.25 | 1.04 – 1.51 |
| | Greater Tunis | 1 | 1.42 – 2.23 |

Fig. 5: Distribution of Tunisian gouvernorates according to the fatality rate and the severity rate of the accidents, 2017-2019



Discussion

- The study need to be deepened according to different socio-economic indicators and at finer regional scales (districts)
- Limits
 - No information about the road safety program in each governorate.
 - Significant under-reporting of road traffic crash casualties (depending on data source, time period, etc.)
 - National accident data focused on the crashes, not on the casualties. Little information on the victims (category of road users, severity of injuries, age, gender, reason for travel, SES, etc.)
 - Absence of risk exposure data: measurement of the extent of mobility according to the different modes

Conclusion

- The effectiveness of current prevention policies is questionable, at national level and at regional or local level (see SGD10, SGD11, SGD3.6, ...).
- It is called into question by the weak improvement in the level of road safety over time.
- Road safety inequalities between regions seem to be correlated to their socio-economic level.
- The regions of the interior suffer from the lack of means of public transport.
- If data over a longer period could be available, a more detailed analysis of the accident characteristics of each governorate could be conducted, with the necessary statistical power.

Recommendations

- Countries have committed to the 17 SDGs. What measures do they intend to implement to achieve this by 2030? For example, the SDG3.6 for road safety?
- In general, it is necessary to fight for the reduction of regional inequalities, in particular:
 - It is essential to fight effectively against dangerous public transport.
 - To improve road safety in disadvantaged regions, public transport accessible to all should be developed there.
 - Hospitals with intensive care units should be accessible in each region.
- In each region, targeted prevention measures adapted to the local context should be initiated.

Acknowledgement

- Tunisian National Road Safety Observatory

References

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**Thank you for your attention !
Any question?**

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