



The Impact of Vehicle Speed Dispersion on Fatal Road Traffic Collisions on Rural Highways in Ghana

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Presentation Outline

- Background
- Problem statement
- The Conflict Theory
- Objective
- Methodology
- Results
- Discussion
- Conclusion

Background

- Speeding as important risk factor
- UN Decade of action- *2021-2030*
- Activities in five distinct pillars
 - 4th Pillar
 - Improving road users behavior
 - *Speeding*
 - Drink-driving
 - Helmet use
 - Seatbelt use
 - Child restraint

Over speeding the major focus?

In Ghana, the majority of road safety discourses use: **the conventional wisdom**:

- speed kills,
- slower speed is safer!

Fig 1: All vehicles do not travel at same speed

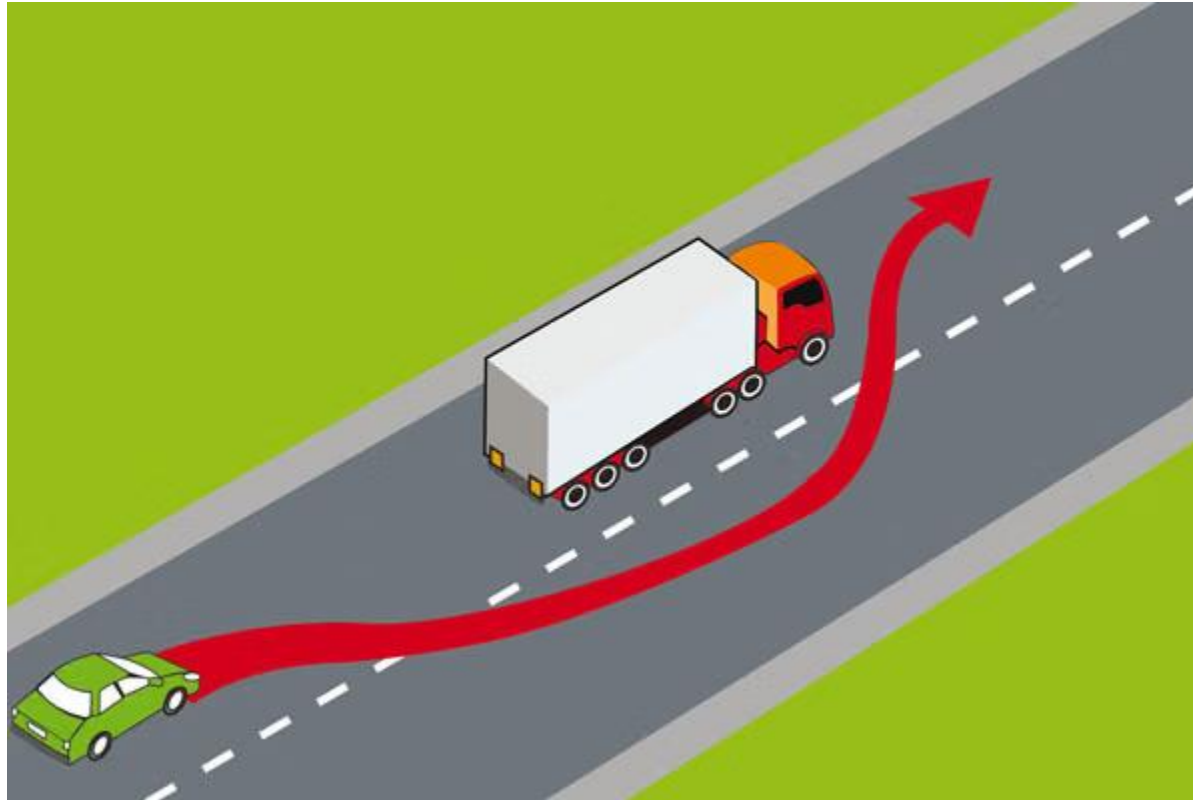
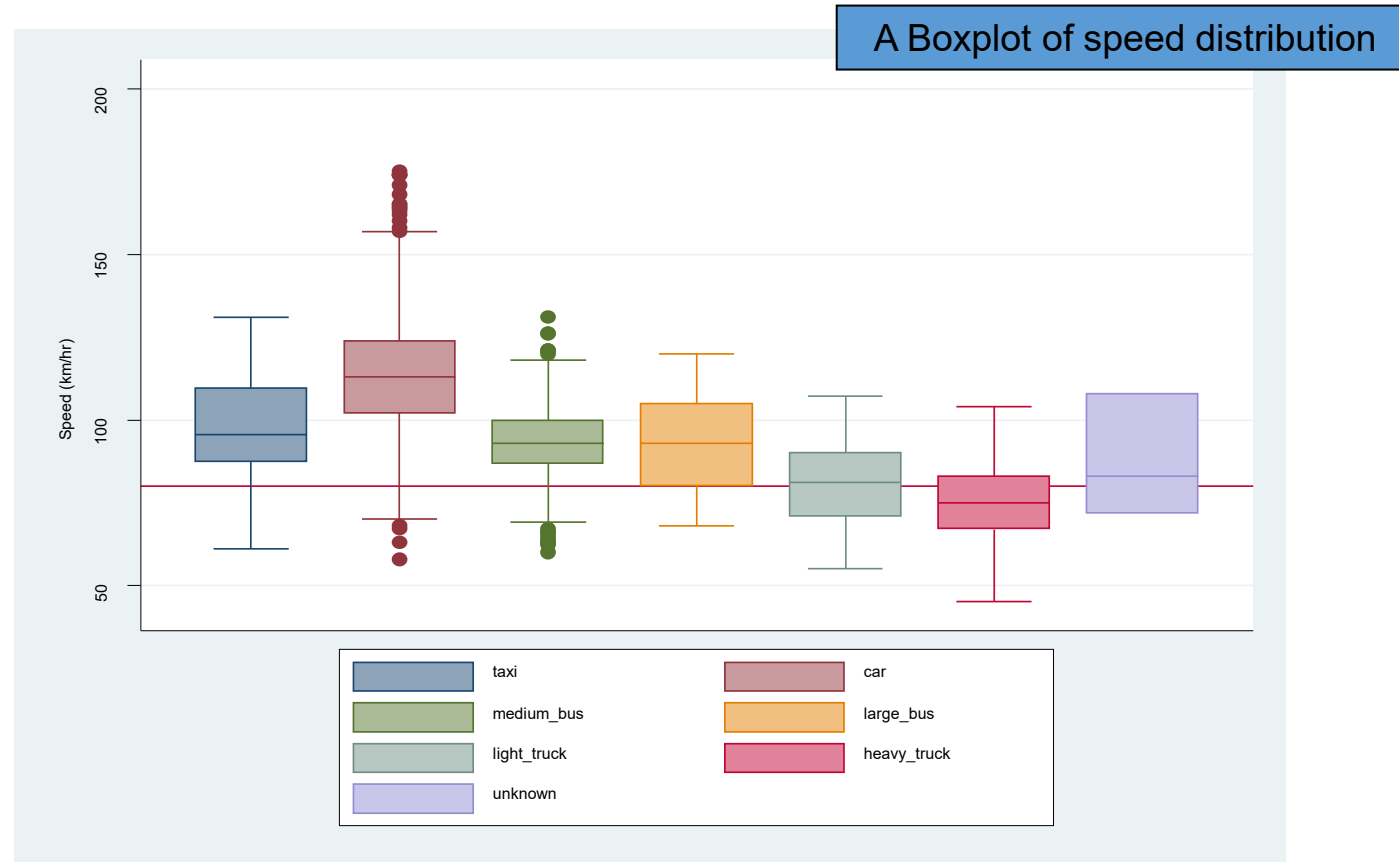


Fig 2: Traffic perturbation on rural Highway

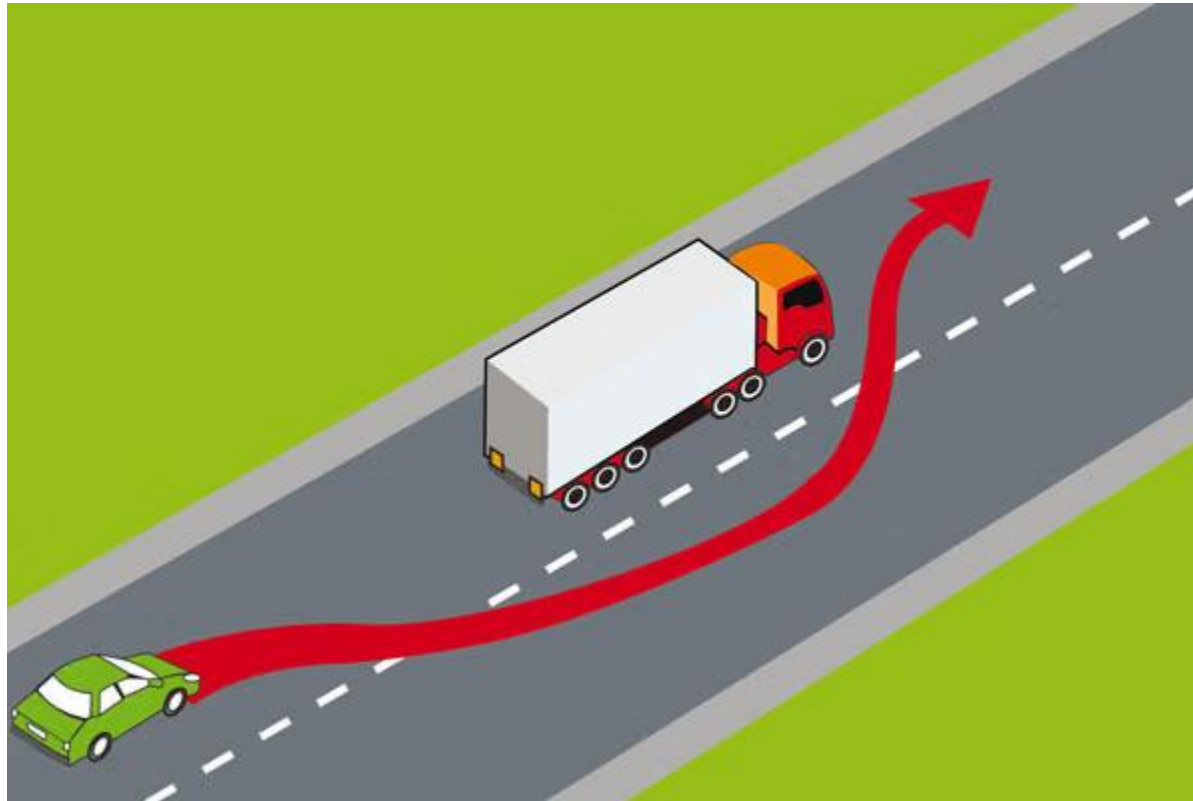


Source: Damsere-Derry et al (2008)

Measures of speed dispersion

- Measures speed variation
 - 85th percentile-Mean.
 - Range
 - Variance
 - Standard deviation etc

Fig 3: Speed dispersion: a cause of traffic conflict



Definition of traffic conflict

A traffic conflict is an observable situation where two or more road users approach each other so closely **in time** and **space** that a **collision is likely if their movements remain unchanged**.

- road users may take evasive action like braking, or steering to avoid crashes
- It represents a potential accident situation,
- It is used as a surrogate measure of safety

Fig 4: The conflict theory and collision types (Hauer, 1971)

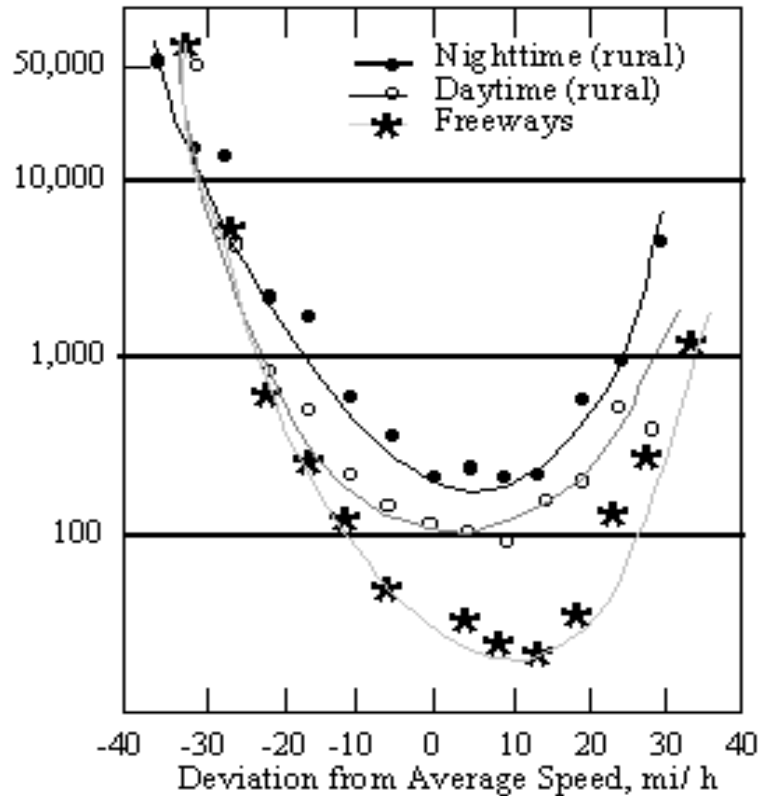


Figure 1. Crash involvement rate by deviation from average travel speed (from Solomon, 1964, and Cirillo, 1968).

- Head-on
- Rear-end
- Side swipe
- Angle
- Lost controls

Source: Solomon, 1964

Objective

- The objective of the research was to establish the proportion of road traffic fatalities associated with high-speed dispersion on rural highway in Ghana.

Results

Table 1: Speed parameters on rural highways
in Ghana

Component Attribute	Highway type		
	National	Interregional	Regional
Observation	11,619	2,787	1,024
Posted speed (km/hr)	80	80	80
Mean (km/hr)	90	80.1	84.4
Std. Deviation	18.9	16.2	15.6
% Exceeding speed limit	65.6	46.5	59.5
Max speed(km/hr)	175	157	146
Min speed(km/hr)	40	35	48
95% CI(km/hr)	89.7-90.4	79.5-80.7	83.4-85.4

Source: Damsere-Derry et al (2008)

Casualties on Rural highways in Ghana (2013-2022)

- There were 62,685 vehicle occupant casualties.
- Out of this, 15% (n=9073).
- 43% Driver versus 57% Passenger.
- 82% Male versus 18% Female.

Fig 5: Collision Type Fatalities (n=9073)

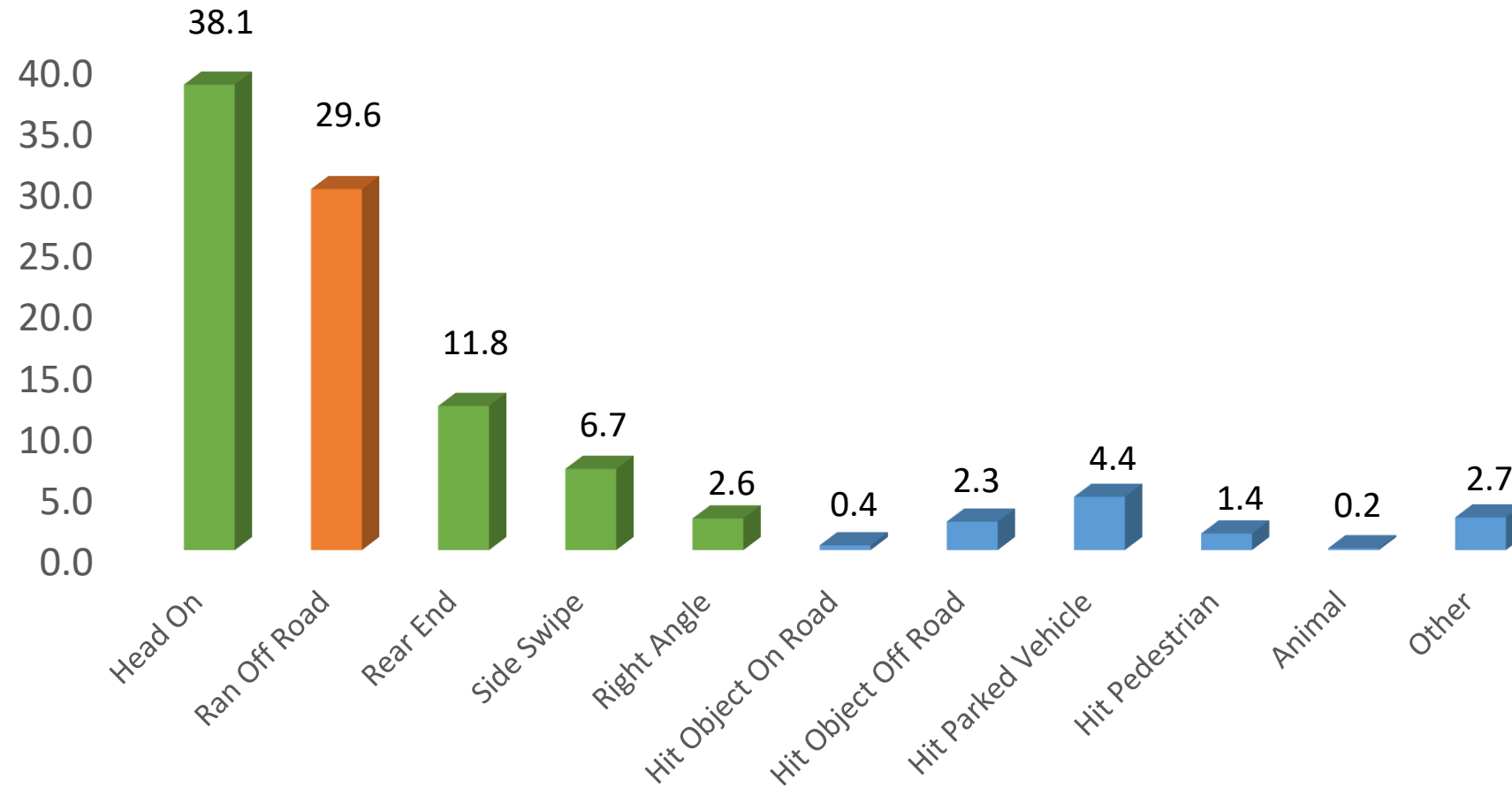


Fig 6: Fatalities associated with Slow Moving Vehicles (n=9061)

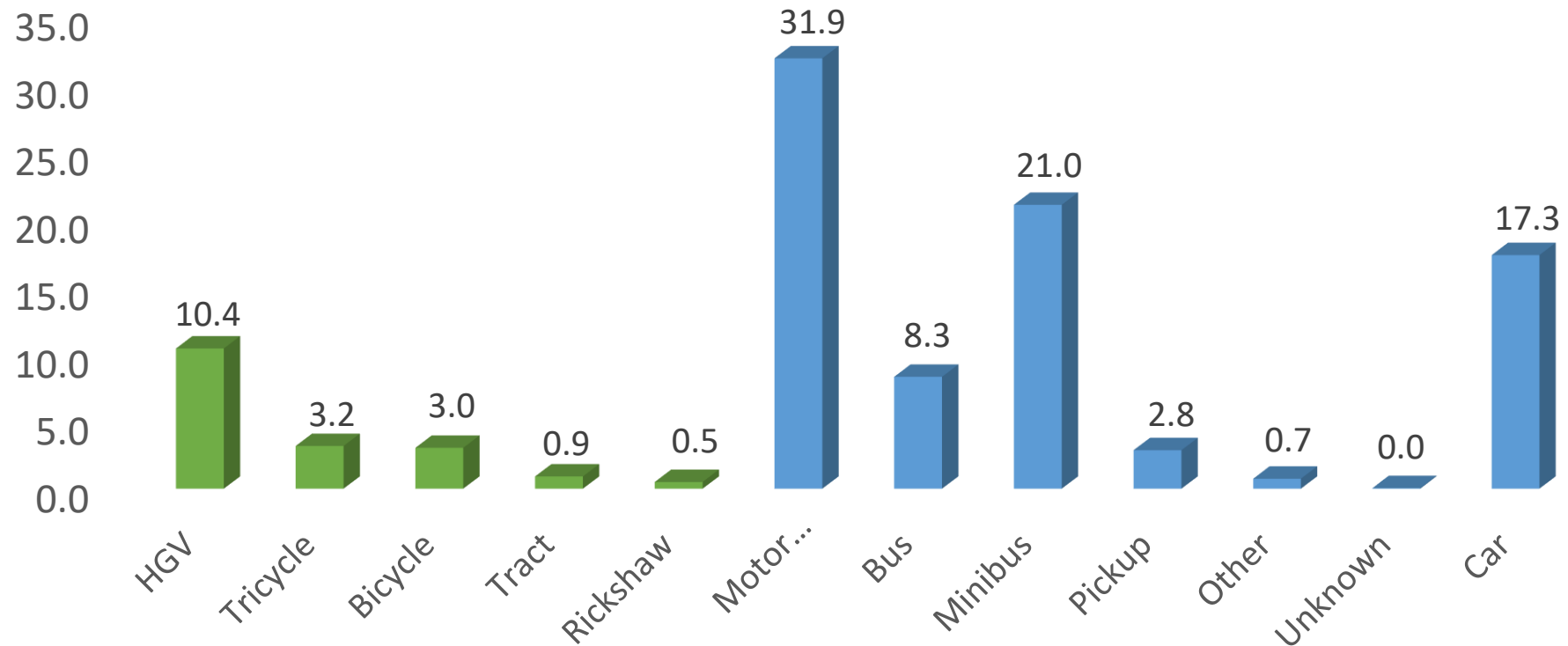


Fig 7: No of death by time of day (n=9061)

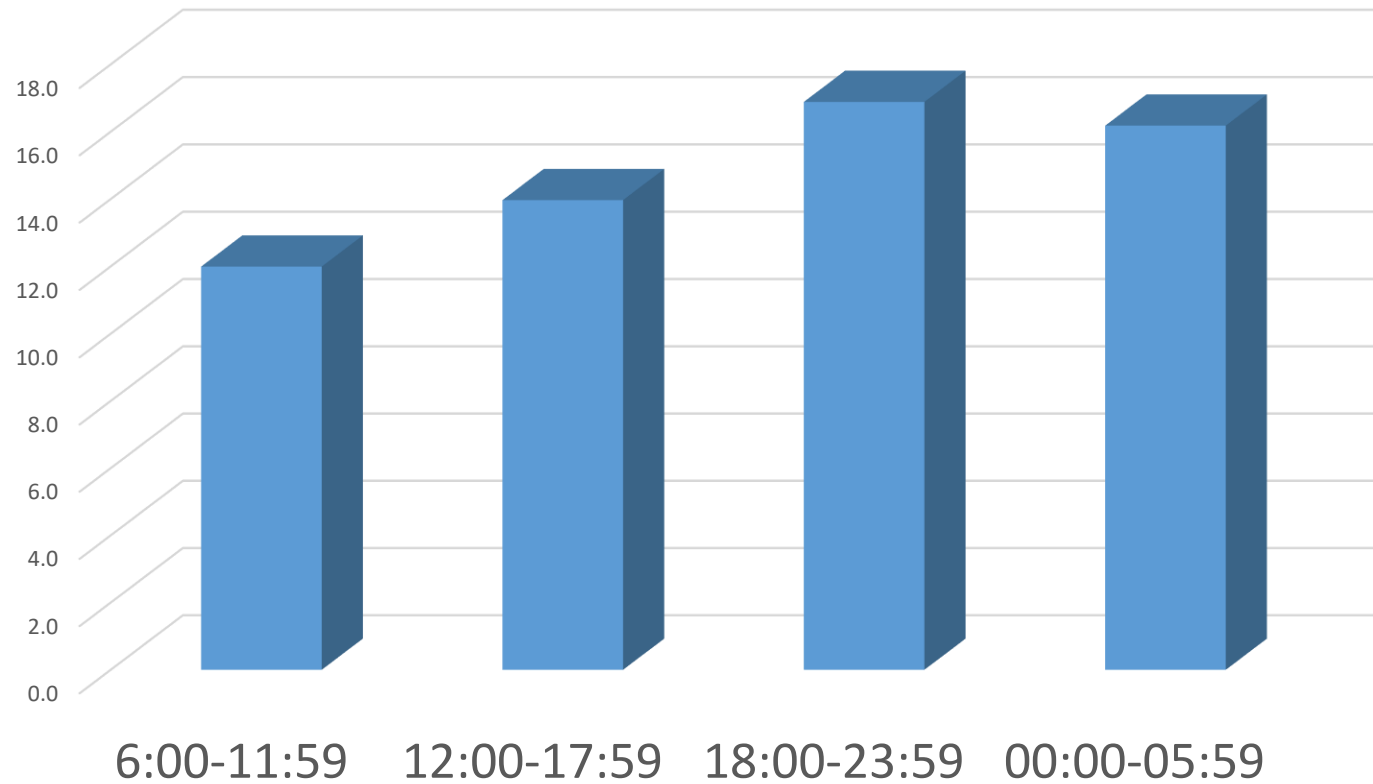


Fig 8: Fatalities associated with Driver Error (n=9073)

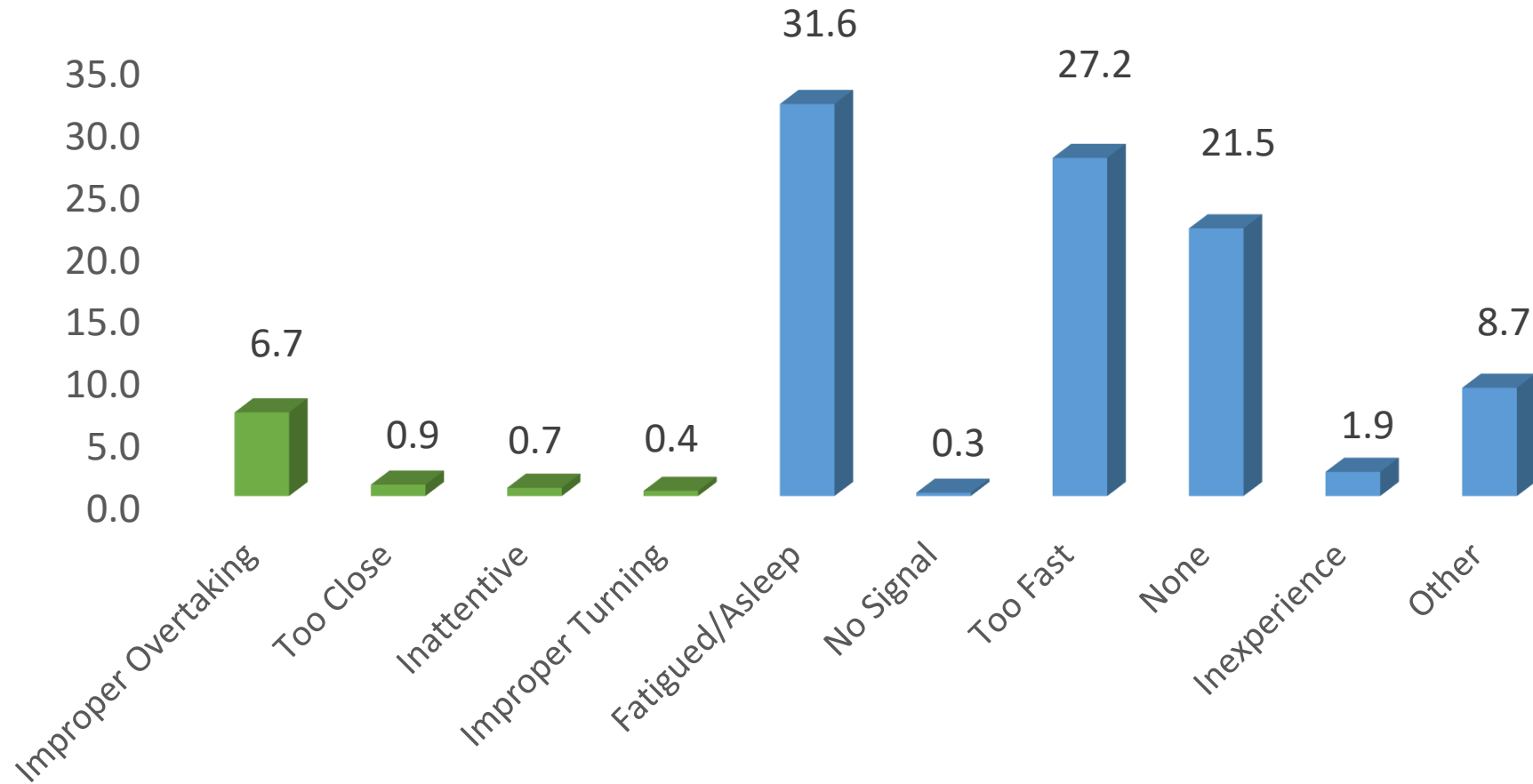
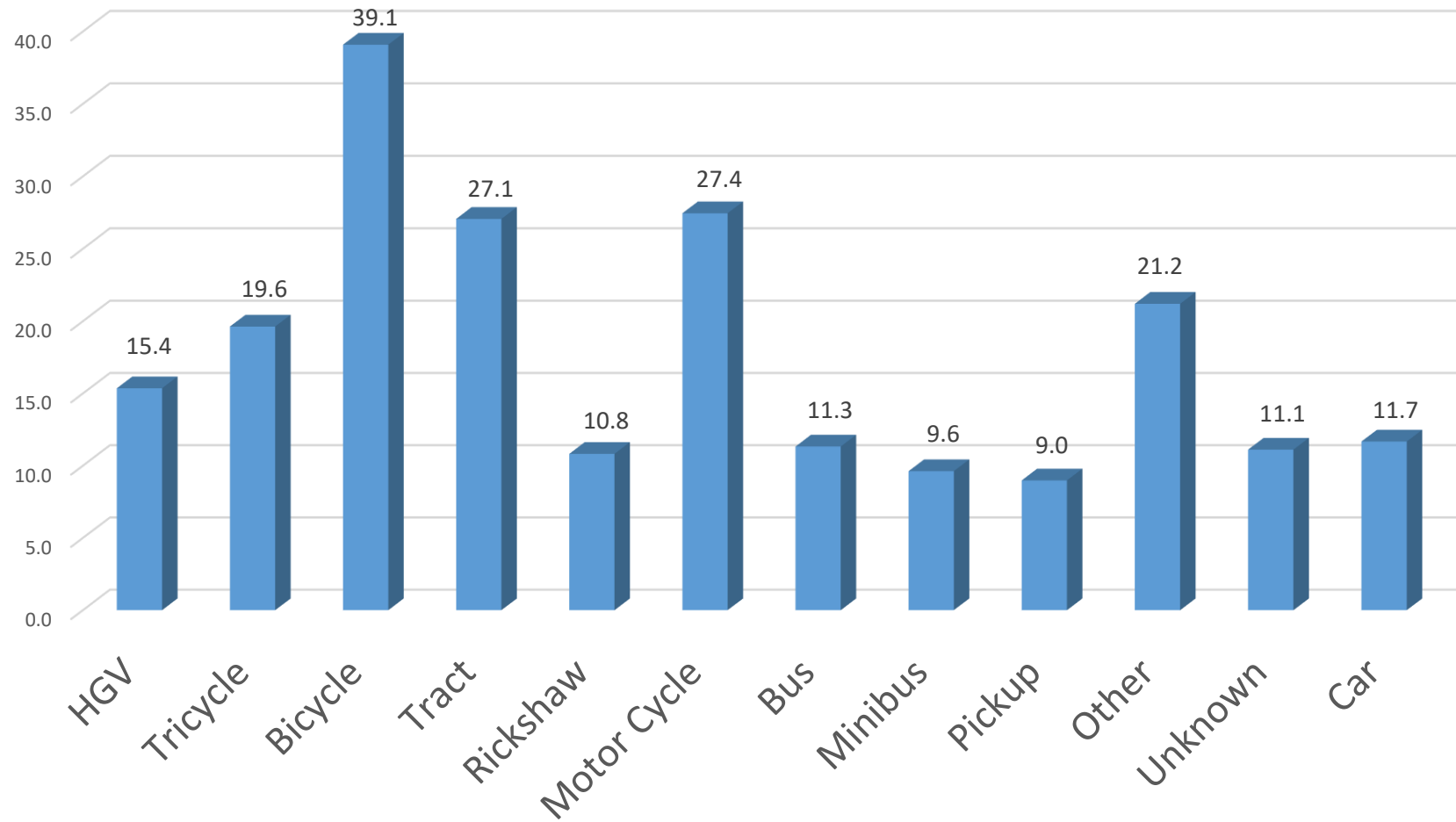


Fig 9: Casualty death among vehicle type (n=9061)



Conclusion



The menace of road traffic accidents on rural highway in Ghana is largely due to the mixture of too fast and too slow vehicles (**High speed dispersion**) rather than absolute high speed.

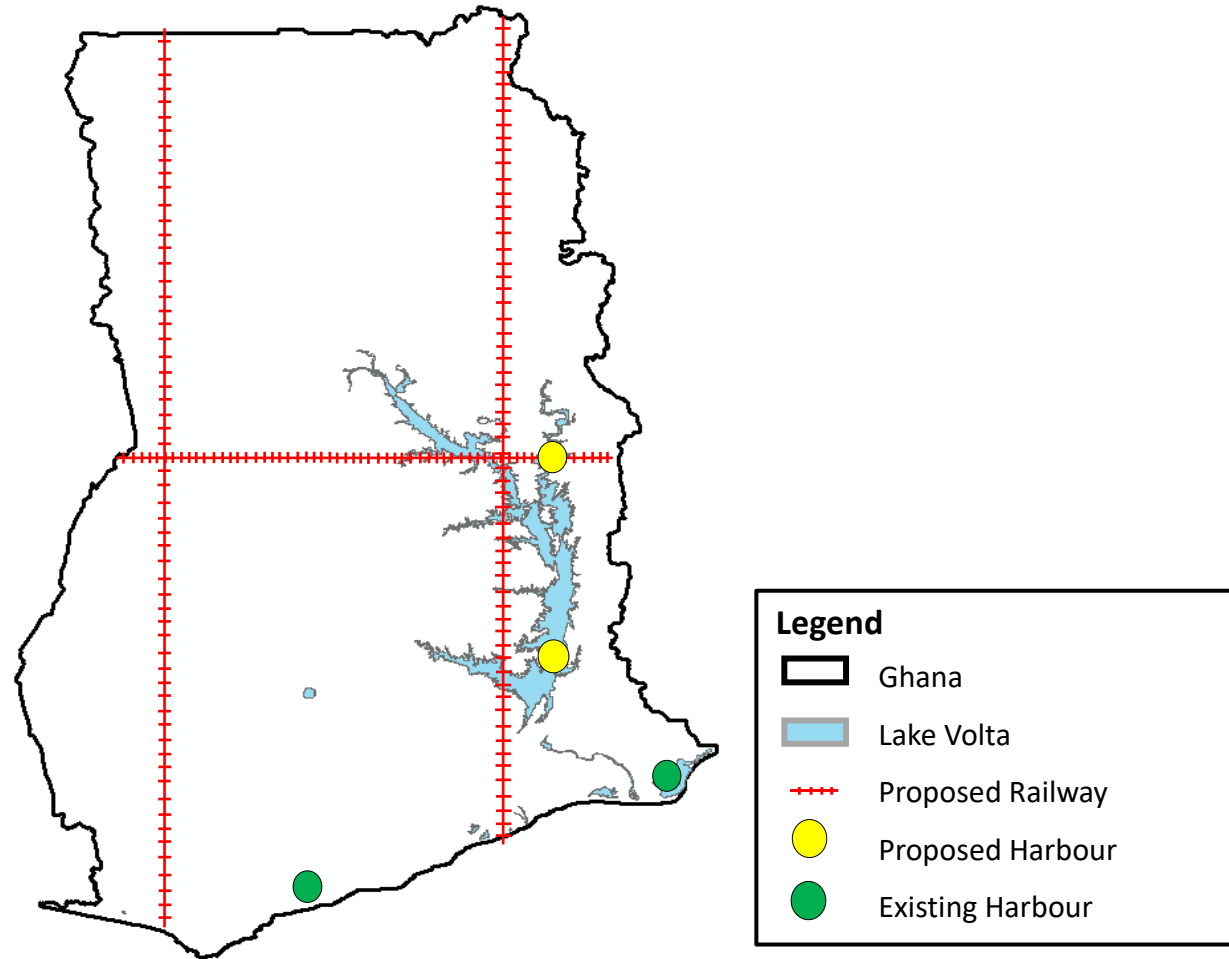
1. Setting and enforcement of minimum speed limit on Rural highways.

Fig 10: Prevention of high speed deviation



- 2. Engineering
 - a. Dualization of Rural highways.
 - b. Climbing lanes

Fig 11: Reduction of trucks on highways



Thank You

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