A Demographic Analysis and Reconstruction of Selected Cases from the Pedestrian Crash Data Study

Jason Stammen

NHTSA People Saving People http://www.nhtsa.dot.gov

Brian Ko

Dennis Guenther

OHIO STATE

Gary Heydinger

FTI

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NHTSA People Saving People http://www.nhtsa.dot.gov

Pedestrian Crash Data Study (PCDS)

- Implemented by NHTSA to Update PICS
- Obtained through NASS
- Pedestrian, Driver, and Vehicle Information in Cases
- Spans 1994-1998
- 521 Documented Cases
- Interim PCDS Analysis (292 Cases) presented in 1998[1]

[1]Jarrett, et al. 1998 ESV

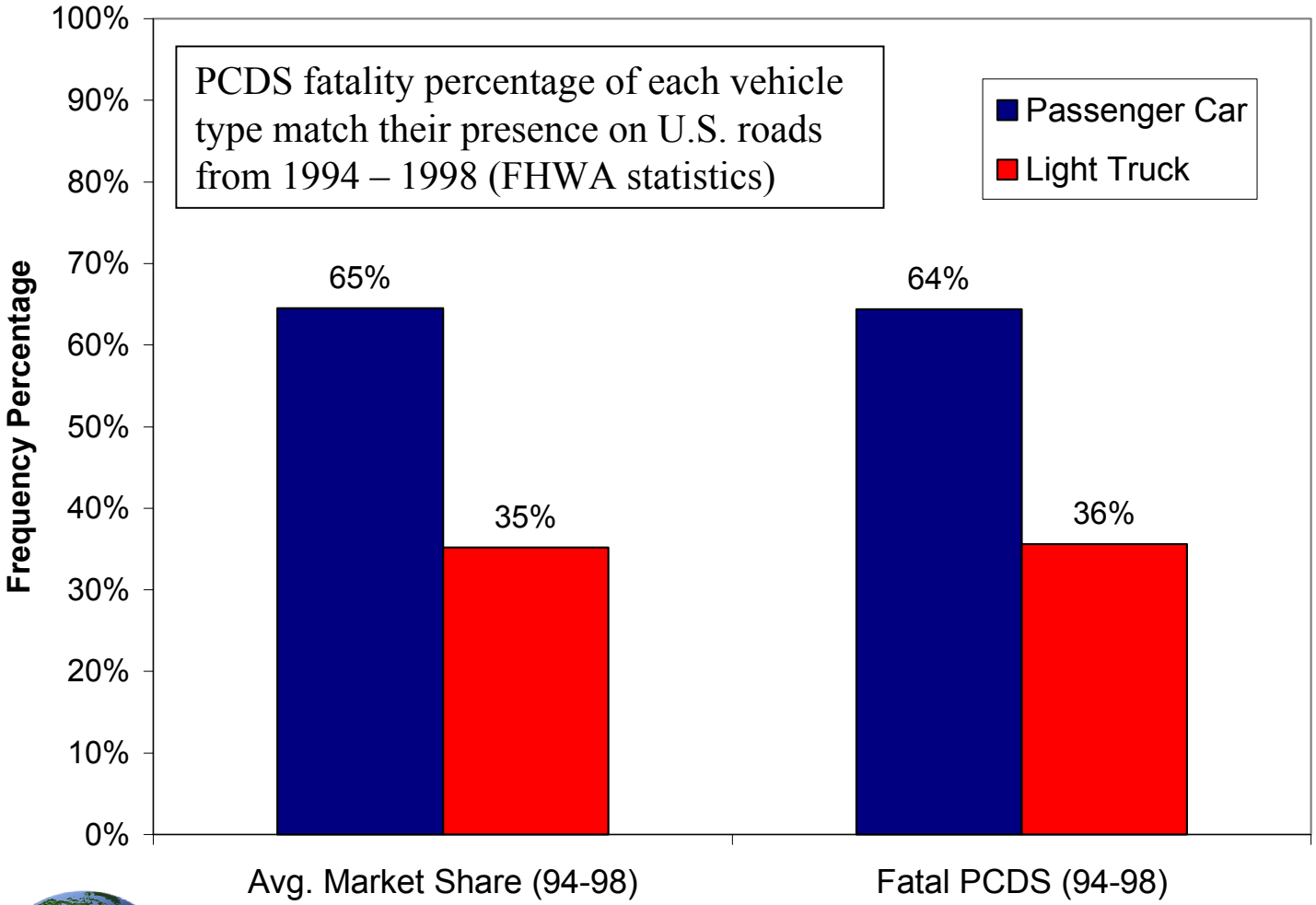
Purpose of Study

Investigate the differences between pedestrian collisions involving passenger cars and light trucks (utility, vans, and pick-ups):

1) Statistically by analyzing the PCDS database

2) Experimentally by reconstructing two PCDS cases (one car, one truck) in sled tests with a pedestrian dummy

Passenger vs. Light Truck



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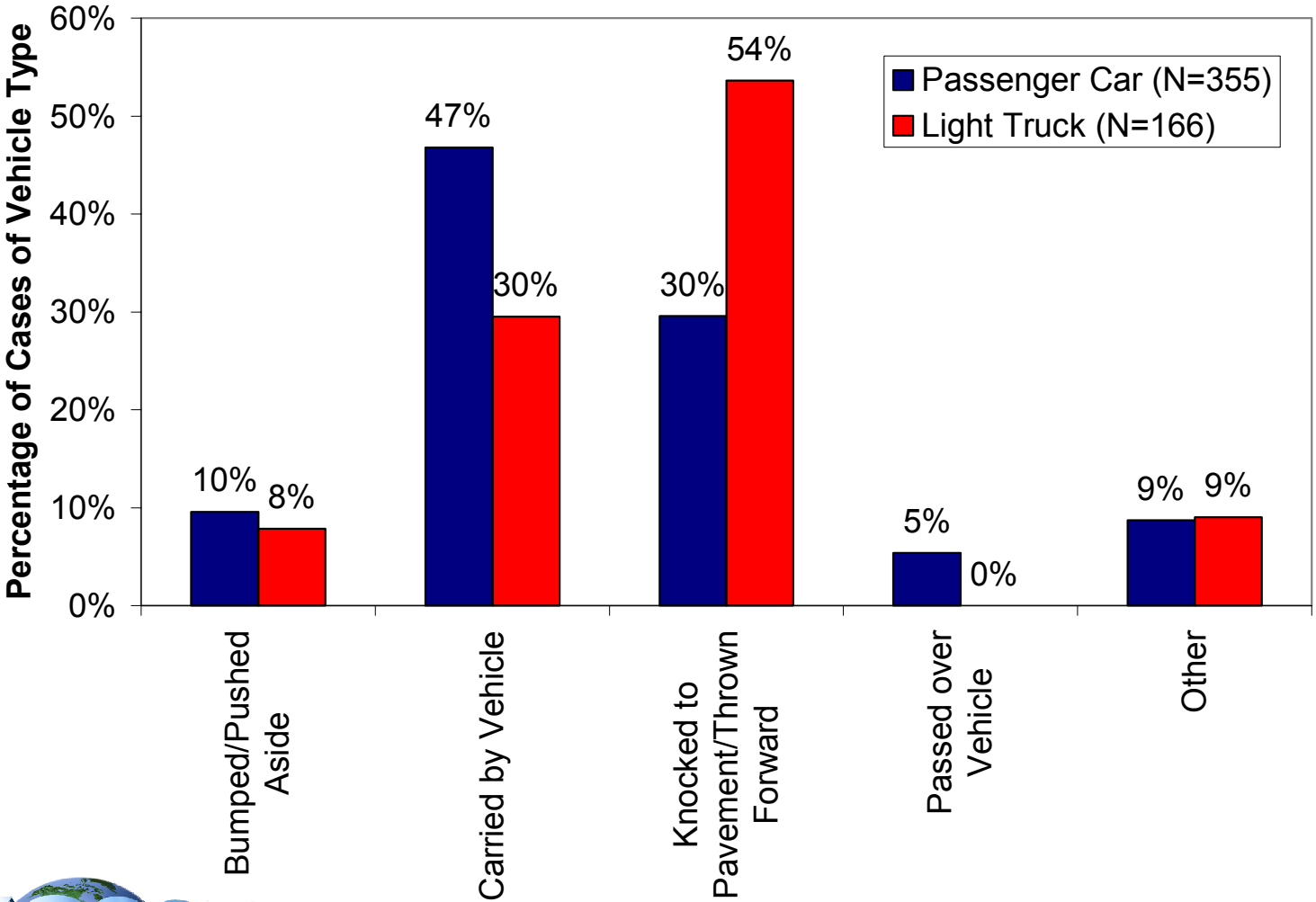
Post-Impact Motion



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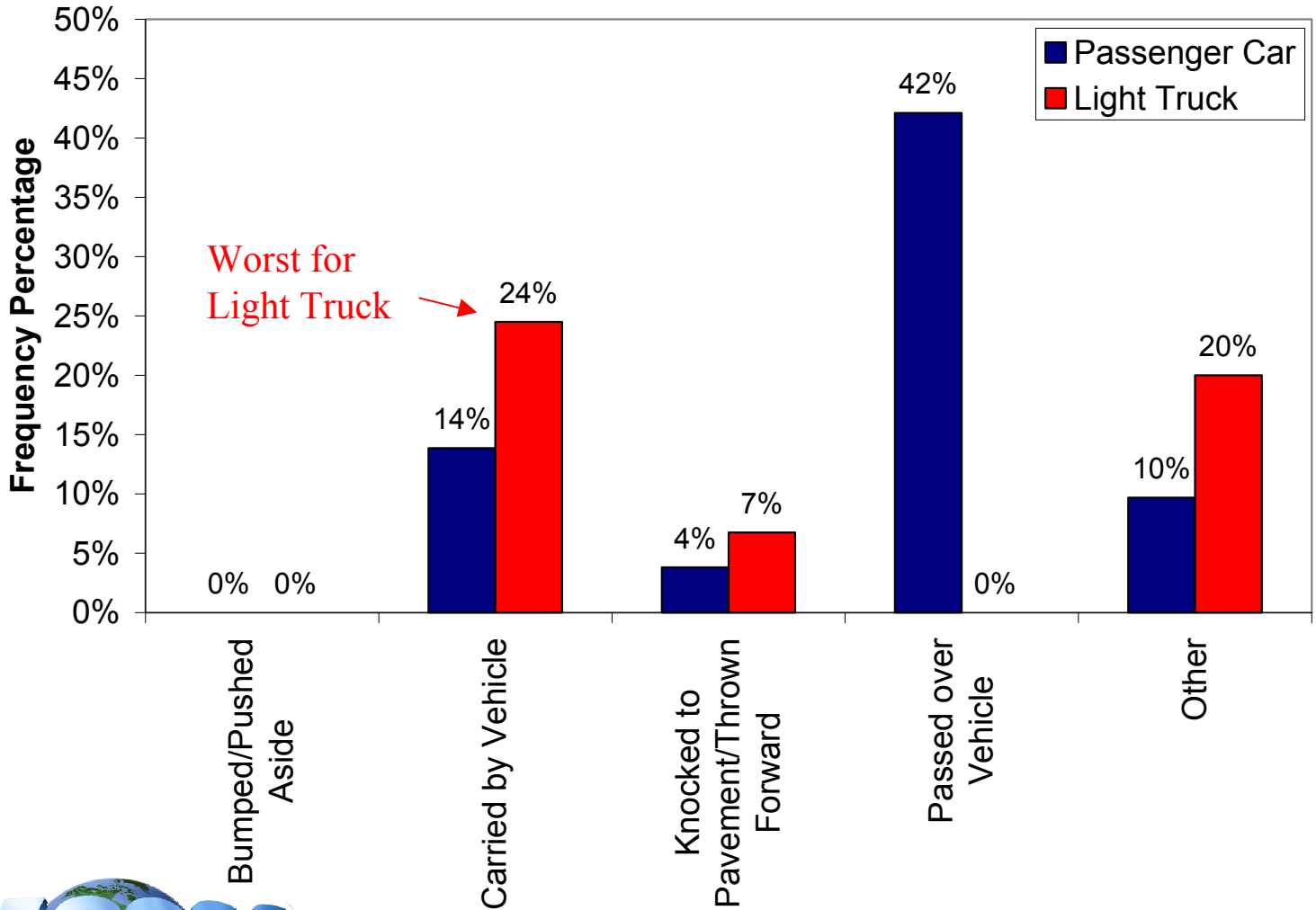
Post-Impact Motion (Fatality Rate)



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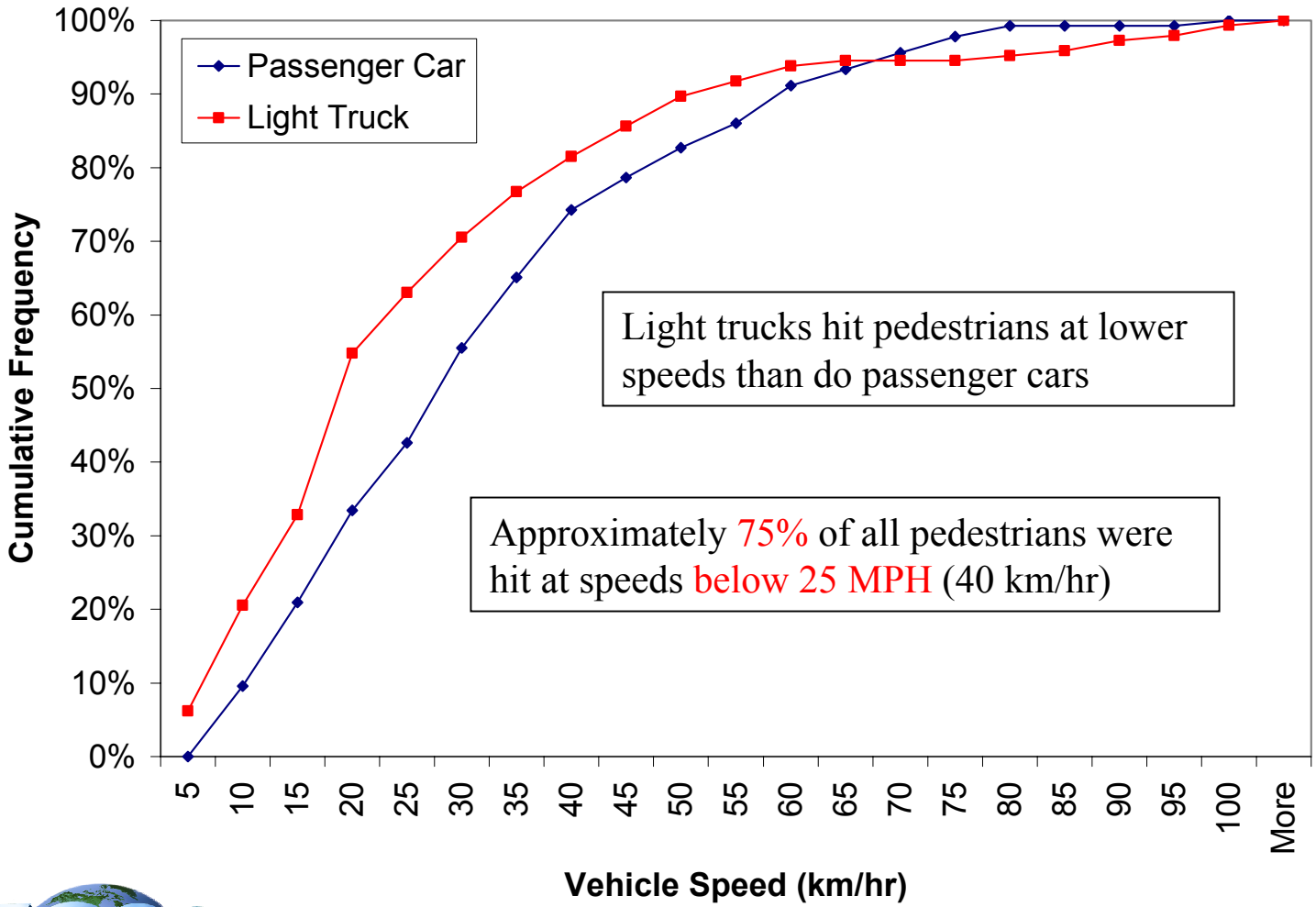
Vehicle Impact Speed



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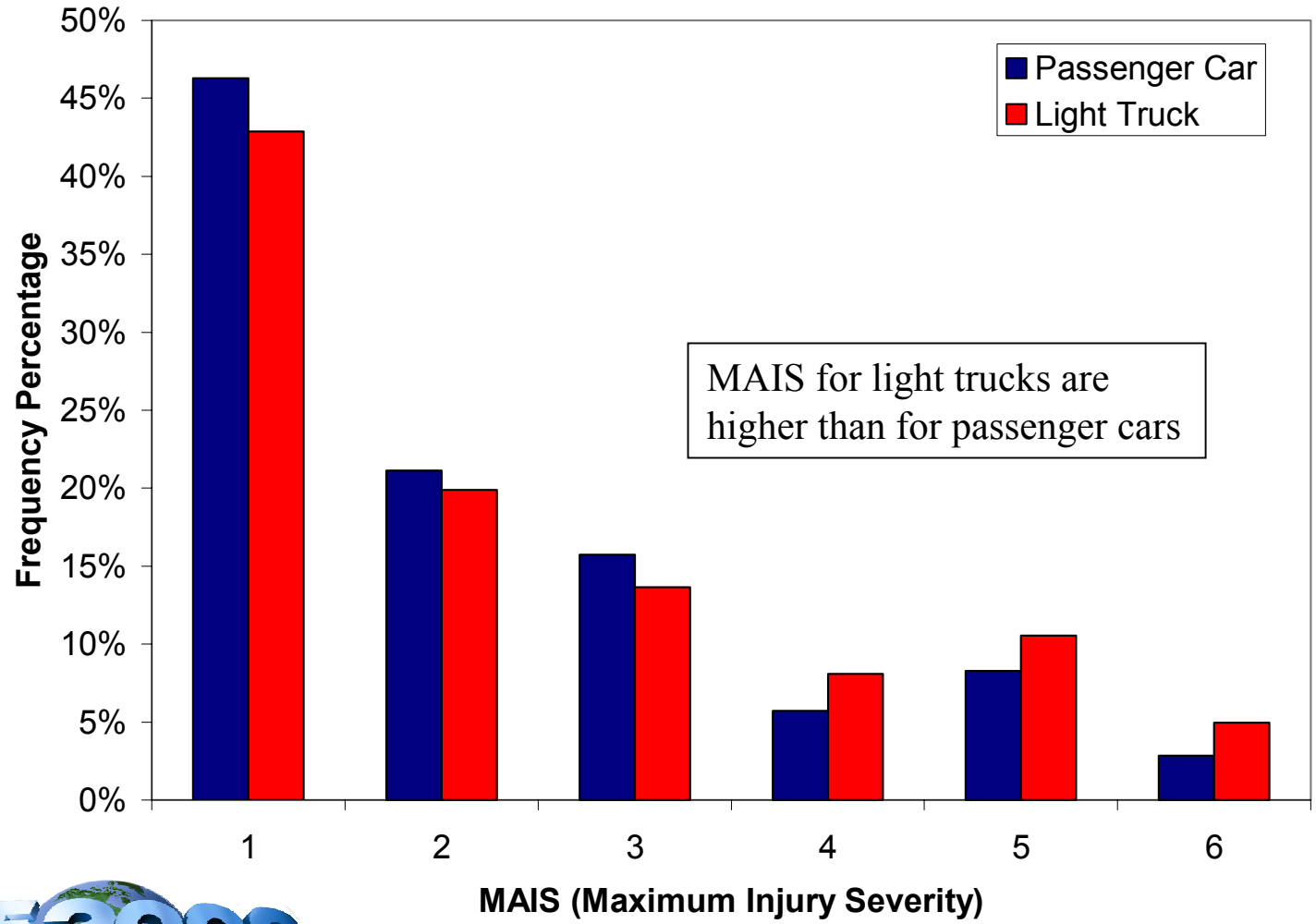
Maximum AIS Injury (MAIS)



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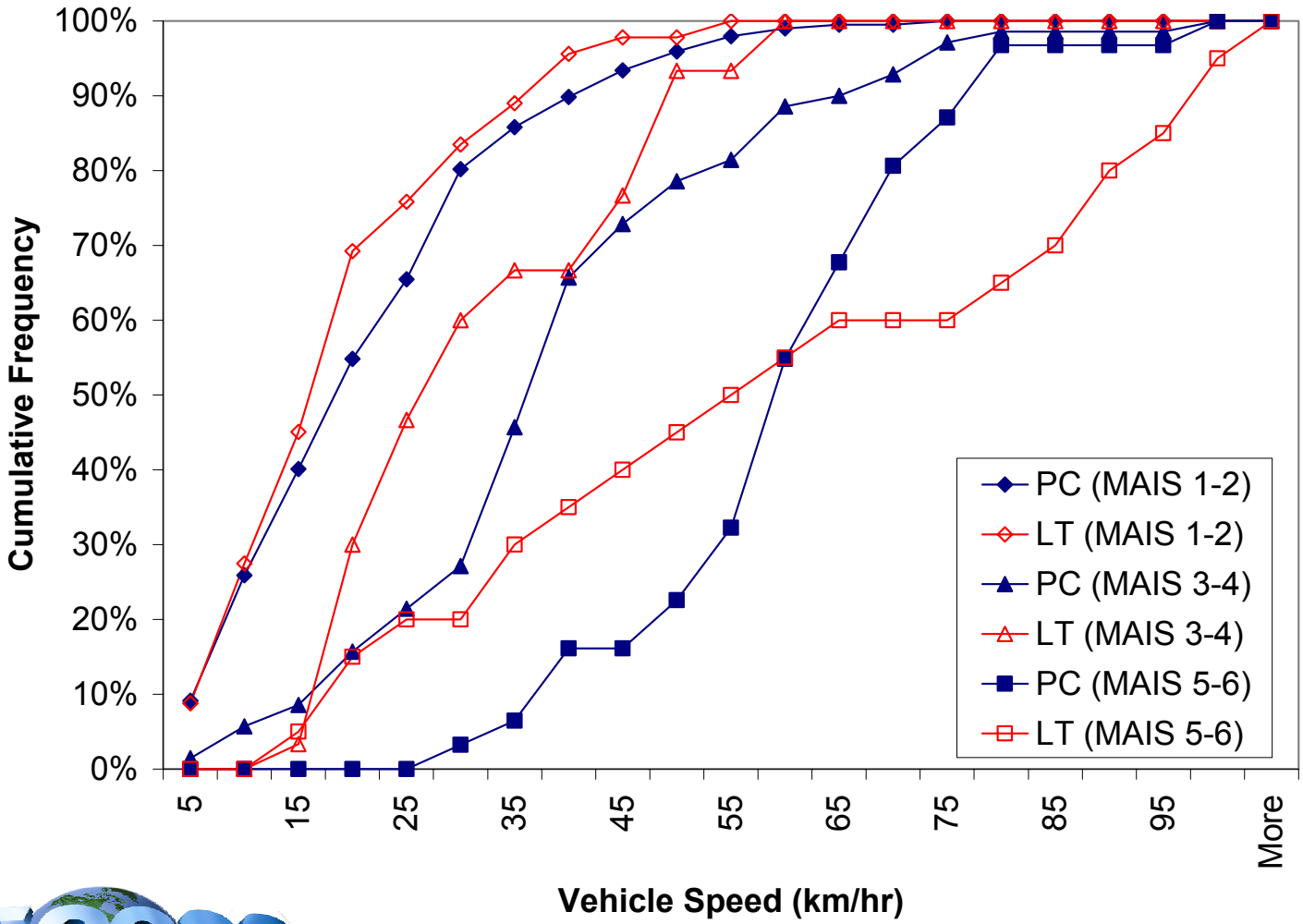
MAIS vs. Vehicle Speed



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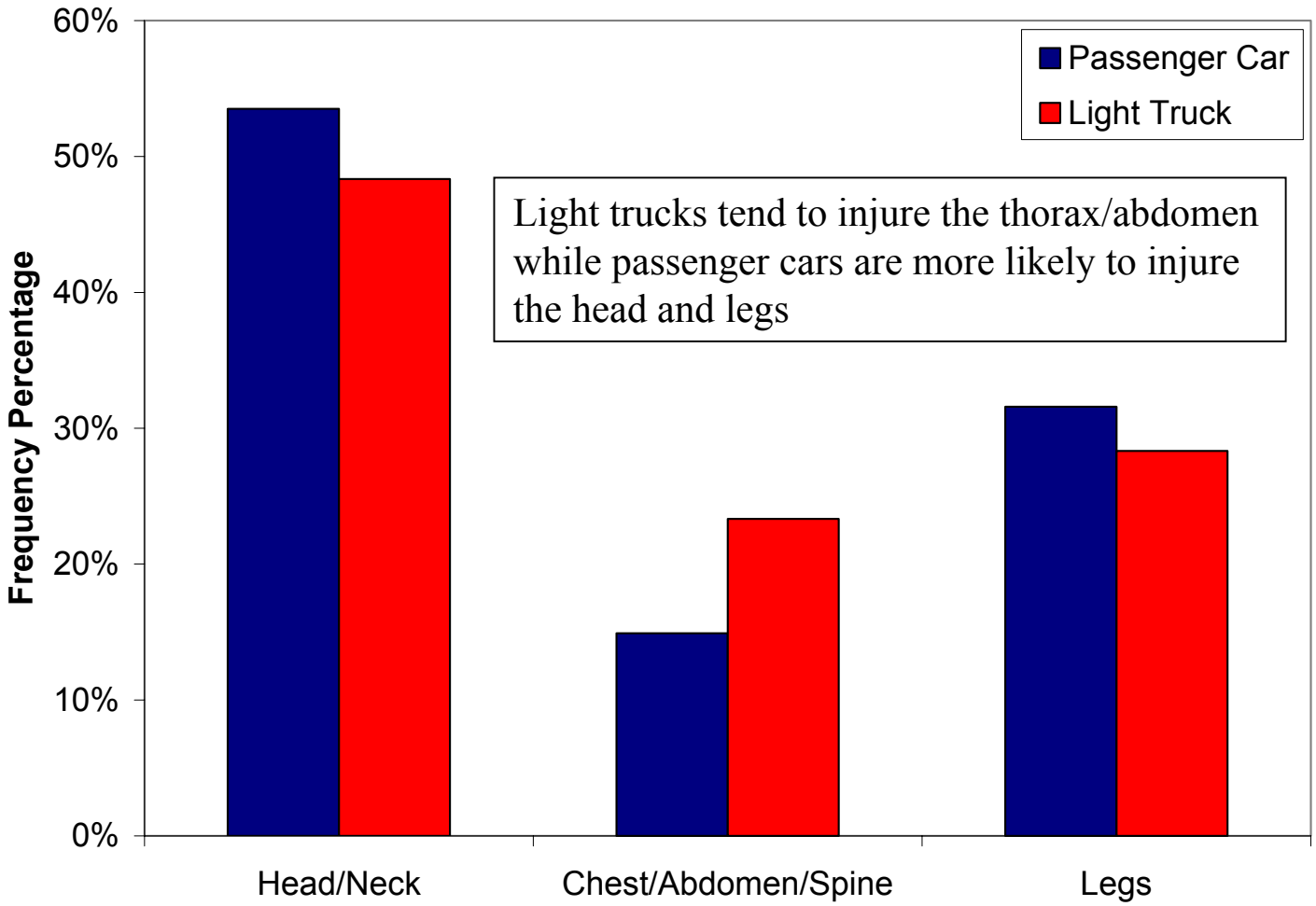
Injury Region (MAIS 3-6)



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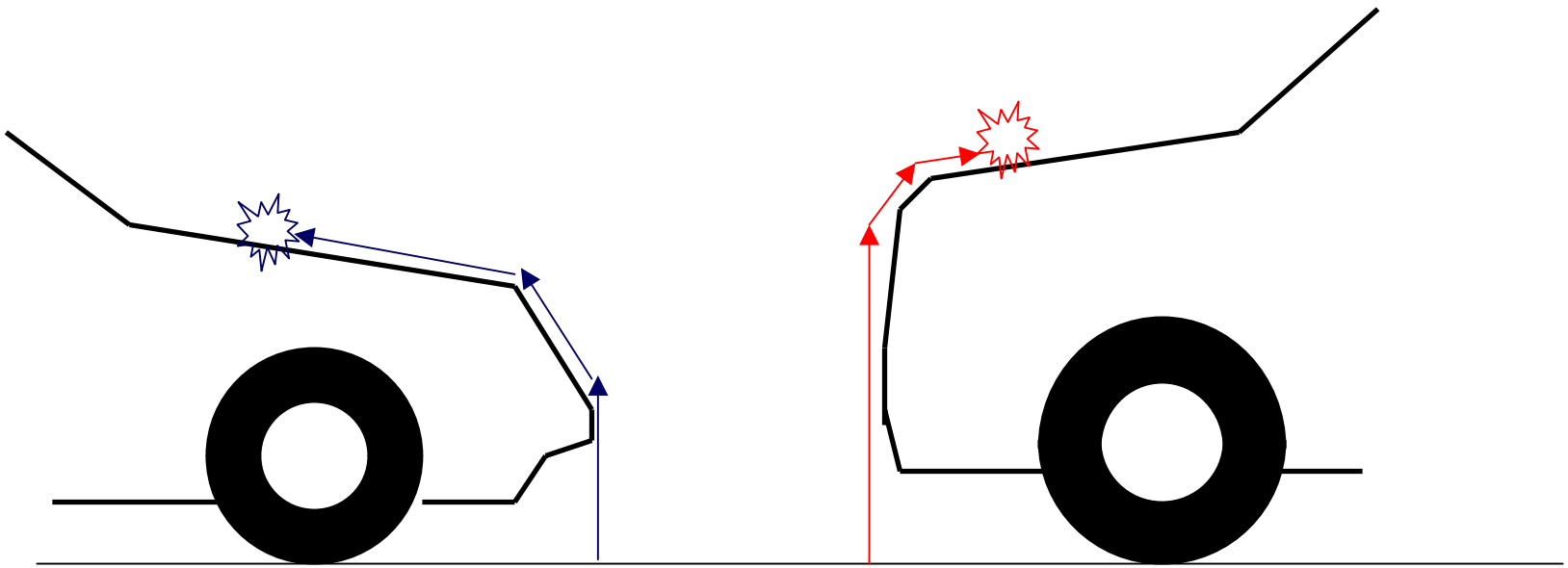
Wrap Around Distance (WAD)



Passenger Car

Light Truck

Head Contact

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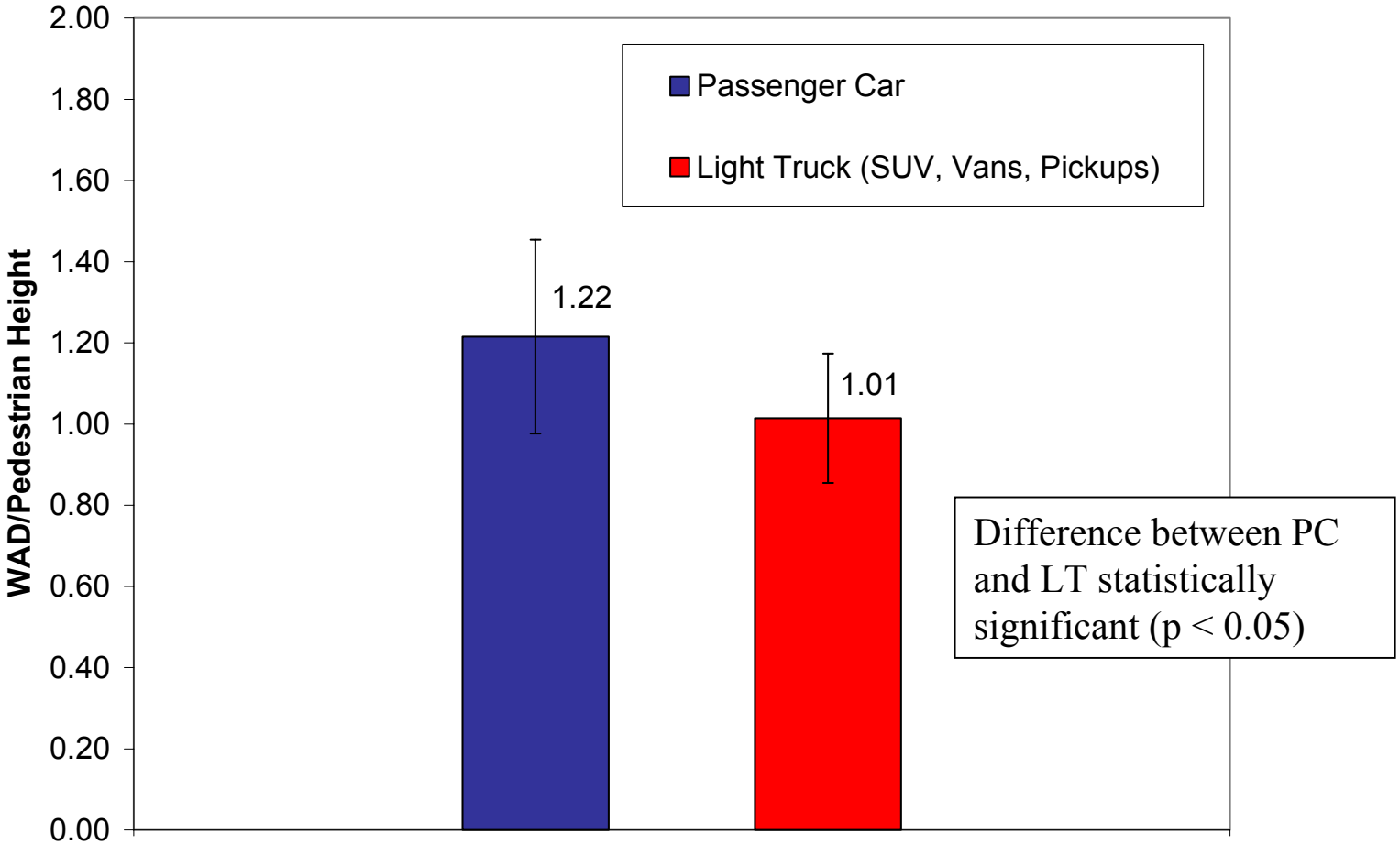
WAD/Pedestrian Height



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According to the PCDS:

- Most vehicles carry or throw pedestrians forward
  - Carrying is more likely to cause fatal injury than throwing fwd
  - LT more likely to cause fatality when pedestrian is carried
- LT hit pedestrians at lower speeds than do PC
- MAIS tends to be more severe for LT than for PC
- MAIS increases with vehicle speed for both PC and LT
- Chest/Abdomen injured more frequently in LT impacts
- WAD/height: Avg. for PC significantly > than LT

PCDS Case Reconstructions

- Honda Polar II Dummy (50th %)
- Passenger Car Case
  - 1999 Honda Civic
  - 44 year old pedestrian jogging
  - AIS 1 head injury
- Light Truck Case
  - 1999 Chevrolet Silverado
  - 77 year old pedestrian
  - Various AIS 3-5 chest/leg injuries

Full-Scale Sled Test Setup

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Kinematics (PC vs. LT)

Passenger Car

Light Truck

Test Results

	Passenger Car	Light Truck
Vehicle Speed	48 kph	20, 25 kph
MAIS Body Region	Head	Chest
MAIS	AIS 1-2	~ AIS 3-5
Post-Impact Motion	Carried	Thrown Fwd
WAD/Pedestrian Height	1.40	0.85
MAIS vs. Speed	---	Increased

Overall Conclusions

- Two very different interactions to examine:

Passenger Car	Light Truck
Carried	Thrown Forward
Less Severe Injuries	More Severe Injuries
Higher speeds	Lower speeds
WAD/Height ~ 1.22	WAD/Height ~ 1.00

Acknowledgements

- Honda R & D
- GESAC
- Japanese Automotive Research Institute (JARI)

THANK YOU!