

Pedestrian and Motor Vehicle Interaction with Streetcars in Barcelona

José I. Farrán

Principal

Adavant Consulting

San Francisco, California

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TRB



Pedestrian and Motor Vehicle Interaction with Streetcars in Barcelona

- Introduction
- Barcelona Streetcar System
- Incident Database
- Preliminary Analysis Results
- Conclusions and Next Steps

Streetcar Systems

- Integrate well in an urban setting, sharing the space with motorists, bicycles and pedestrians
- Inherently safe mode of travel, but incidents can occur in a complex environment
- Analysis of incident data allows understanding of causality and facilitates prevention
- Preliminary results using publicly available data

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Barcelona, Spain



- NE of Spain on the Mediterranean Coast
- About 100 miles south of the Pyrenees
- Approx. 2.6 M residents in the metropolitan area
- Second largest city in the country

Barcelona Streetcar System TRAM

- Trambaix
 - 15 km, double track
 - 29 stations
- Trambesòs
 - 14 km, double track
 - 27 stations

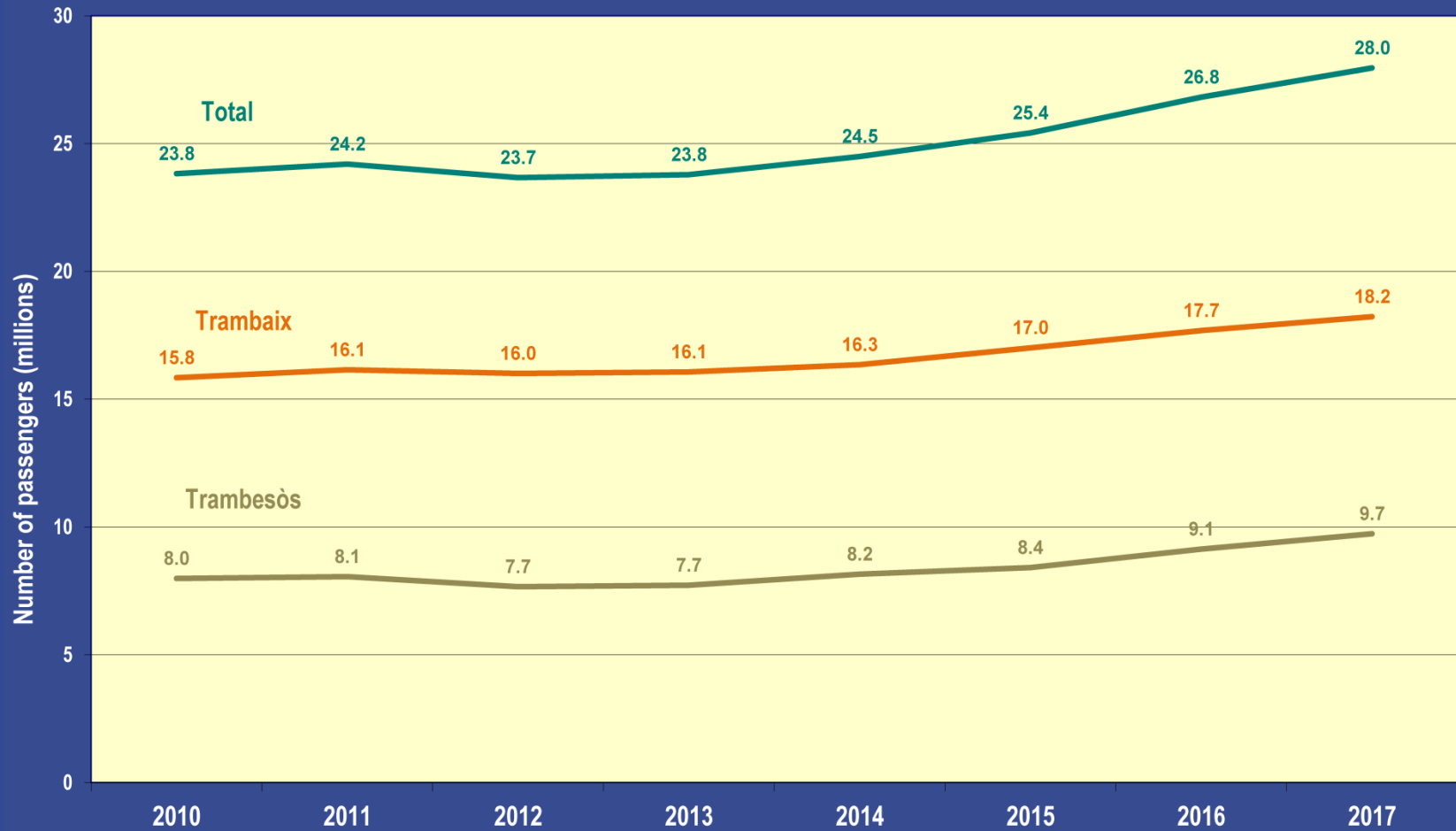


Barcelona Streetcar System TRAM



- Alstom Citadis
 - 100 % low floor, bi-directional
 - 33 m, 218 passengers
 - Trambaix: 15 vehicles in peak service each way
 - Trambesòs: 8 vehicles in peak service each way

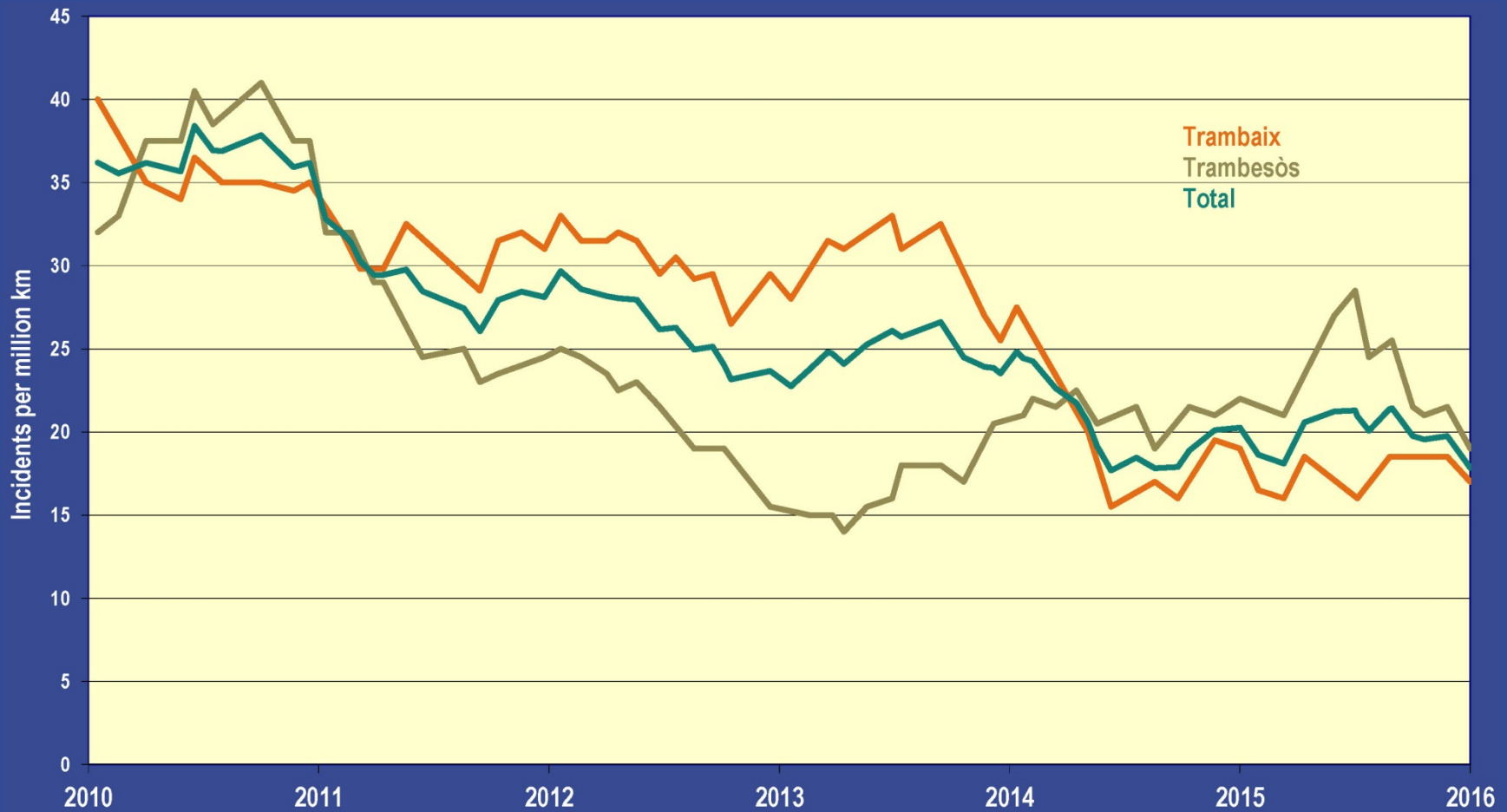
Annual Ridership



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Annual Incident Index (12-month Moving Average)



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Incident Database

- BCN Open Data
- Publicly available 2010- 2017
- 90% include injuries/fatalities
- Date and time
- Approximate location
- Codified type of incident



Incident Database

- Individuals
 - Driver, passenger, pedestrian
 - Gender, age
 - Driver license class, driving experience
- Preliminary causes
- Level of injuries, fatalities



Area of Coverage



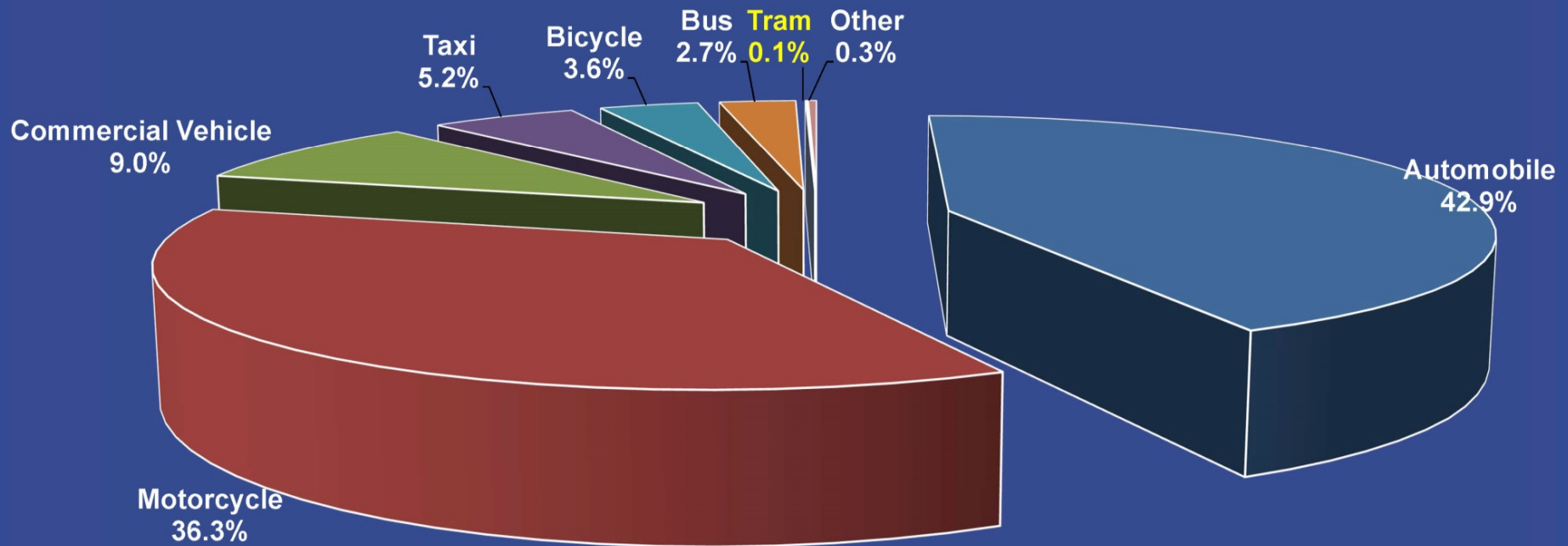
- Within city limits
- 46 percent of trackage and 48 percent of stations
- 52 percent of vehicle-km and 56 percent of ridership

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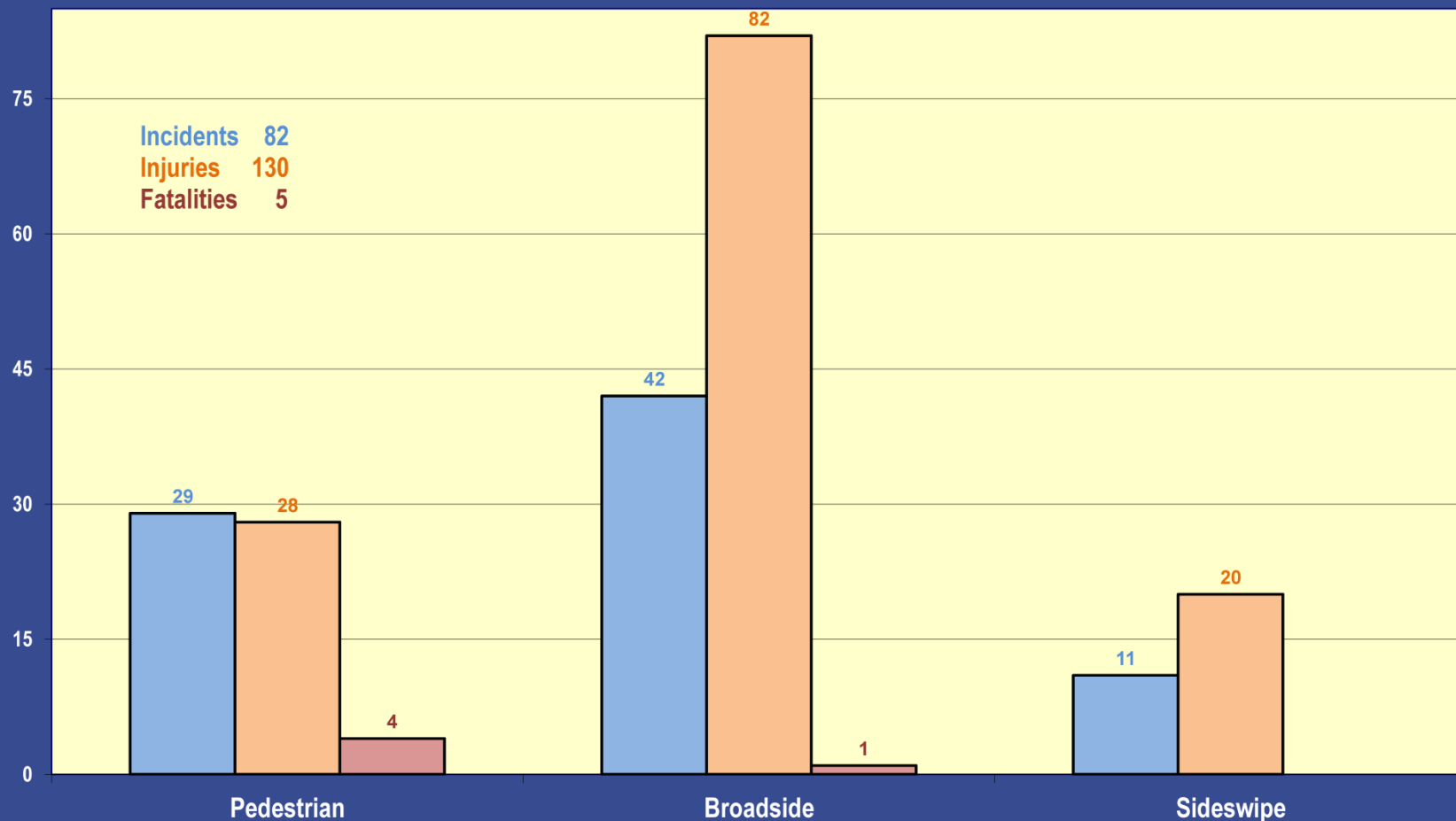
2010-2017

Vehicles Involved in Reported Incidents



- Approximately 20,000 reported incidents per year

2010-2017 Total Reported Tram Incidents, Injuries and Fatalities by Type

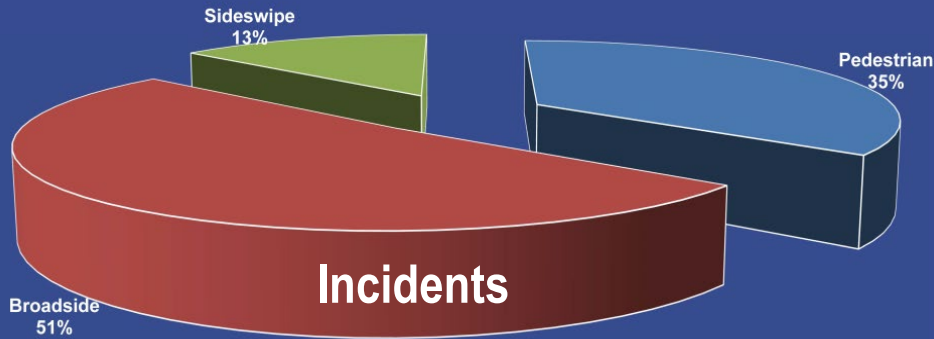


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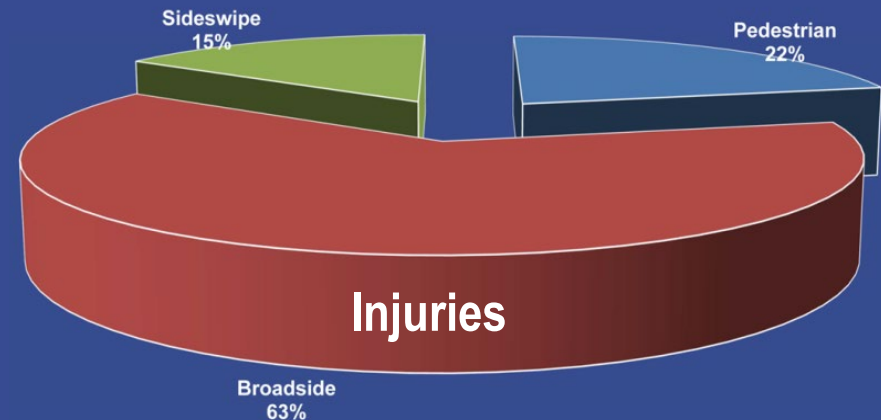
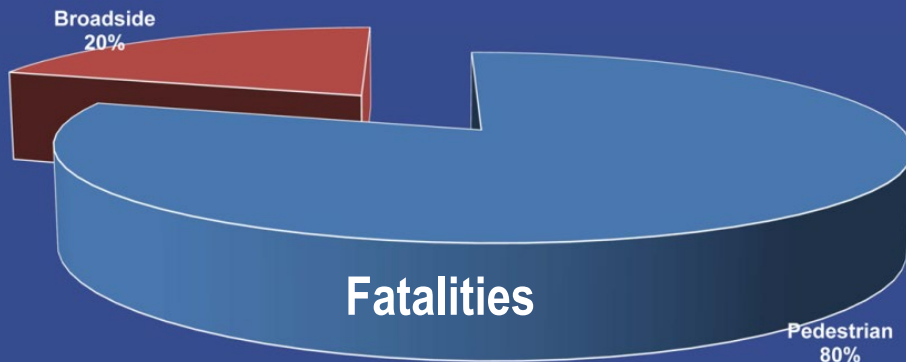
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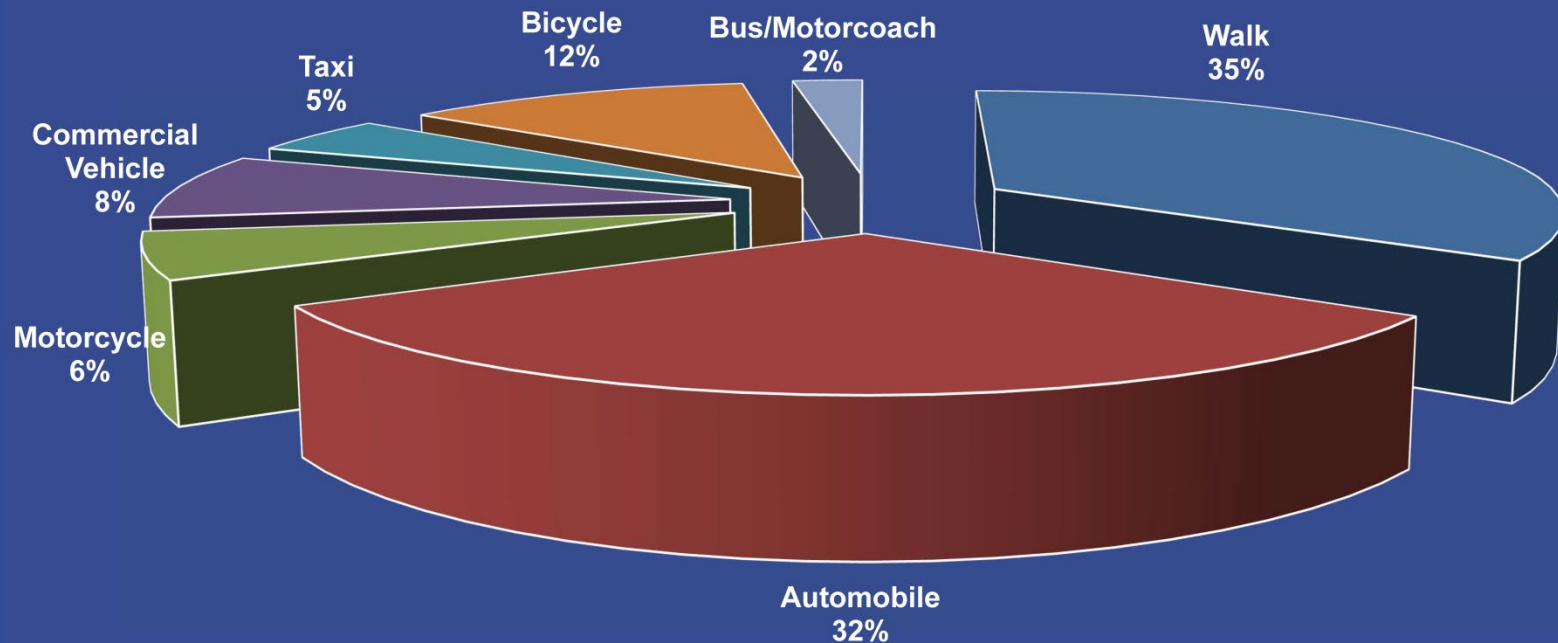
2010-2017 Total Reported Tram Incidents, Injuries and Fatalities by Type



- 35% of incidents account for 80% of fatalities
- 51% of incidents account for 63% of injuries



2010-2017 Total Reported Tram Incidents by Means of Transport

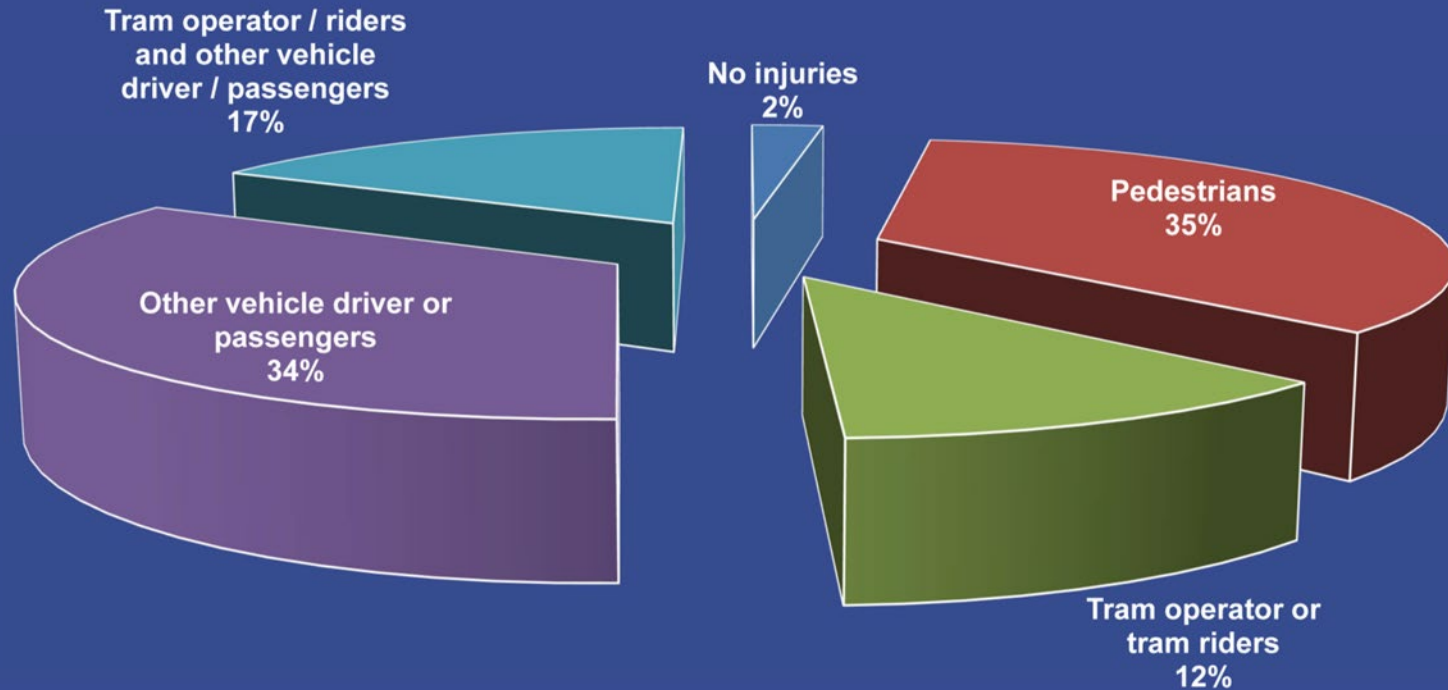


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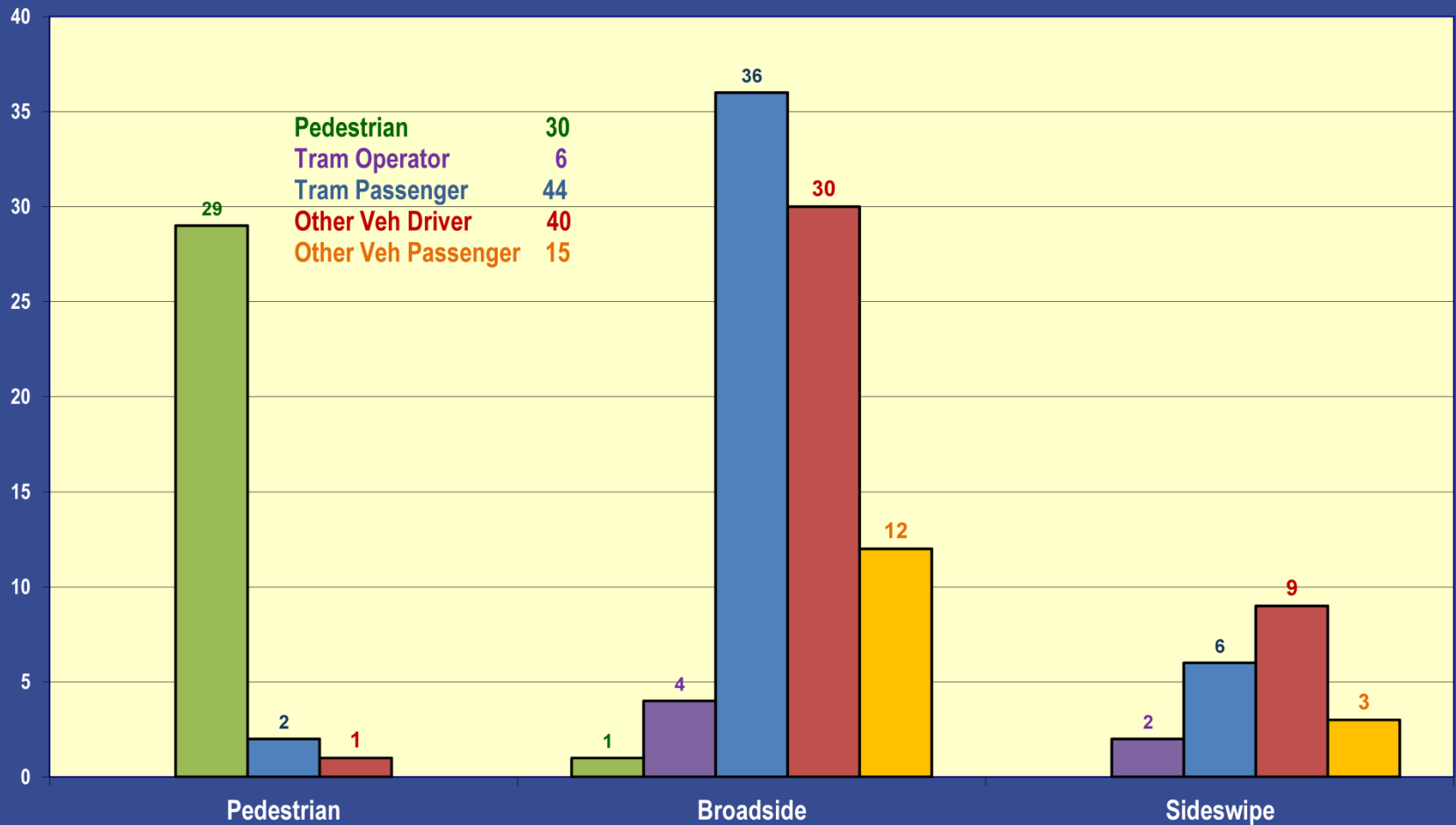
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2010-2017 Total Reported Tram Incidents by Type of Casualty



2010-2017 Total Tram Casualties by Incident Type



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Key Presentation Takeaways

- Streetcars are inherently safe, but incidents can occur in a complex environment
- Incident databases provide researchers and others with a key tool to conduct safety research
- Examples developed with limited publicly available streetcar incident data

Key Presentation Takeaways

- Possible Next Steps:
 - Evaluate and adjust geocoding
 - Conduct cluster analysis
 - Consider onboard incidents
 - Gather additional data as it becomes available
- Encourage operators/agencies to share information to enhance safety research and facilitate incident prevention

Thank you!



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