

Pre-crash motion and conditions of bicyclist-to-car crashes in Sweden

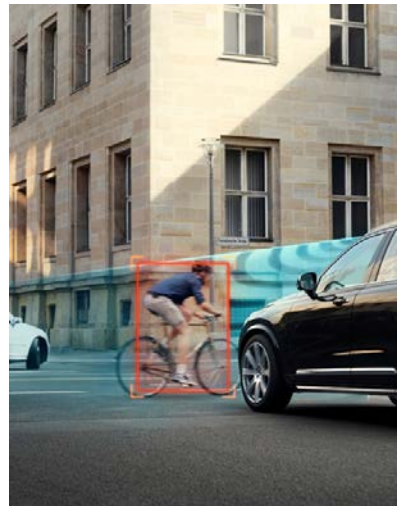
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3rd International Cyclist Safety Conference

Göteborg, November 18-19, 2014



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Tenerife Island 1977



578 people killed



Every day more than 1300 pedestrians
& bicyclists are killed in traffic

= 2 Tenerife plane crashes every day

Background

Euro NCAP / Accident data

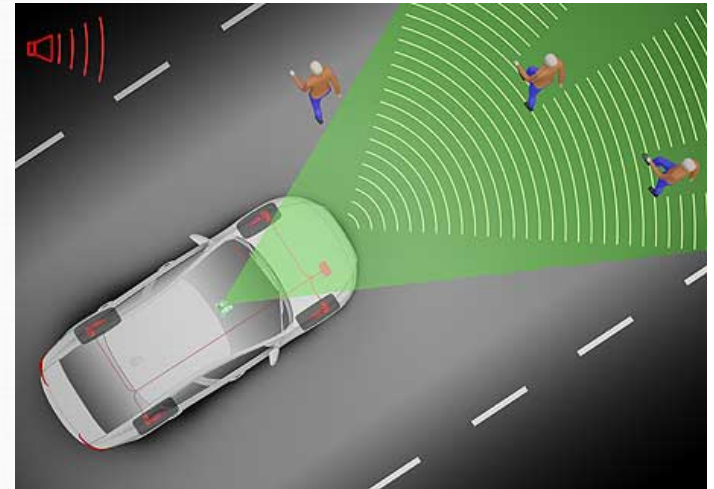
Strandroth STAPP 2014:

Higher star-rated cars (in Euro NCAP)
reduces injuries for pedestrians
and bicyclists

Background

Pedestrian protection

- Active system tests Euro NCAP 2016
- Systems increasing rapidly on the market



Background

- Volvo cyclist AEB
- EuroNCAP begin cyclist AEB tests 2018



CATS project

- Develop test methods and tools for cyclist AEB tests
- Important to understand how car-to-cyclist accidents occur
- Accident data from 6 countries



Aim

- Investigate Swedish accident data to conclude:
 - Most common accident types
 - Pre-crash motion of most common car-to-bicyclist accidents
 - Other important details, such as light conditions, precipitation, road layout, age, size etc

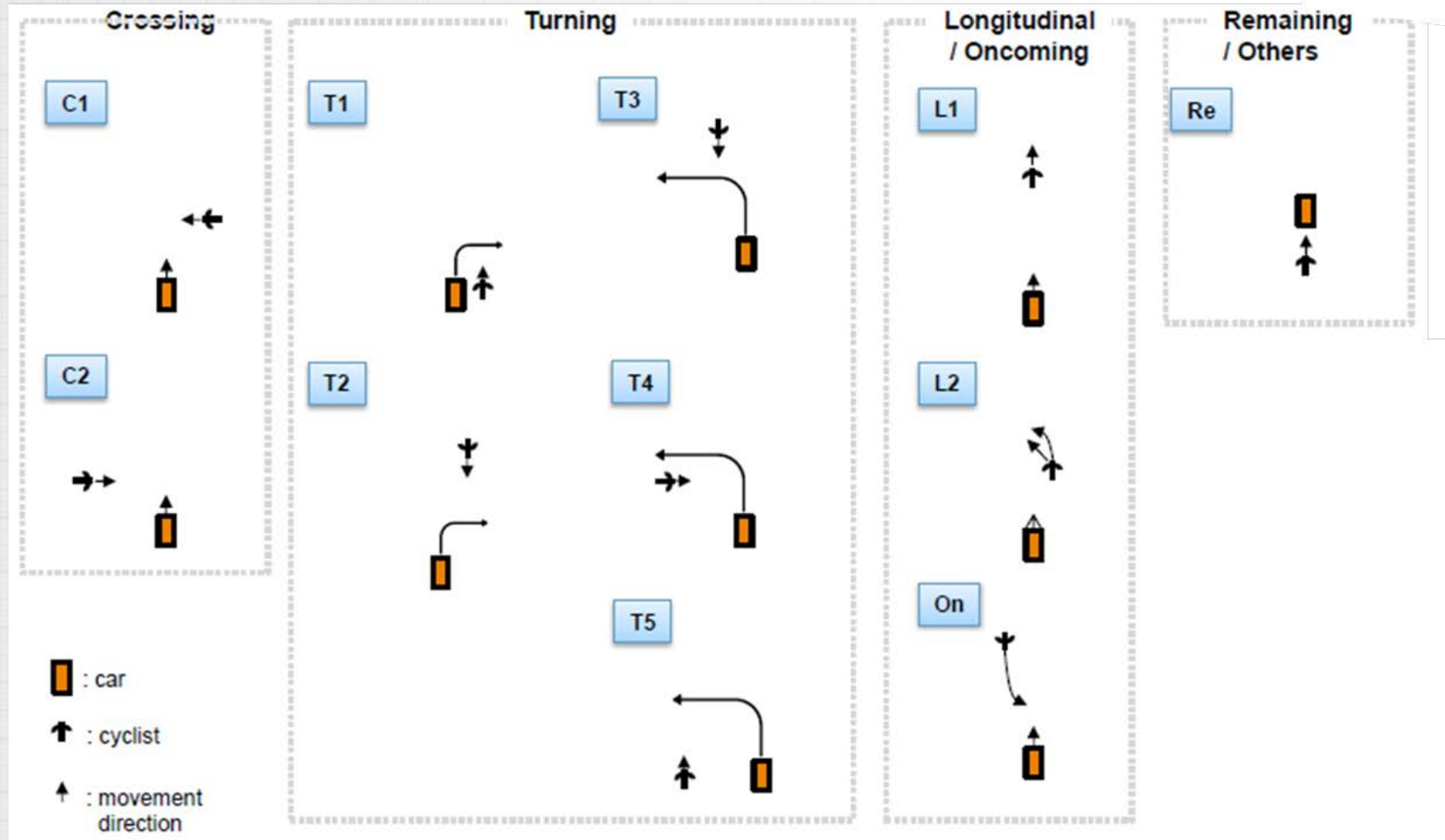
Method

- STRADA database
 - All persons seeking emergency care in Sweden
 - Fatal cases excluded
 - Passenger car - bicyclist
 - AIS2+ cases
 - 2010-2014
 - 435 cases
- Trafikverket database (Swedish Transport Administration)
 - All fatal accidents in Sweden
 - Passenger car – bicyclist
 - 2005-2014
 - 104 cases

Injured

Killed

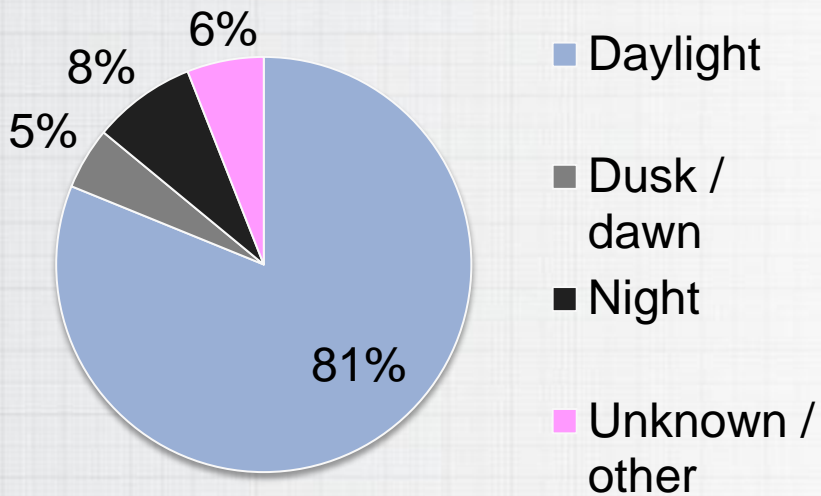
Scenario definition (CATS project)



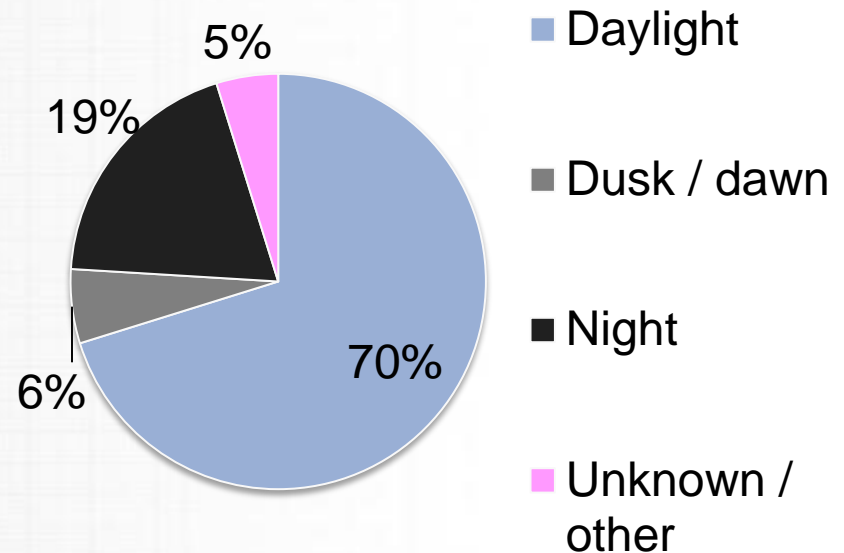
Results

Light conditions

AIS2+

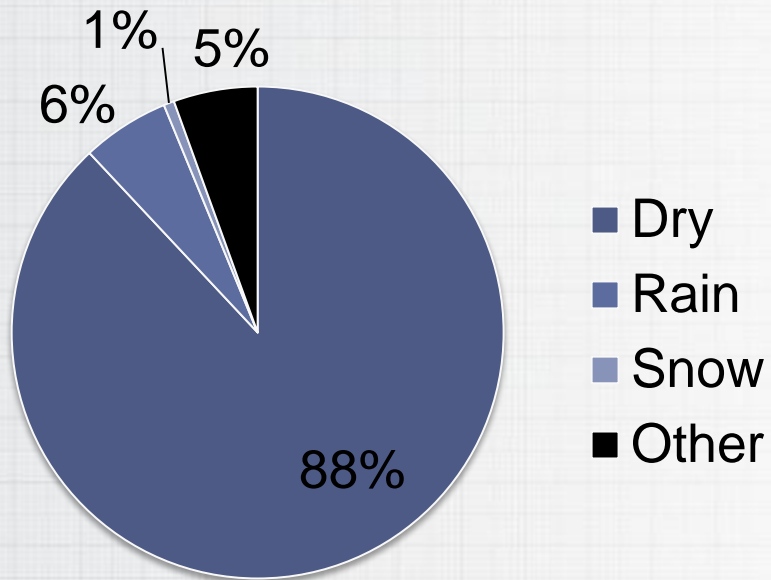


Fatal

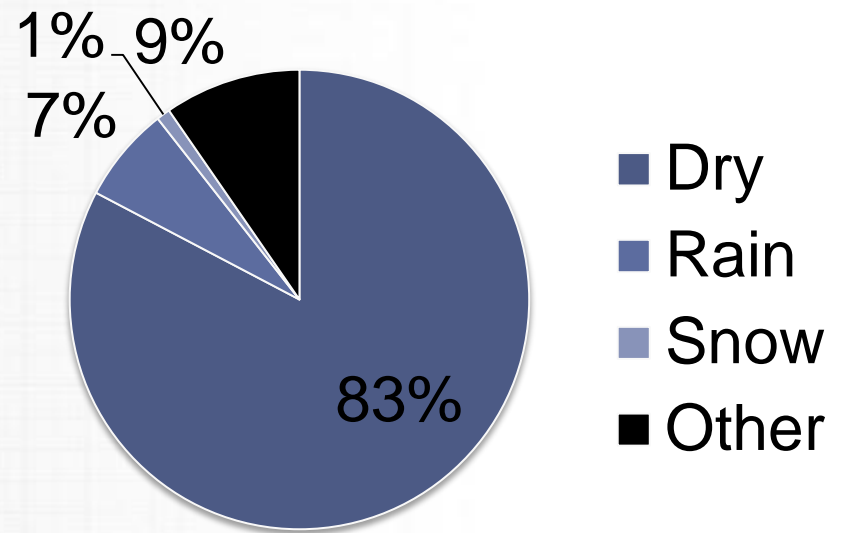


Precipitation

AIS2+

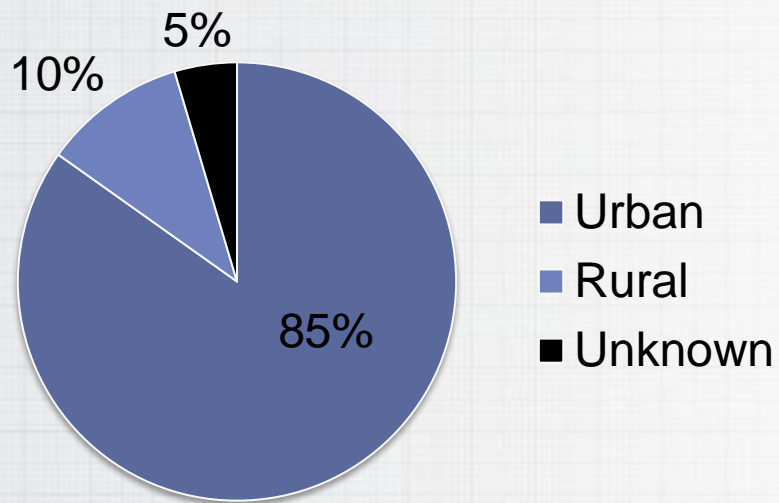


Fatal

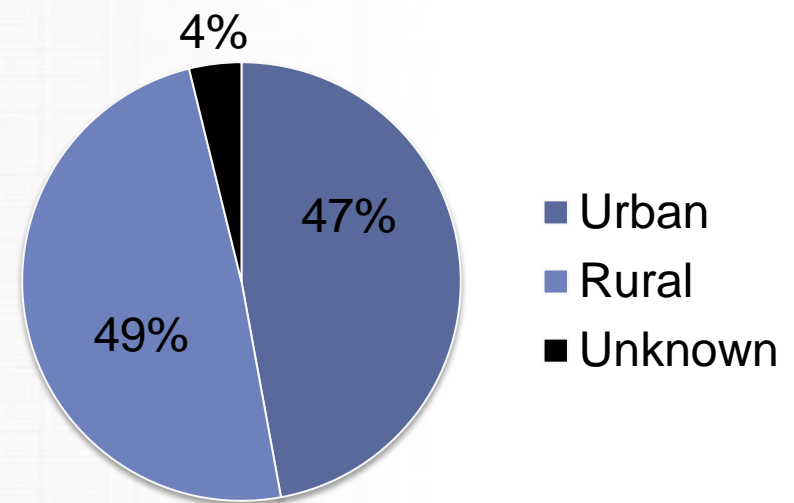


Location

AIS2+

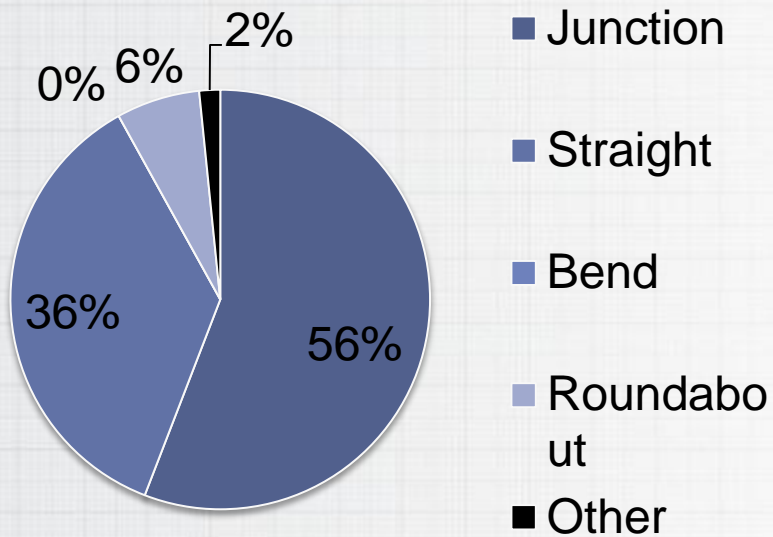


Fatal

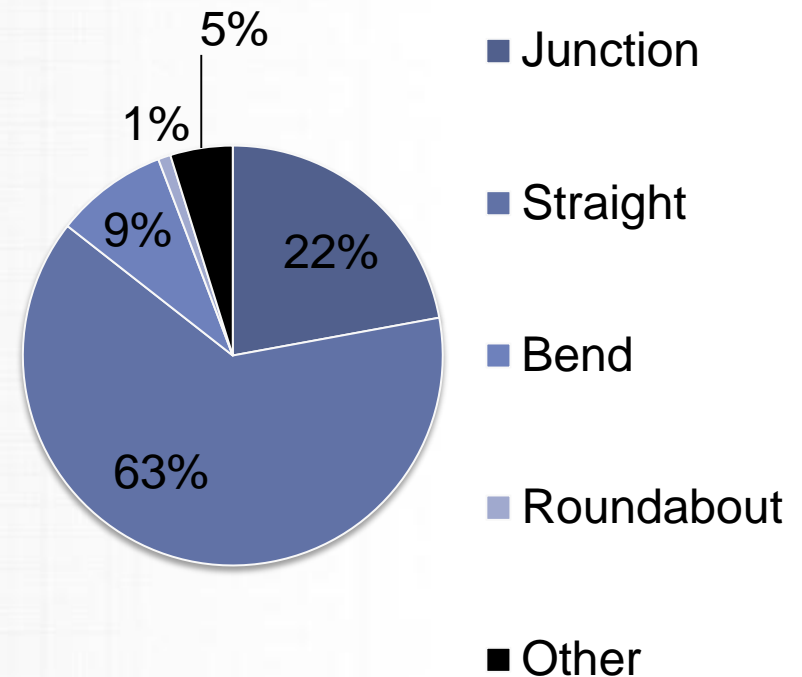


Road layout

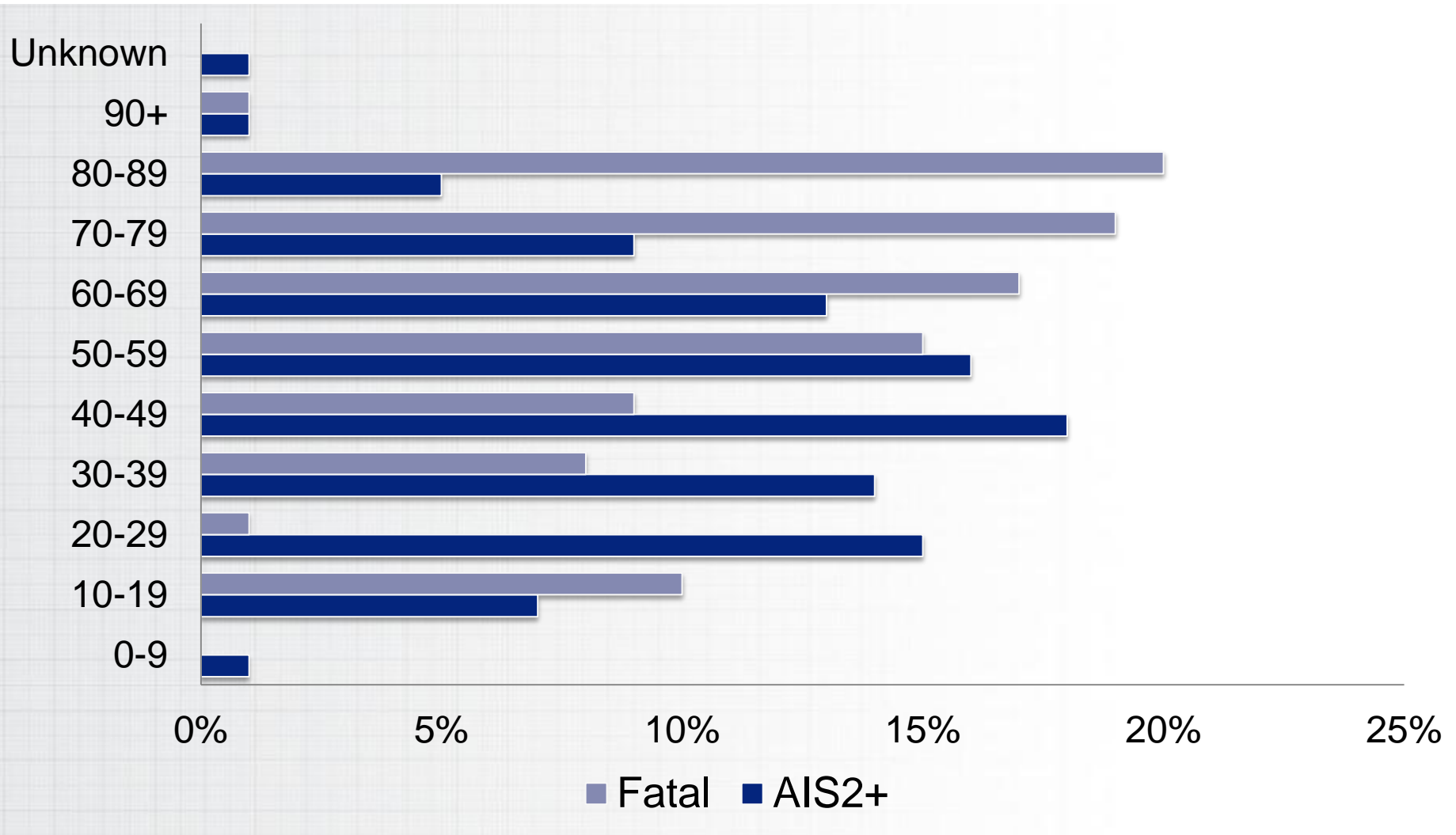
AIS2+



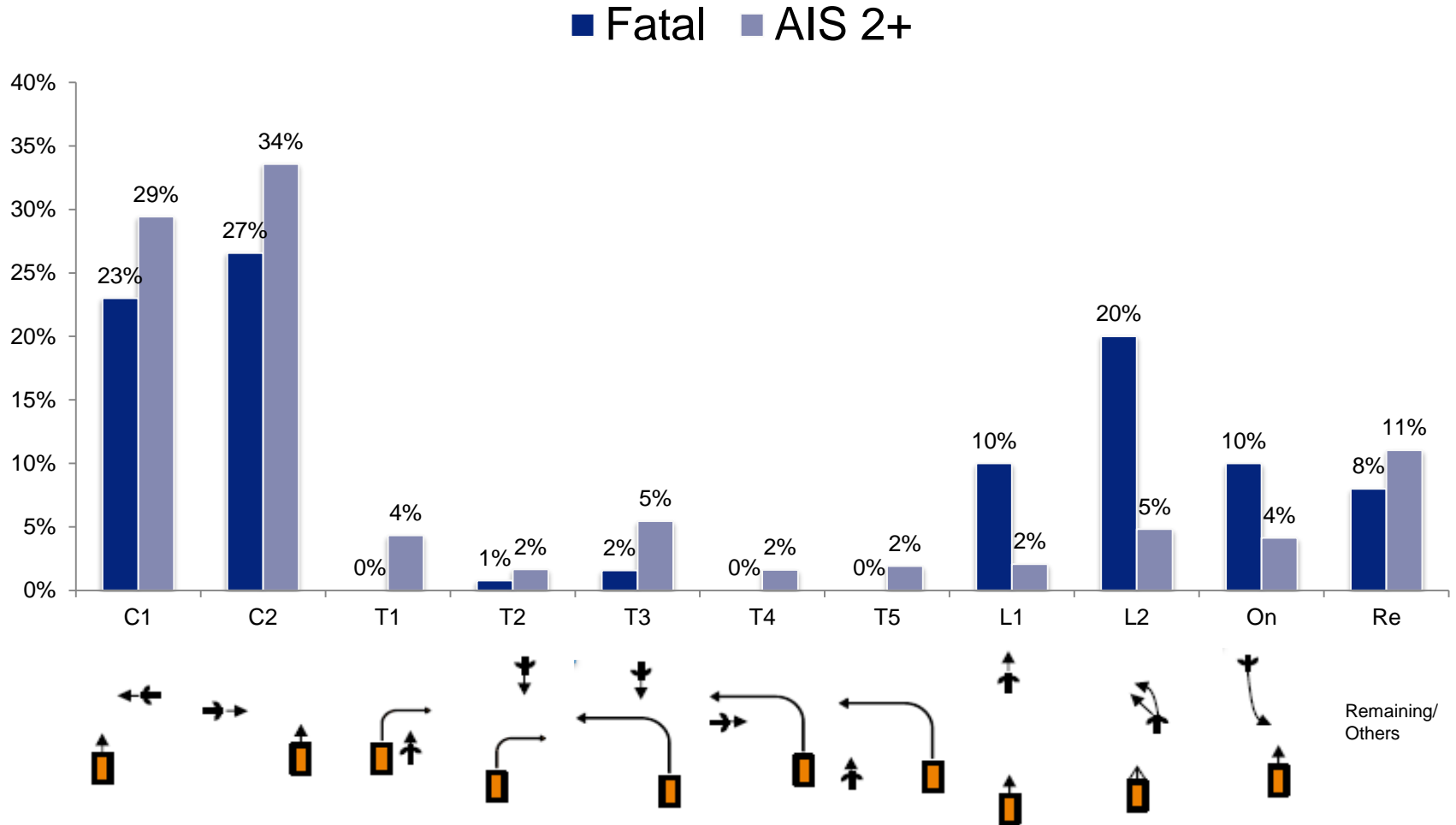
Fatal



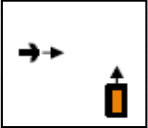
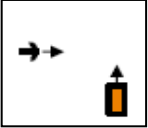
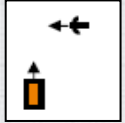
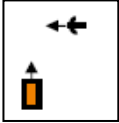
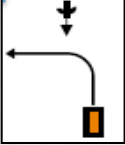
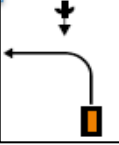
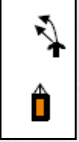
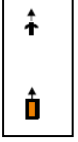
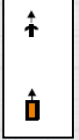

Age



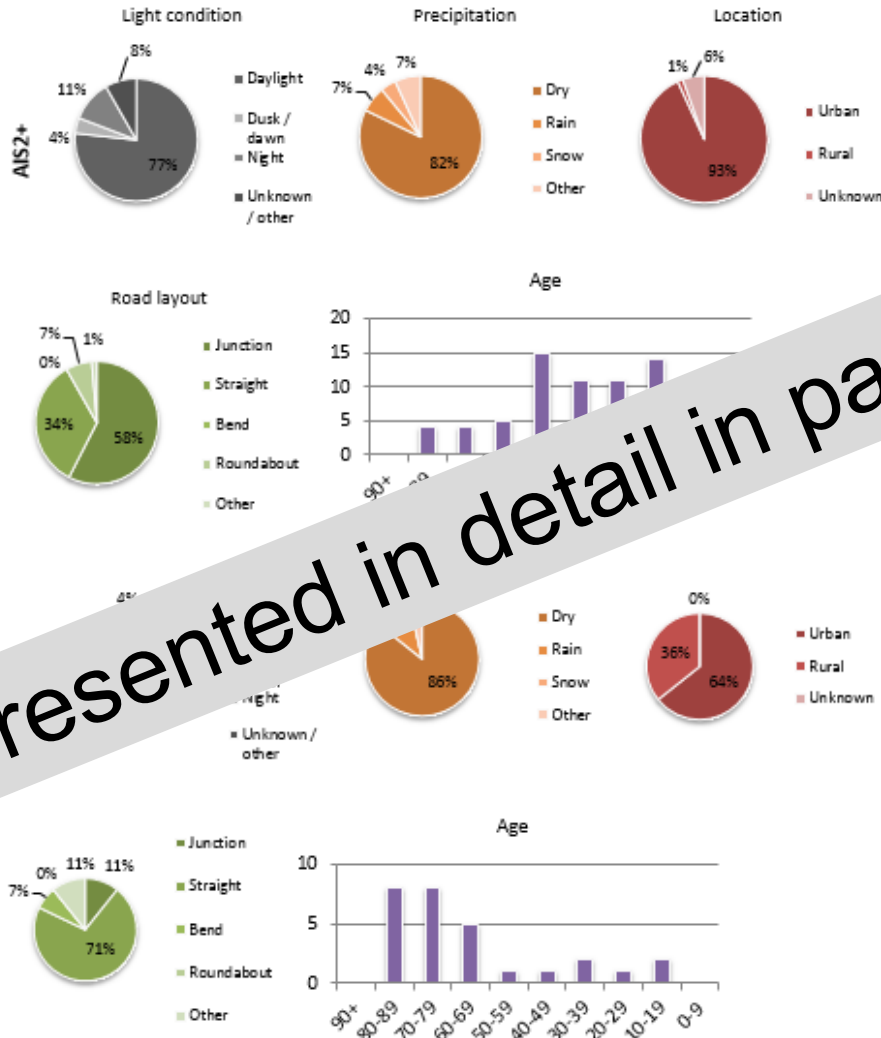
Accident scenario distribution



Accumulated frequency

	AIS2+	Accum. freq.	Fatal	Accum. freq.	
	1 C2 (car straight, bike from left)	34%	C2 (car straight, bike from left)	27%	
	2 C1 (car straight, bike from right)	63%	C1 (car straight, bike from right)	50%	
	3 T3 (car left, bike from right)	68%	L2 (car/bike in same lane, bike turns)	70%	
	4 L2 (car/bike in same lane, bike turns)	73%	L1 (car into bike from rear)	80%	
	4 T1 (car left, bike from left)	78%	On (car/bike straight, opposite directions)	89%	

Detailed information per scenario

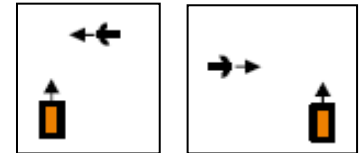


Presented in detail in paper

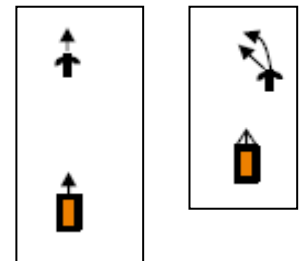
Conclusion

- Daylight and dry weather dominates
- Most common scenarios (both fatal and injured):

■ Cyclist crossing from left/right 50-63%



■ Cyclist longitudinal (hit from rear) 7-30%



■ Together 73-80%

Thank you!



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