National Technical University of Athens

A critical assessment of intersection safety across Europe

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Overview (1/2)

- Objective: macroscopic analysis of road safety related parameters in junctions in the European road networks.

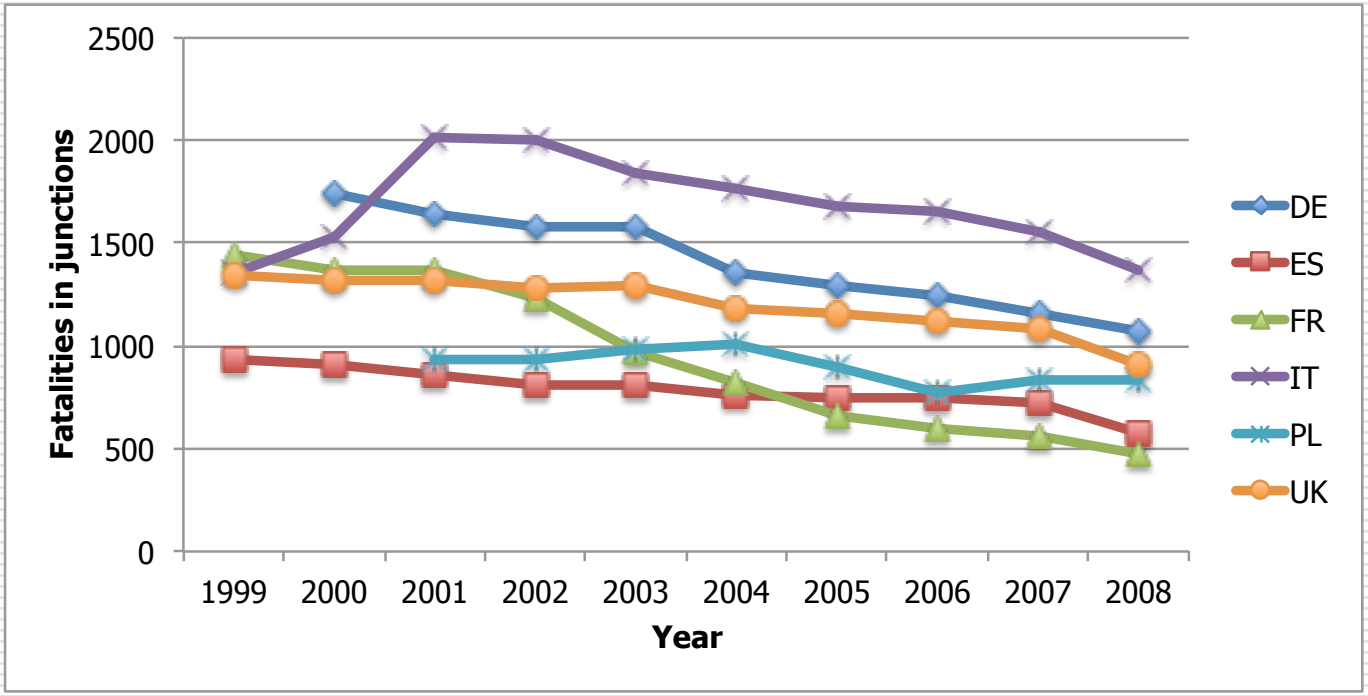
- Using data from:
  - the EU CARE database with disaggregate data on road accidents
  - combined with data from other international data files (e.g. IRTAD, as well as national sources).

Overview (2/2)

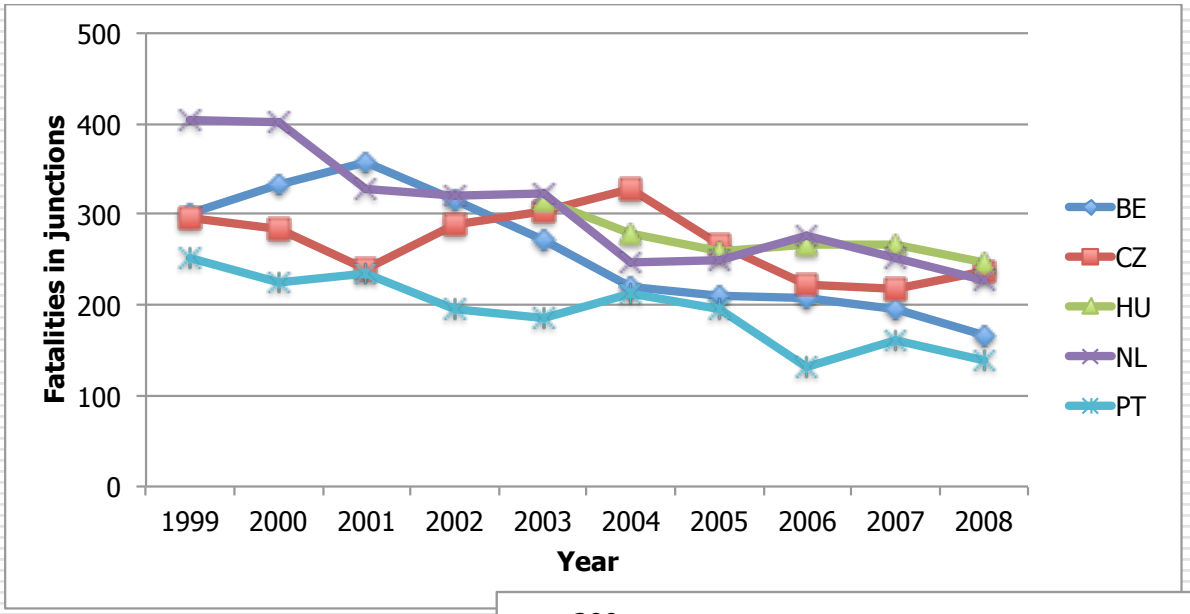
- Road accident data on junctions
  - for the decade 1999-2008 and
  - 23 EU countries
- are correlated with basic safety parameters like
  - Mode of transport, road and junction type, and
  - Socioeconomic characteristics.
- Accident causation is also analyzed using in-depth data
- The data on which this analysis is based, along with much of the analysis, is obtained through the SAFETY-NET and DACOTA projects and the European Road Safety Observatory (ERSO)

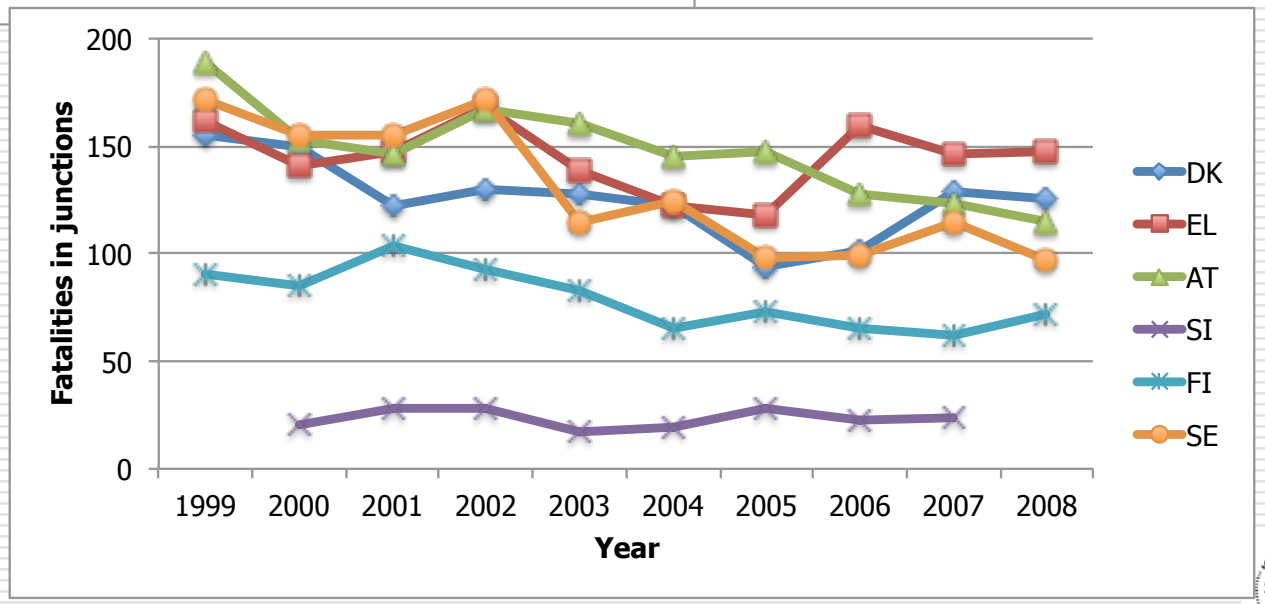
Overall trends (1/2)

- More than 82.000 persons were killed in traffic accidents at junctions in 18 European Union countries between 1999 and 2008
- In these 18 countries there were 30% fewer traffic accident fatalities at junctions in 2008 than in 1999



Overall trends (2/2)





Number of fatalities by type of junction by country, 2008

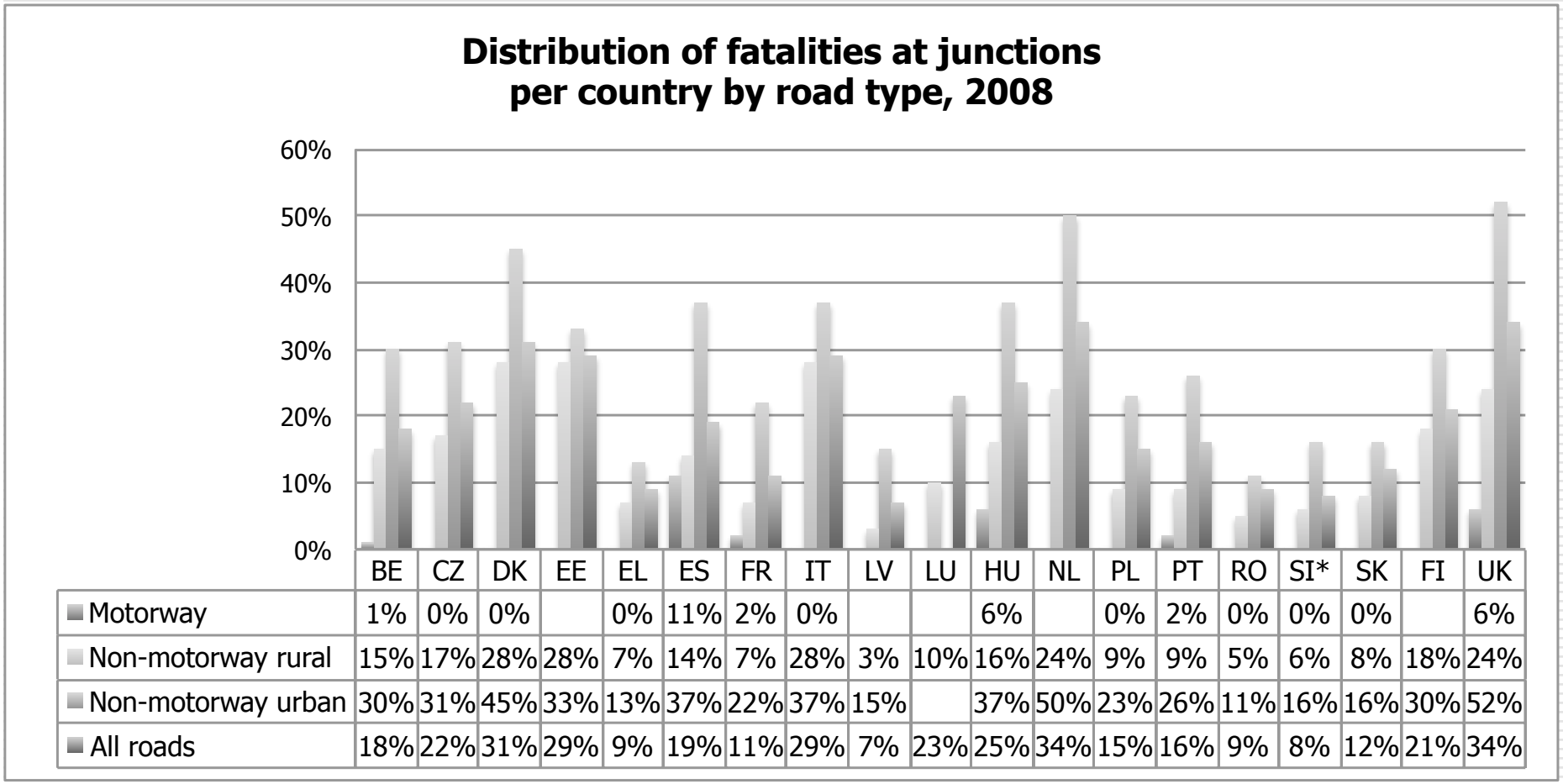
	Accidents at junctions					Accidents not at junctions	Not known	Total	% at junctions	
	Cross road	T or Y Junction	Round-about	Railway Level Crossing	Other/ Unknown				min	max
BE	0	0	5	1	161	777	0	944	18%	18%
CZ	101	108	0	28	1	836	2	1,076	22%	22%
DK	58	0	2	3	63	279	1	406	31%	31%
DE	906	0	0	63	148	1.561	1,799	4,477	25%	65%
EE	12	20	0	0	6	91	3	132	29%	31%
IE	15	23	2	0	2	0	238	280	15%	100%
EL	0	0	0	0	147	1.406	0	1,553	9%	9%
ES	203	216	66	0	92	2.523	0	3,099	19%	19%
FR	189	128	41	30	87	3.8	0	4,275	11%	11%
IT	604	0	87	6	675	3.359	0	4,731	29%	29%
LV	0	0	0	0	20	285	11	316	6%	10%
LU	0	0	0	0	8	27	0	35	23%	23%
HU	196	0	0	40	10	750	0	996	25%	25%
NL	193	0	11	16	7	450	0	677	34%	34%
AT	75	23	2	15	0	410	154	679	17%	40%
PL	823	0	7	42	0	4.565	0	5,437	16%	16%
PT	50	68	8	8	6	713	32	885	16%	19%
RO	230	0	0	39	0	2.792	0	3,061	9%	9%
SI*	24	0	0	0	0	260	9	293	8%	11%
SK	33	35	2	0	0	528	8	606	12%	13%
FI	0	0	0	0	72	271	1	344	21%	21%
SE	85	0	1	0	11	5	295	397	24%	99%
UK	145	511	55	0	196	1.738	0	2,645	34%	34%
EU-23	3.942	1.132	289	291	1.711	27.425	2,553	37,344	2%	8%
Share	11%	3%	1%	1%	5%	73%	7%	100%	21%	28%

* data for 2007

Source: CARE Database / EC

Date of query: October 2010

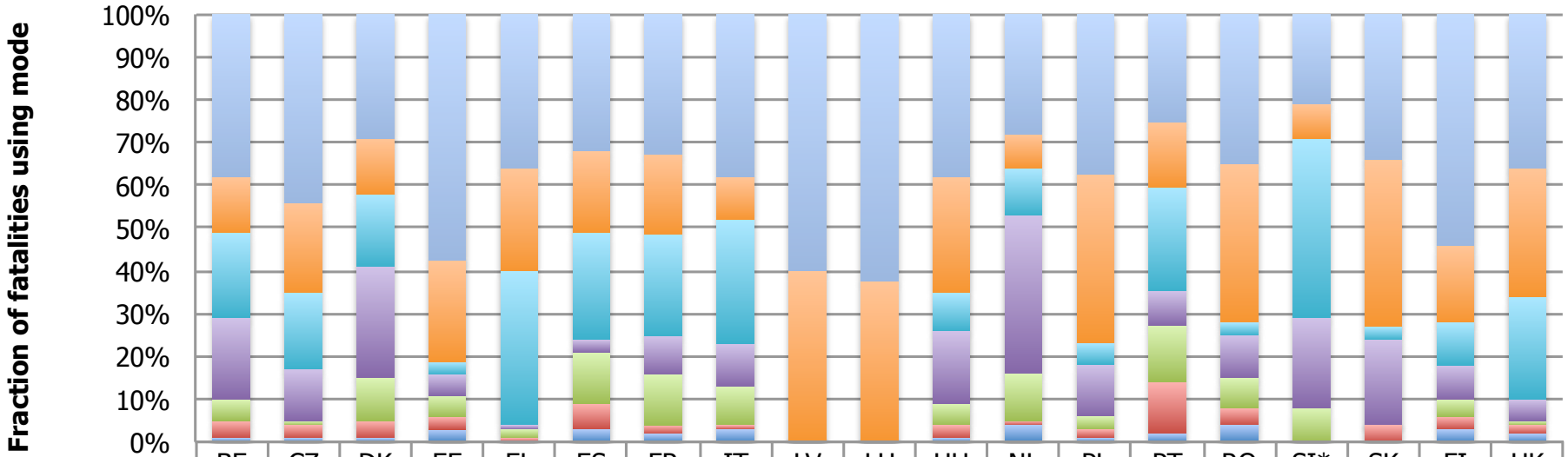
Distribution of fatalities at junctions per country by road type, 2008



	BE	CZ	DK	EE	EL	ES	FR	IT	LV	LU	HU	NL	PL	PT	RO	SI*	SK	FI	UK
Motorway	1%	0%	0%		0%	11%	2%	0%			6%		0%	2%	0%	0%	0%		6%
Non-motorway rural	15%	17%	28%	28%	7%	14%	7%	28%	3%	10%	16%	24%	9%	9%	5%	6%	8%	18%	24%
Non-motorway urban	30%	31%	45%	33%	13%	37%	22%	37%	15%		37%	50%	23%	26%	11%	16%	16%	30%	52%
All roads	18%	22%	31%	29%	9%	19%	11%	29%	7%	23%	25%	34%	15%	16%	9%	8%	12%	21%	34%

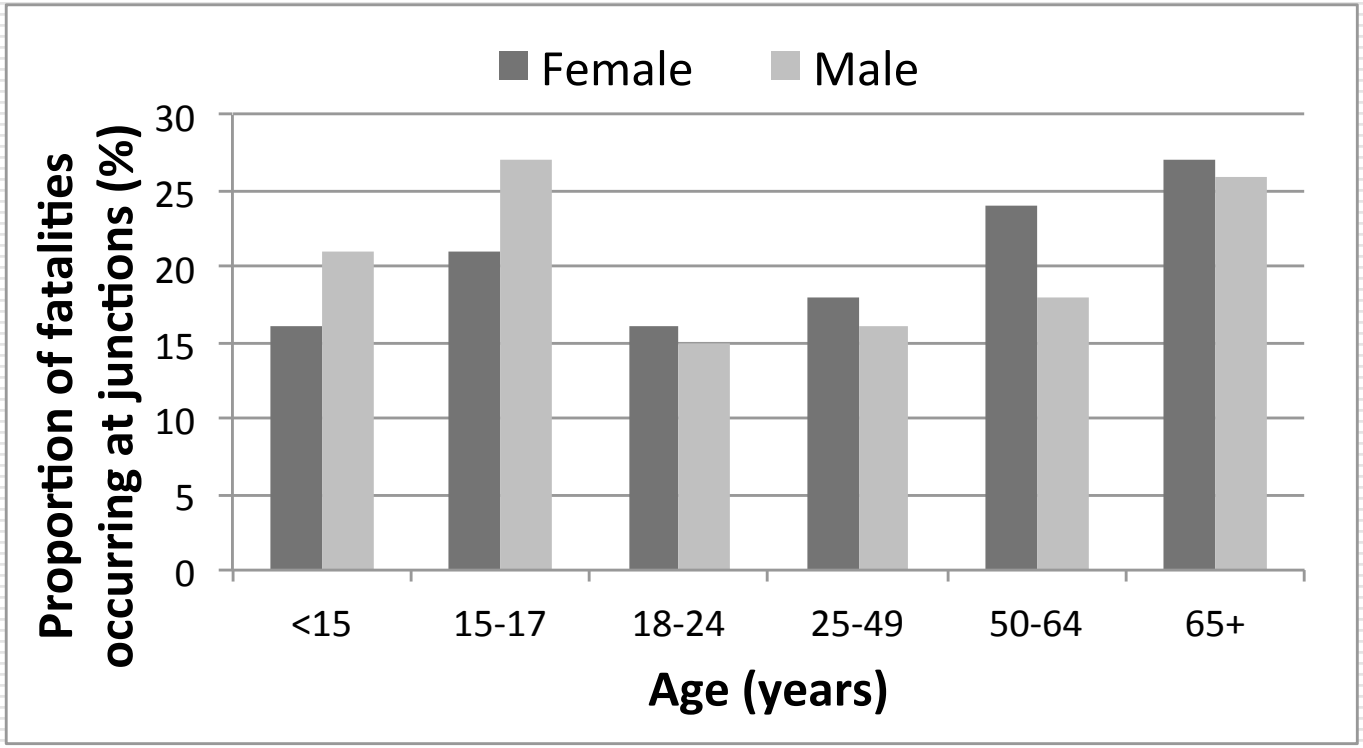
- Road accident fatalities at junctions occur mostly in urban areas.
- In countries with high road safety standards more than half of the road fatalities occur at junctions.

Classification by mode of transport, 2008



	BE	CZ	DK	EE	EL	ES	FR	IT	LV	LU	HU	NL	PL	PT	RO	SI*	SK	FI	UK
Car or Taxi	38%	44%	29%	58%	36%	32%	33%	38%	60%	63%	38%	28%	37%	25%	35%	21%	34%	54%	36%
Pedestrian	13%	21%	13%	24%	24%	19%	19%	10%	40%	38%	27%	8%	39%	15%	37%	8%	39%	18%	30%
Motor Cycle	20%	18%	17%	3%	36%	25%	24%	29%	0%	0%	9%	11%	5%	24%	3%	42%	3%	10%	24%
Pedal Cycle	19%	12%	26%	5%	1%	3%	9%	10%	0%	0%	17%	37%	12%	8%	10%	21%	20%	8%	5%
Moped	5%	1%	10%	5%	2%	12%	12%	9%	0%	0%	5%	11%	3%	13%	7%	8%	0%	4%	1%
Lorry	4%	3%	4%	3%	1%	6%	2%	1%	0%	0%	3%	1%	2%	12%	4%	0%	4%	3%	2%
Other	1%	1%	1%	3%	0%	3%	2%	3%	0%	0%	1%	4%	1%	2%	4%	0%	0%	3%	2%

Distribution of junction fatalities by age and gender, 2008



- 27% of the fatalities at junctions were female, comparing to 22% not at-junctions.
- 15-17 years old males and the elderly are more likely to be killed at junctions.

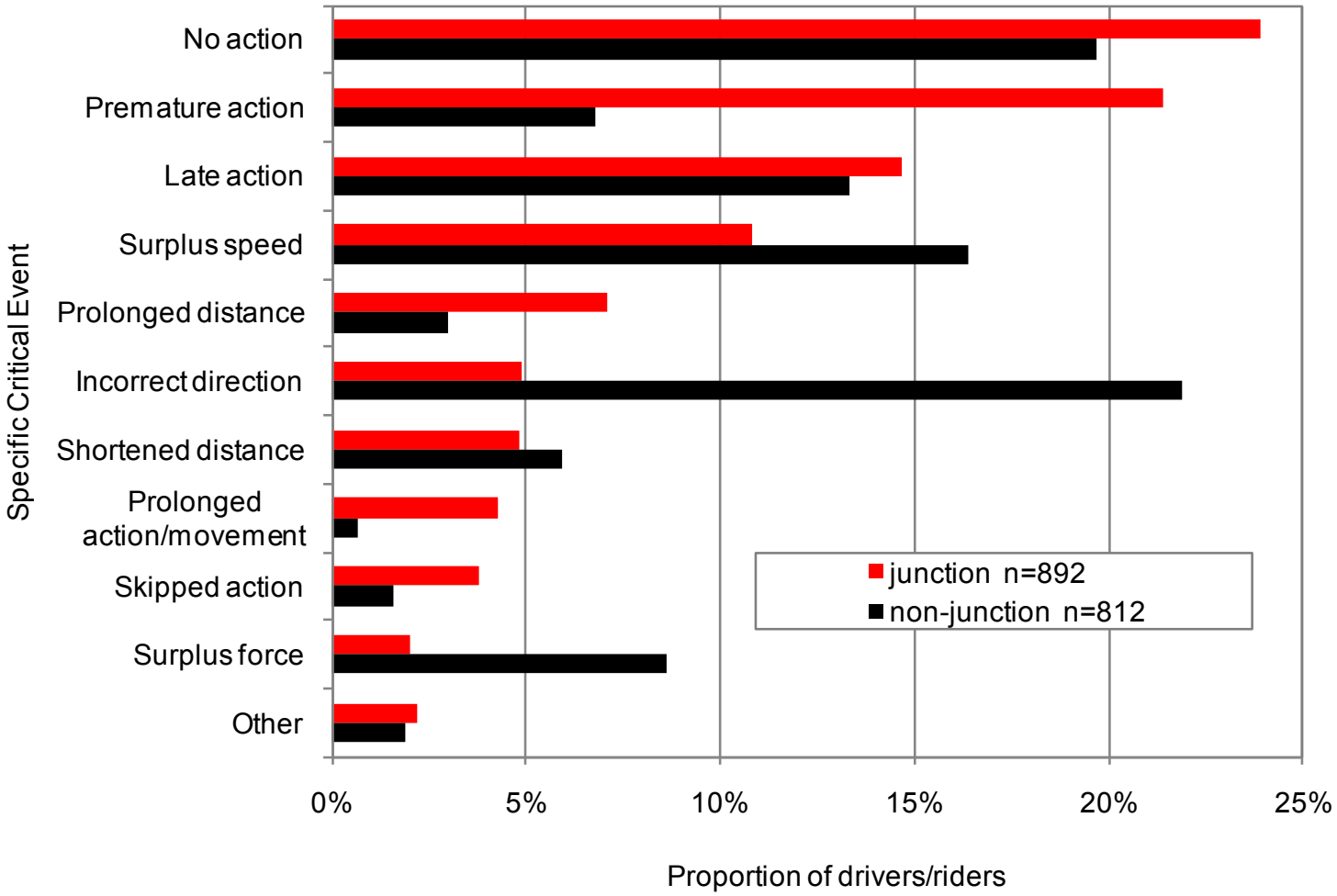
Accident causation

- Additional insight into accident causation can be offered by in-depth data.

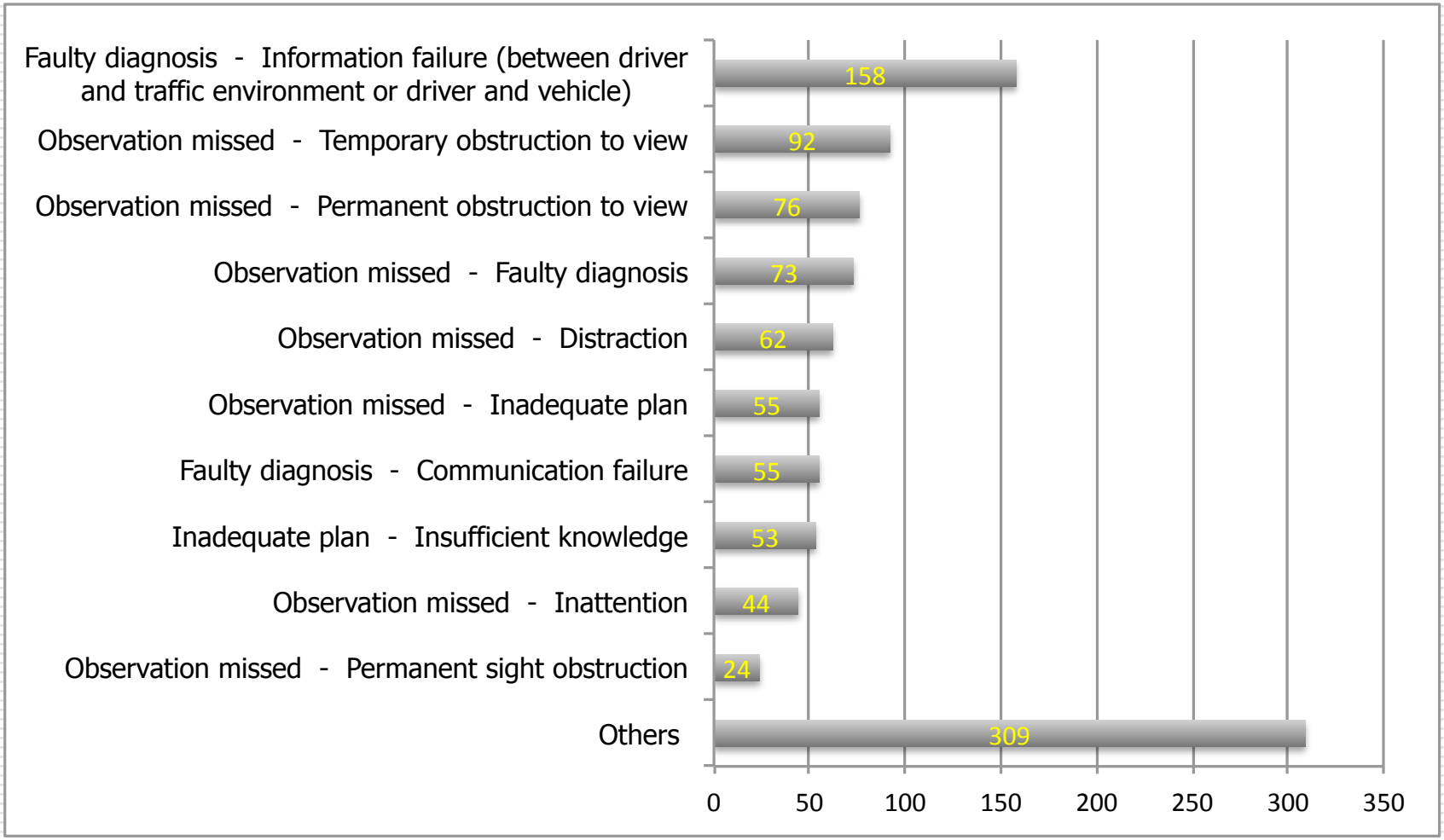
- The SafetyNet Accident Causation Database was formed between 2005 and 2008, and contains details of 1.006 accidents from 6 EU countries, covering all injury severities.

- One specific critical event is attributed to each driver, rider or pedestrian. Links then form chains between the critical event and the causes that led to it.

Distribution of specific critical events - drivers or riders by junction presence



Ten most frequent links between causes - drivers/riders, junction accidents



Concluding remarks (1/2)

- Overall decrease of almost 31% in traffic accident fatalities at junctions during the analysis period, with the largest decrease (67%) for France.
- Fatal accidents at junctions in 2008: 52% at crossroads and 14% at T or Y intersections, while only 5% occurred at roundabouts.
- Fatalities at junctions: ~36% are car or taxi occupants, followed by 34% two-wheeler users and almost 26% pedestrians.
  - More than half of the fatalities at junctions in Denmark and the Netherlands are two-wheeler users, while in Slovenia the percentage exceeds 70%
  - In Portugal the number of fatalities of lorry occupants at junctions is more than four times the average.

Concluding remarks (2/2)

- 27% of fatalities in junction accidents were female, compared with 22% in non-junction accidents.
- An analysis of in-depth data from more than 1000 accidents provide an indication of the most frequently recorded accident causes and the most frequently recorded links between them.
  - "Observation missed" and "faulty diagnosis" are found to be the two dominant causes for drivers/riders in junction accidents.
- Analysis allows for an overall assessment of the road safety level in the European road intersections.
- Useful support to decision makers.
- Need for additional data (i.e. exposure data, in-depth analysis of accident data at junctions).

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