Pedestrian Protection in Europe

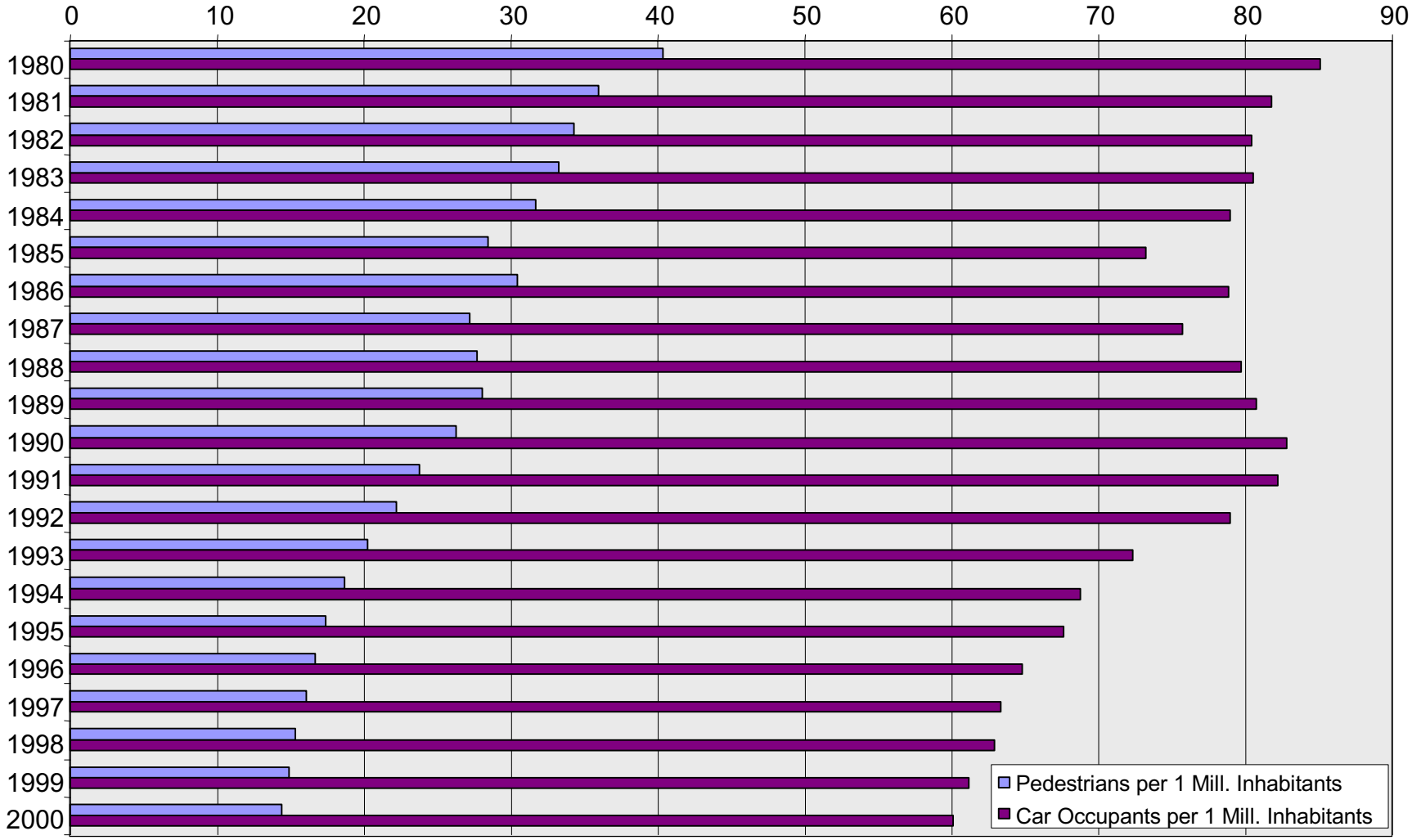
The Potential of Car Design and Impact Testing

DEKRA Automobil GmbH, Accident Research
F. A. Berg, M. Egelhaaf

DaimlerChrysler AG, Accident Research
J. Bakker, H. Bürkle, R. Herrmann, J. Scheerer

Fatality Rates in Europe *

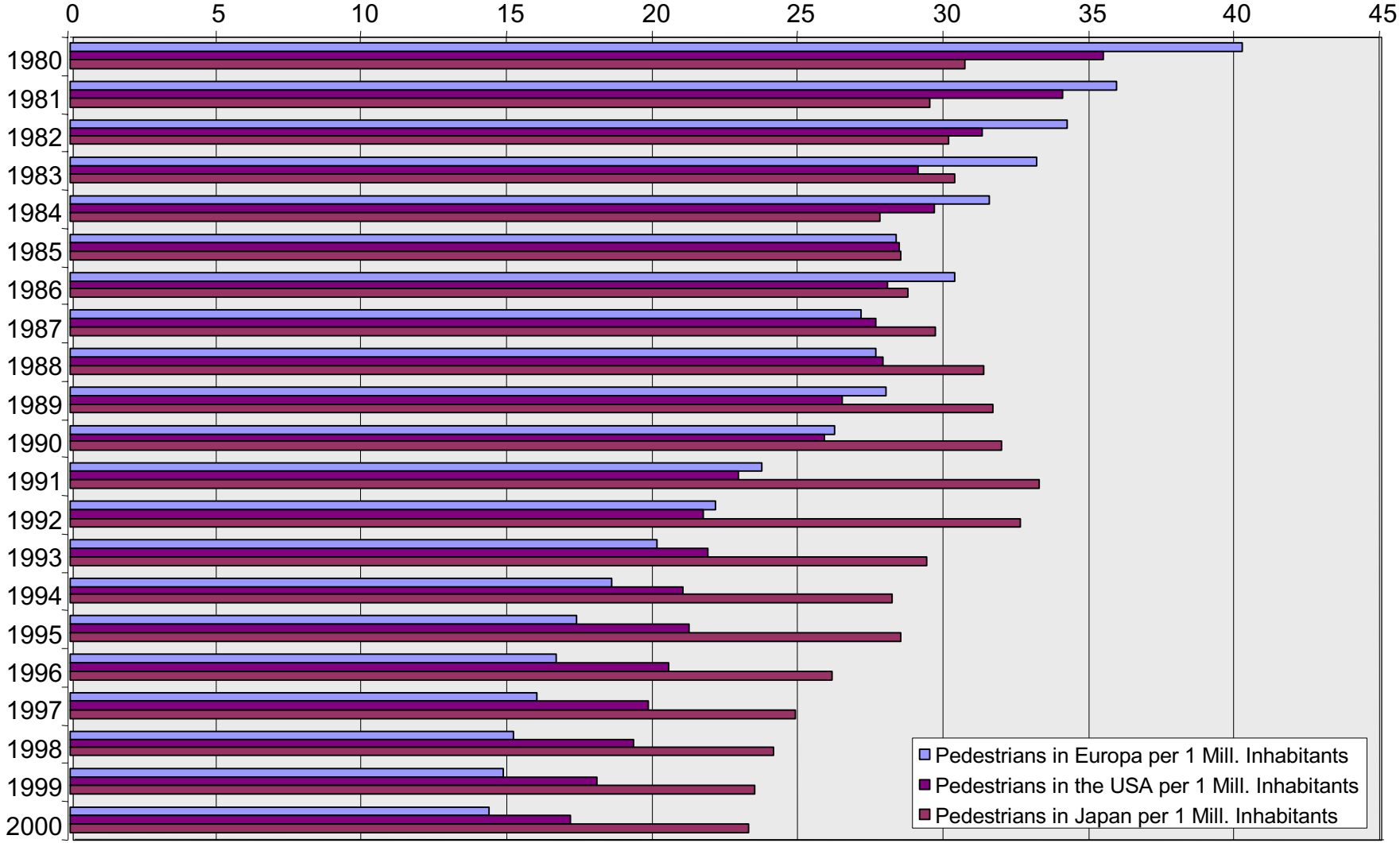
Source: IRTAD-data



* Data from Greece and Portugal not available

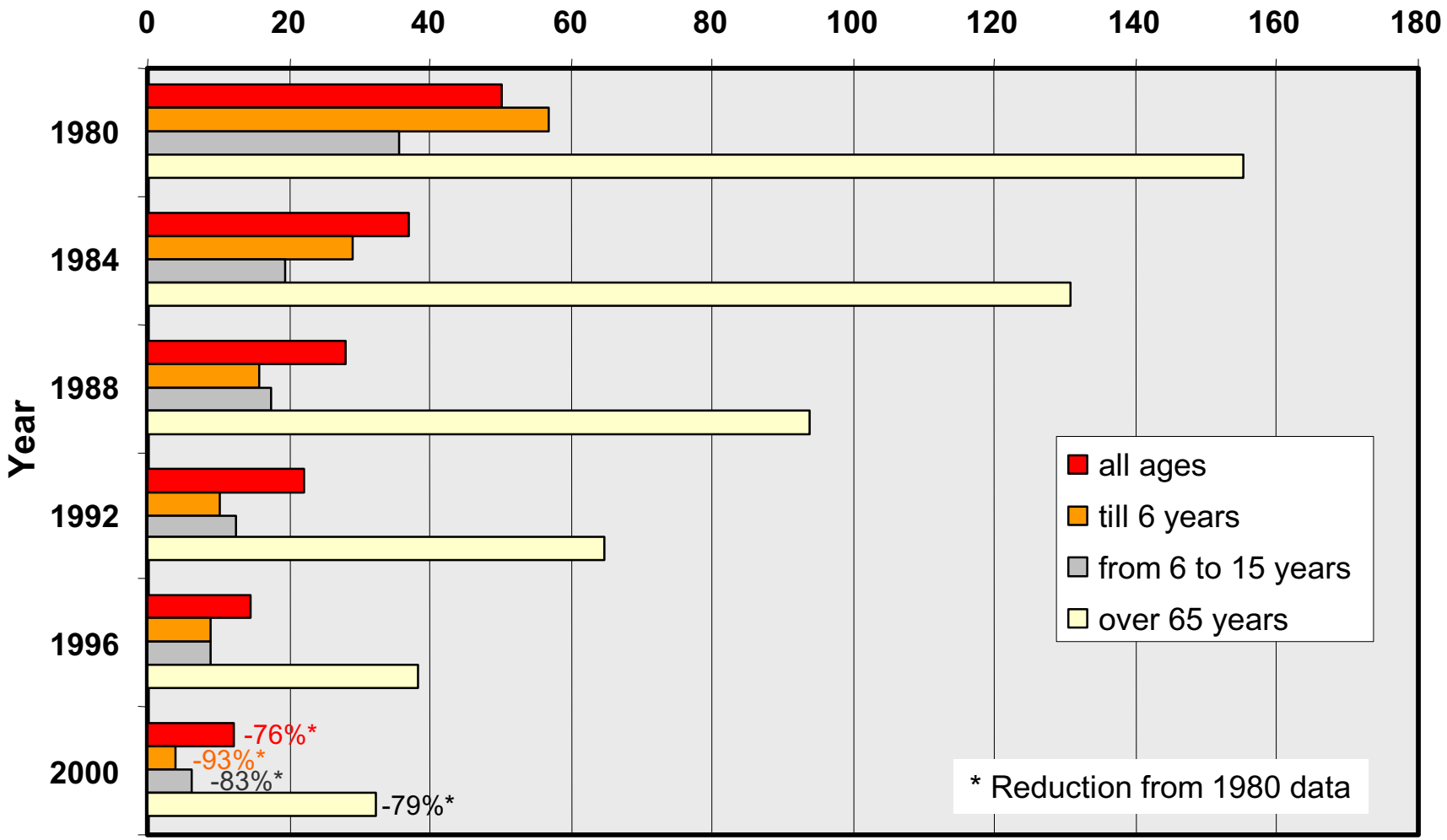
Fatality Rates for Pedestrians (Europe, USA, Japan)

Source: IRTAD-data



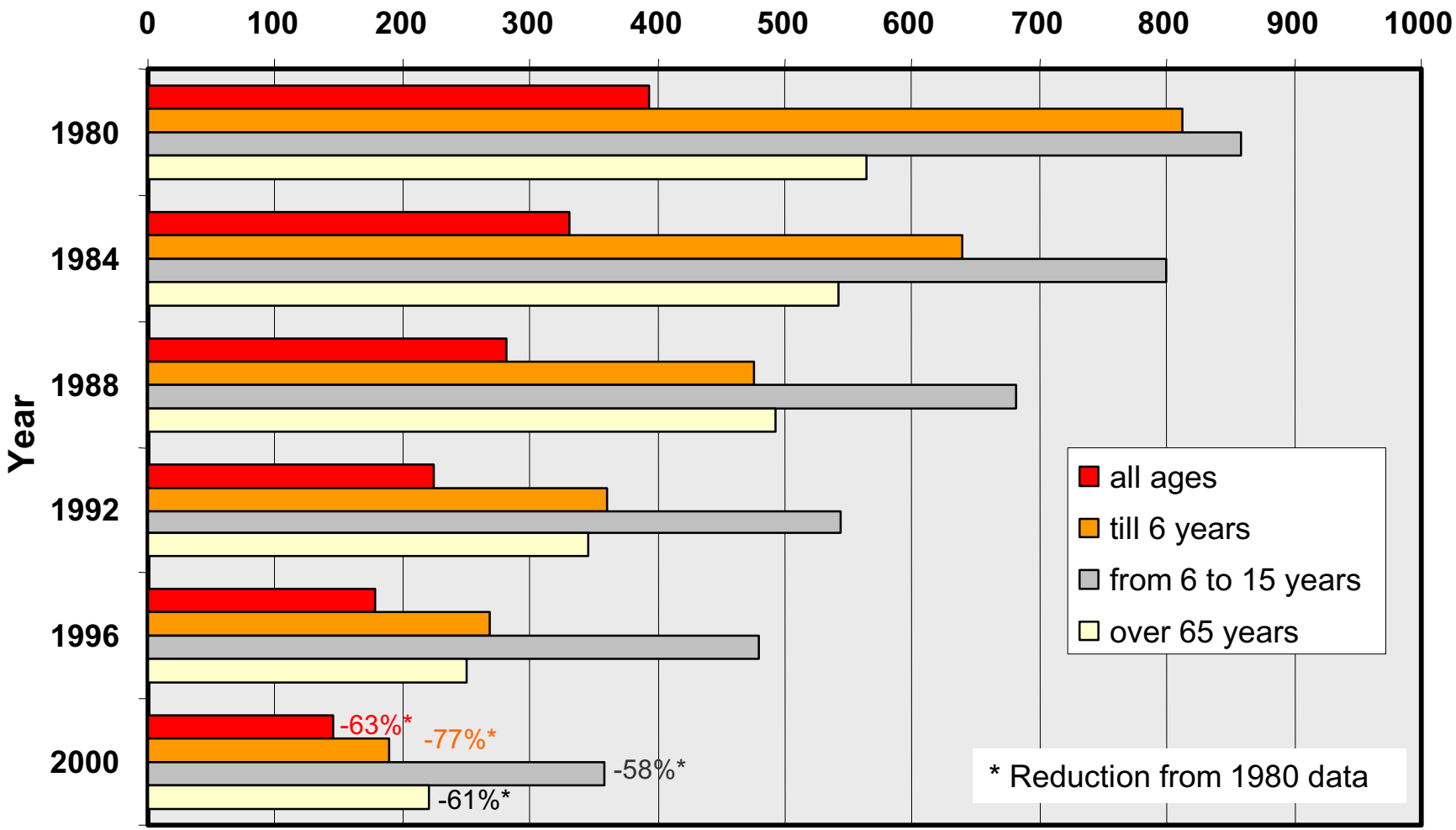
Pedestrian Fatalities per Mill. Inhabitants

Source: German National Statistics

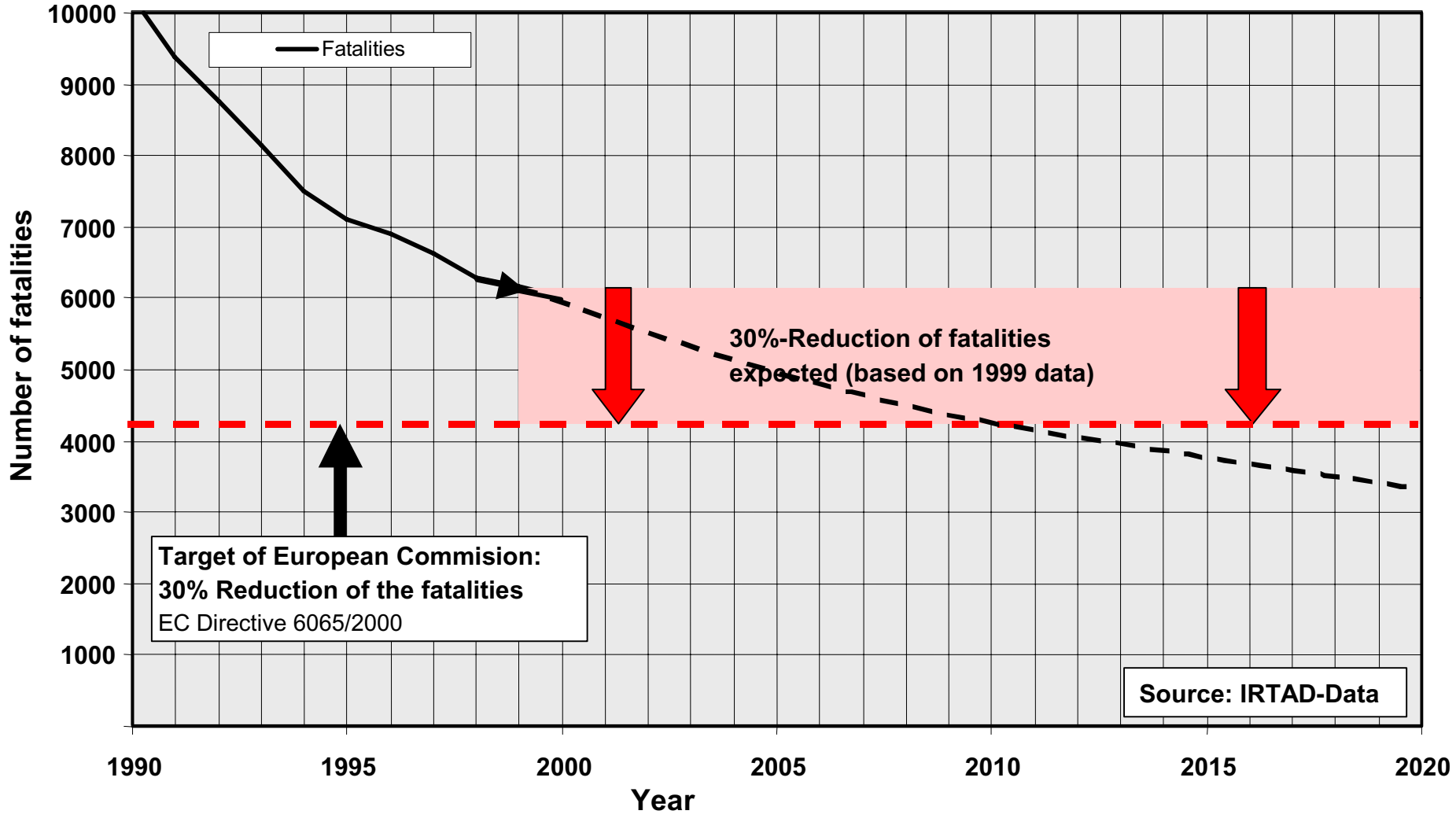


Severely Injured Pedestrians per Mill. Inhabitants

Source: German National Statistics

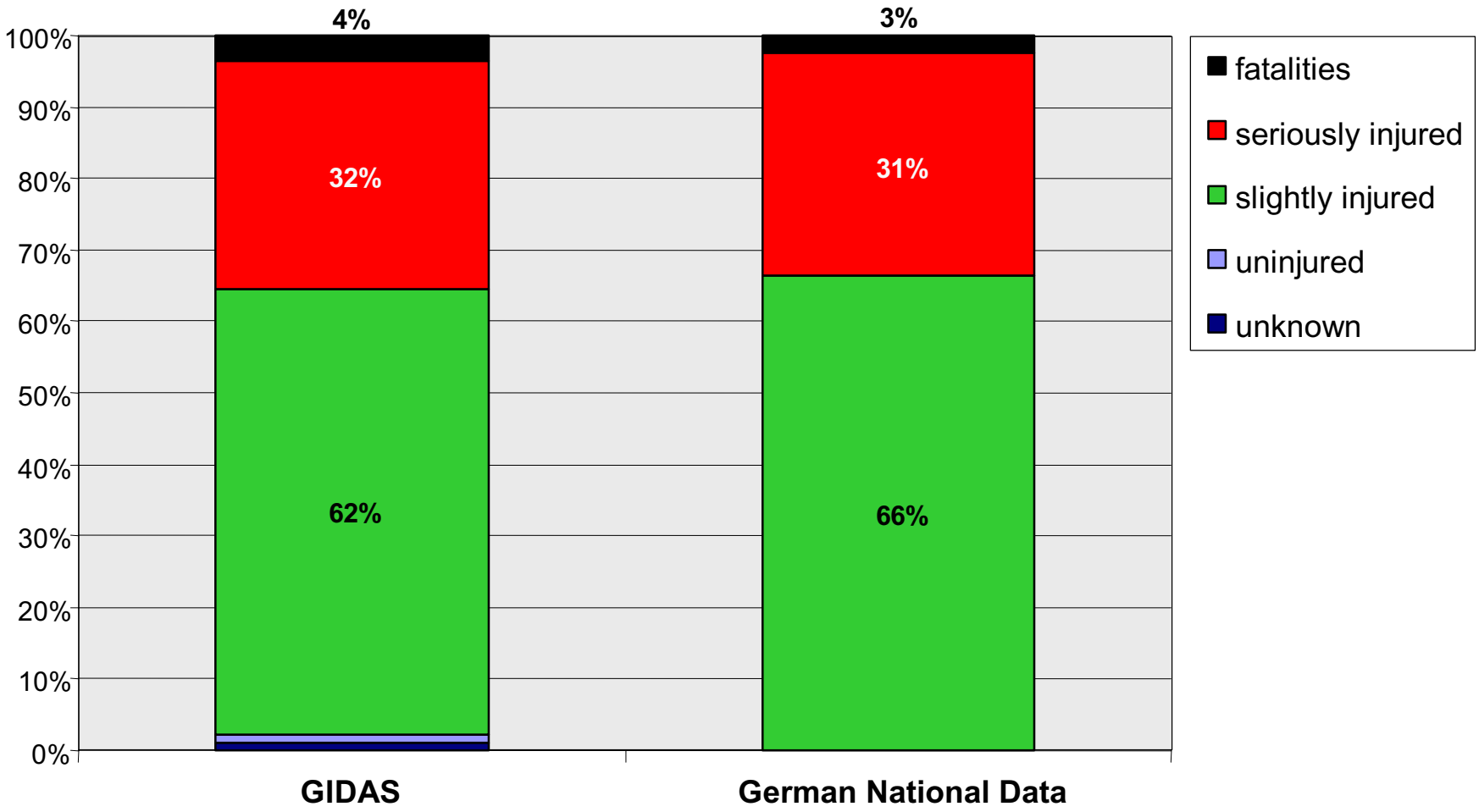


Trend of the European Pedestrian Fatalities and the Draft Phase-In



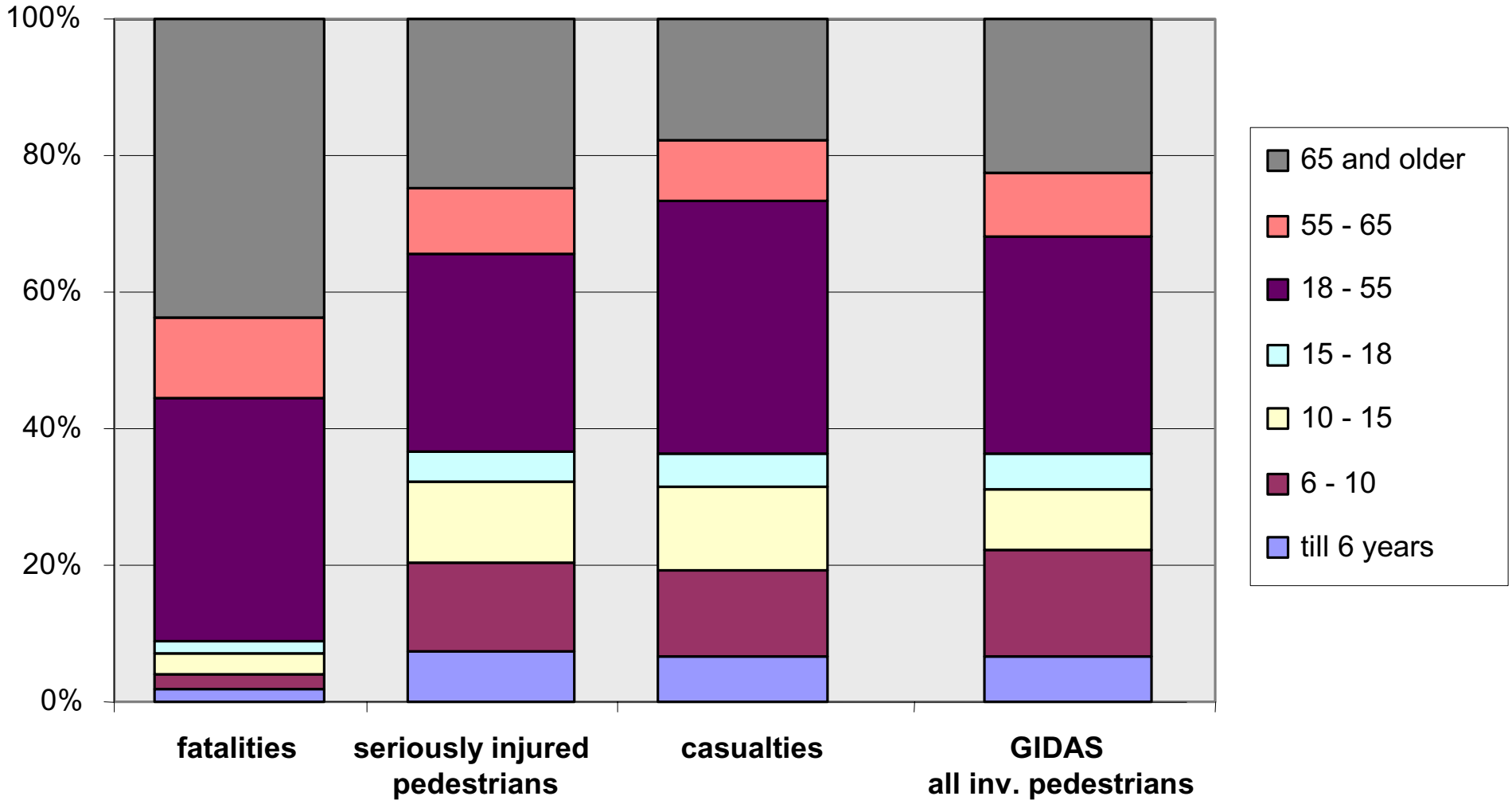
Pedestrian Accidents in Germany

Comparison of the German National Data 2000 with the GIDAS data (n=415)



Sources: German National Data 2000
GIDAS (German In-Depth Accident Study) 1999-2001

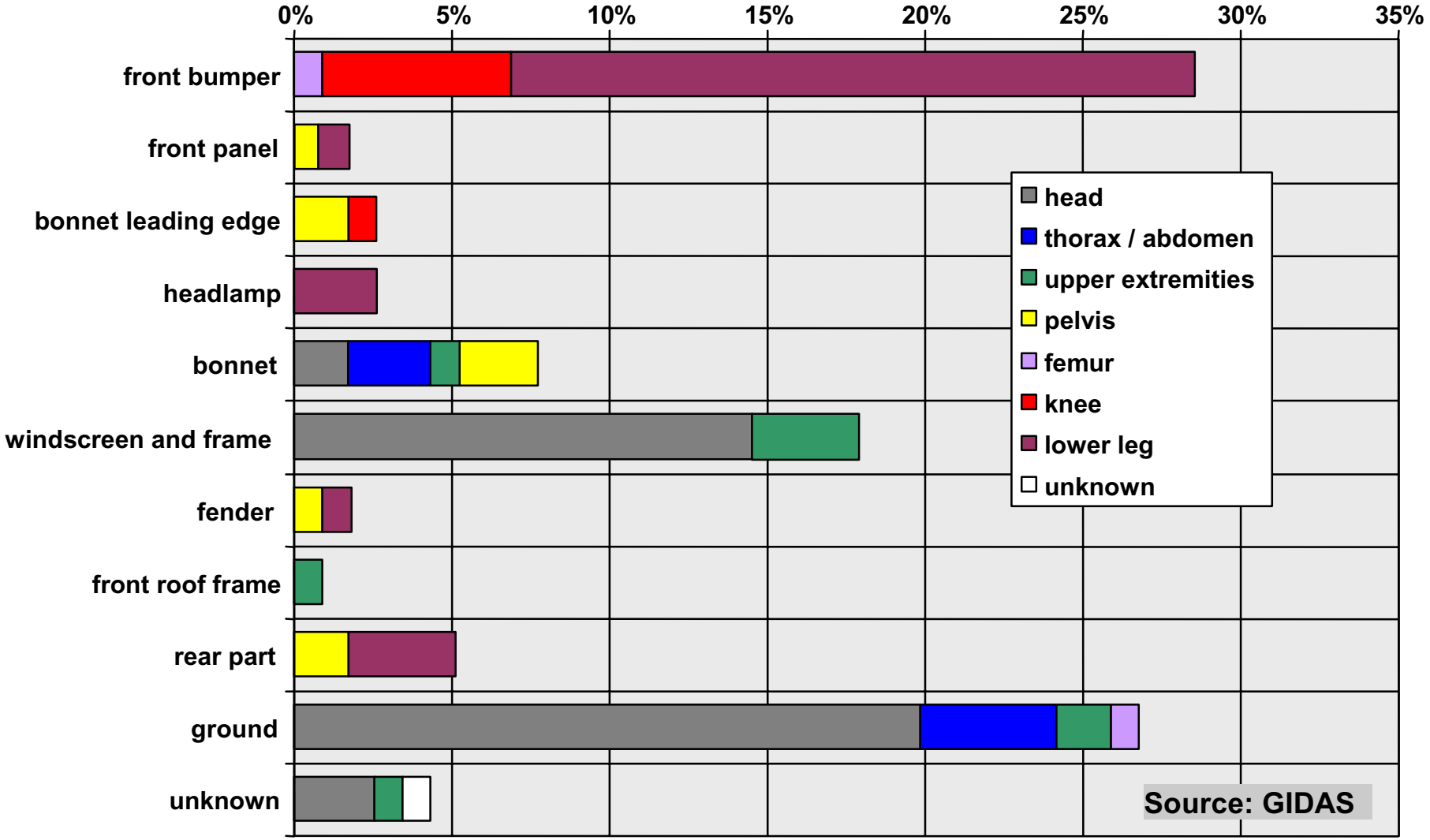
Age Groups in Pedestrians Accidents



Source: German National Data 2000

Injuries and Contact Zones for AIS 2+ injuries

(n = 116 Injuries from 53 Pedestrians)



Frequency of contacts for AIS 2+ - injuries, all body regions

(front-to-pedestrian impacts, only passenger cars, all impact speeds)

	GIDAS	IHRA (Europe)
Contact zones	100% = 116 injuries	100% = 1460 injuries
Parts of vehicle	**share**	**share**
front bumper	28%	21%
front panel and headlamps	5%	3%
bonnet leading edge	3%	10%
bonnet	8%	15%
Subtotal for vehicle front	**44%**	**49%**
windscreen and frame	18%	24%
ground surface	27%	13%
others	11%	14%

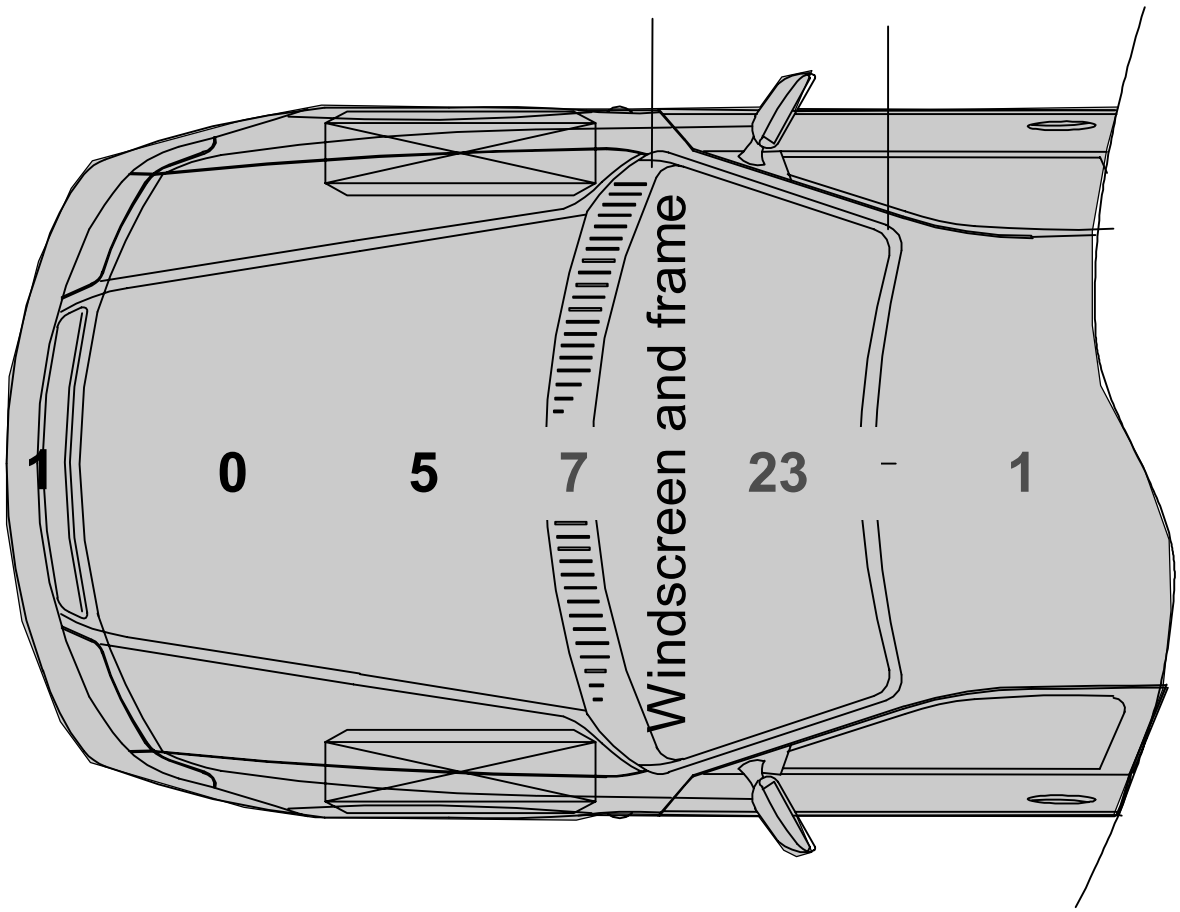
Frequency of contacts for AIS 2+ - injuries, head and face

(front-to-pedestrian impacts, only passenger cars, all impact speeds)

	GIDAS	IHRA (Europe)
Contact zones	100% = 45 injuries	100% = 512 injuries
Parts of vehicle	**share**	**share**
front bumper	0%	0%
front panel and headlamps	0%	1%
bonnet leading edge	0%	0,2%
bonnet	6%	16%
Subtotal for vehicle front	**6%**	**17,2%**
windscreen and frame	35%	51%
ground surface	49%	22%
others	10%	9,8%

Number of Contacts in Different Zones for AIS 1+ Head Injuries

Source: GIDAS



Frequency of contacts for AIS 2+ - injuries, lower extremities

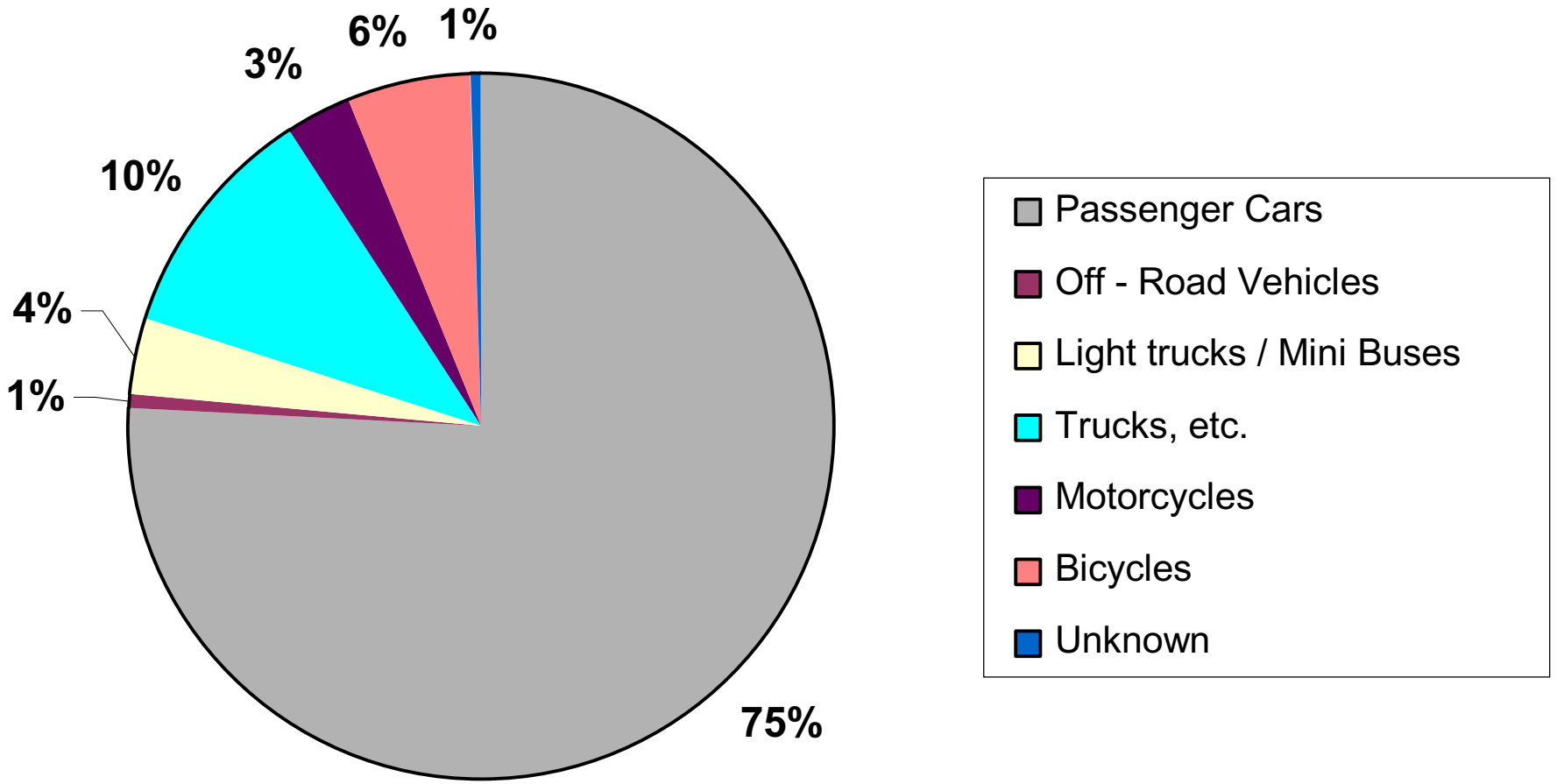
(front-to-pedestrian impacts, only passenger cars, all impact speeds)

Contact zones		GIDAS 100% = 55 injuries	IHRA (Europe) 100% = 572 injuries
Parts of vehicle		**share**	**share**
front bumper	all	61%	52%*
	lower leg	46%	39%
	knee	13%	5%
	femur	2%	3%
front panel and headlamps		9%	6%
bonnet leading edge	all	6%	19%
	pelvis	4%	12%
bonnet		6%	4%
Subtotal for vehicle front		**82%**	**81%**
windscreen and frame		0%	0%
ground surface		2%	5%
others		16%	14%

*including 5% “others”

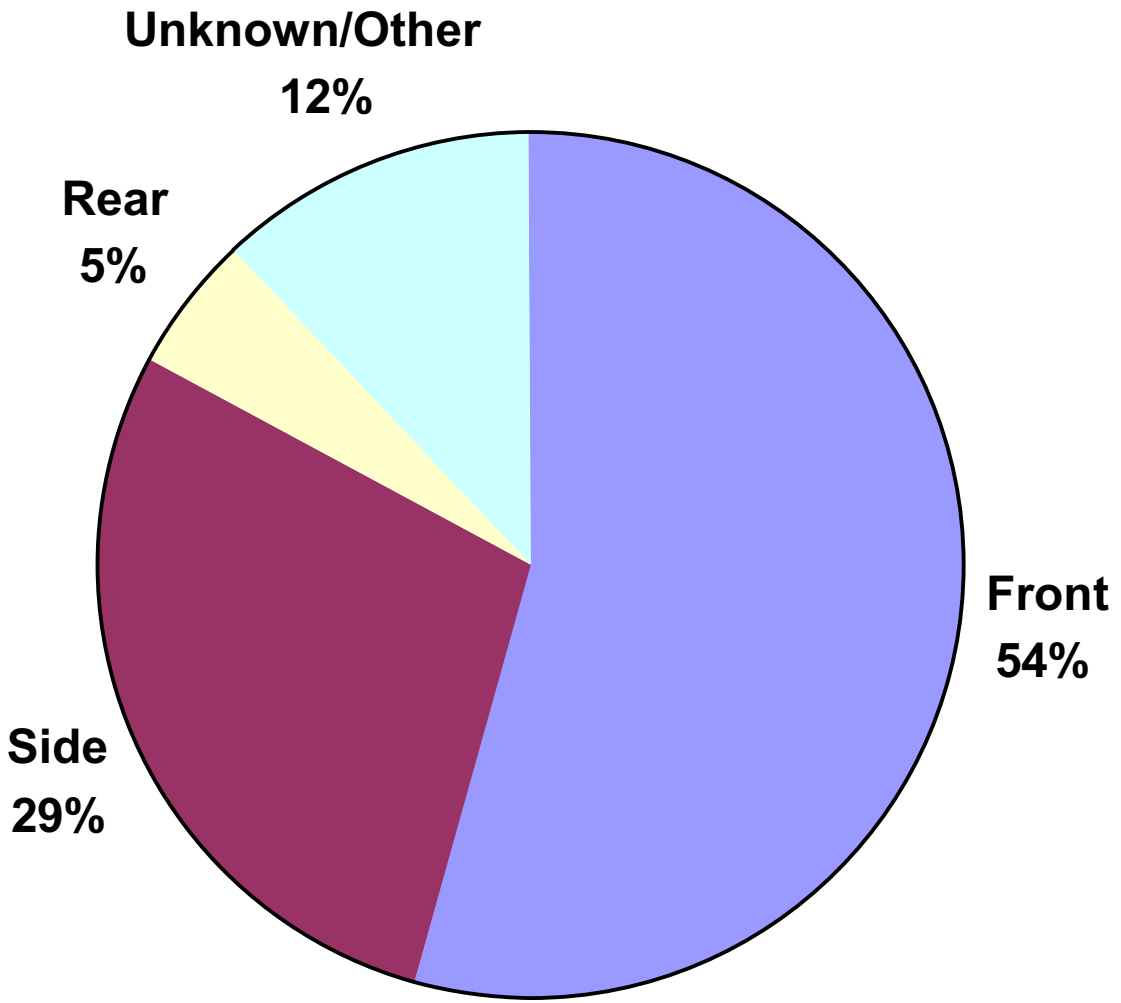
Distribution of Vehicle Types in Pedestrian Accidents (AIS1+)

Source: GIDAS

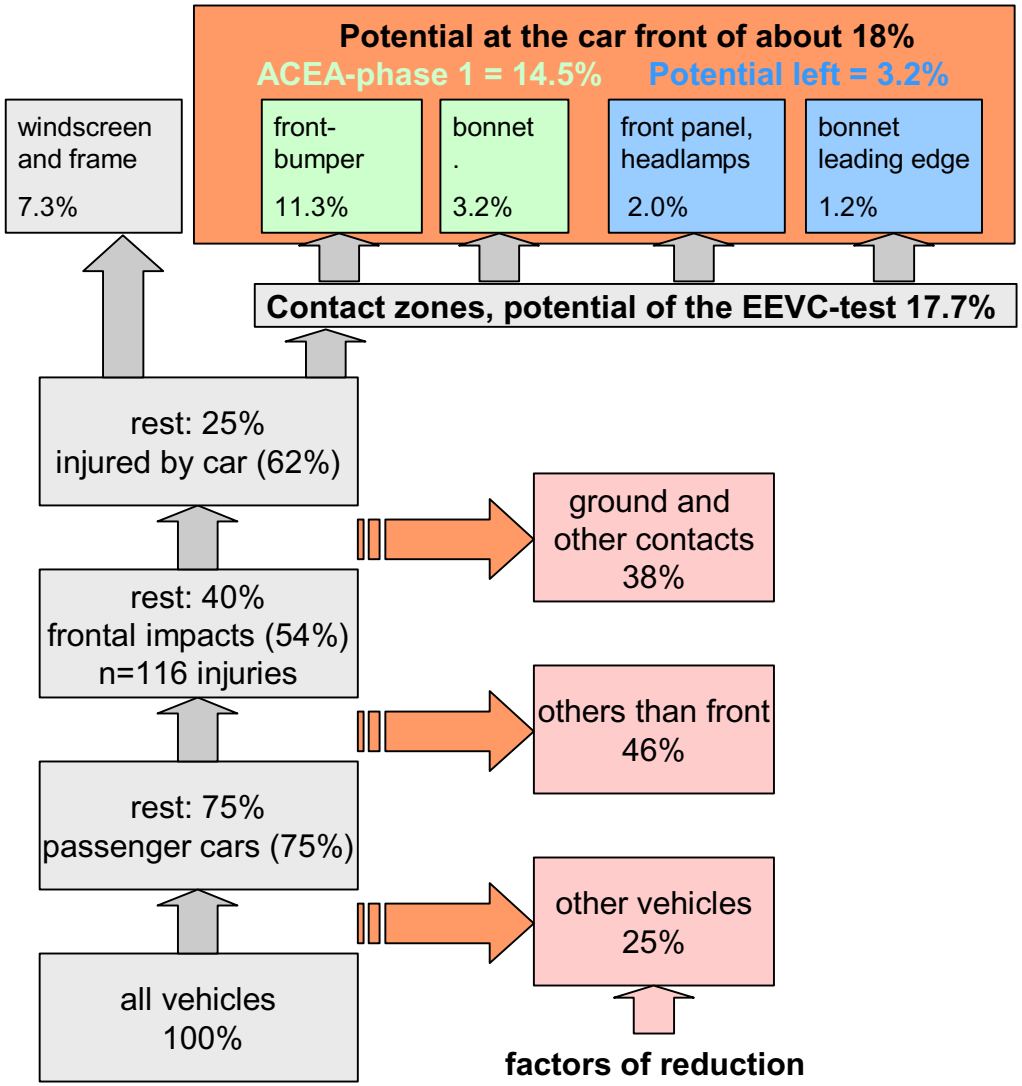


Impact Locations in Car-to-Pedestrian Accidents (AIS1+)

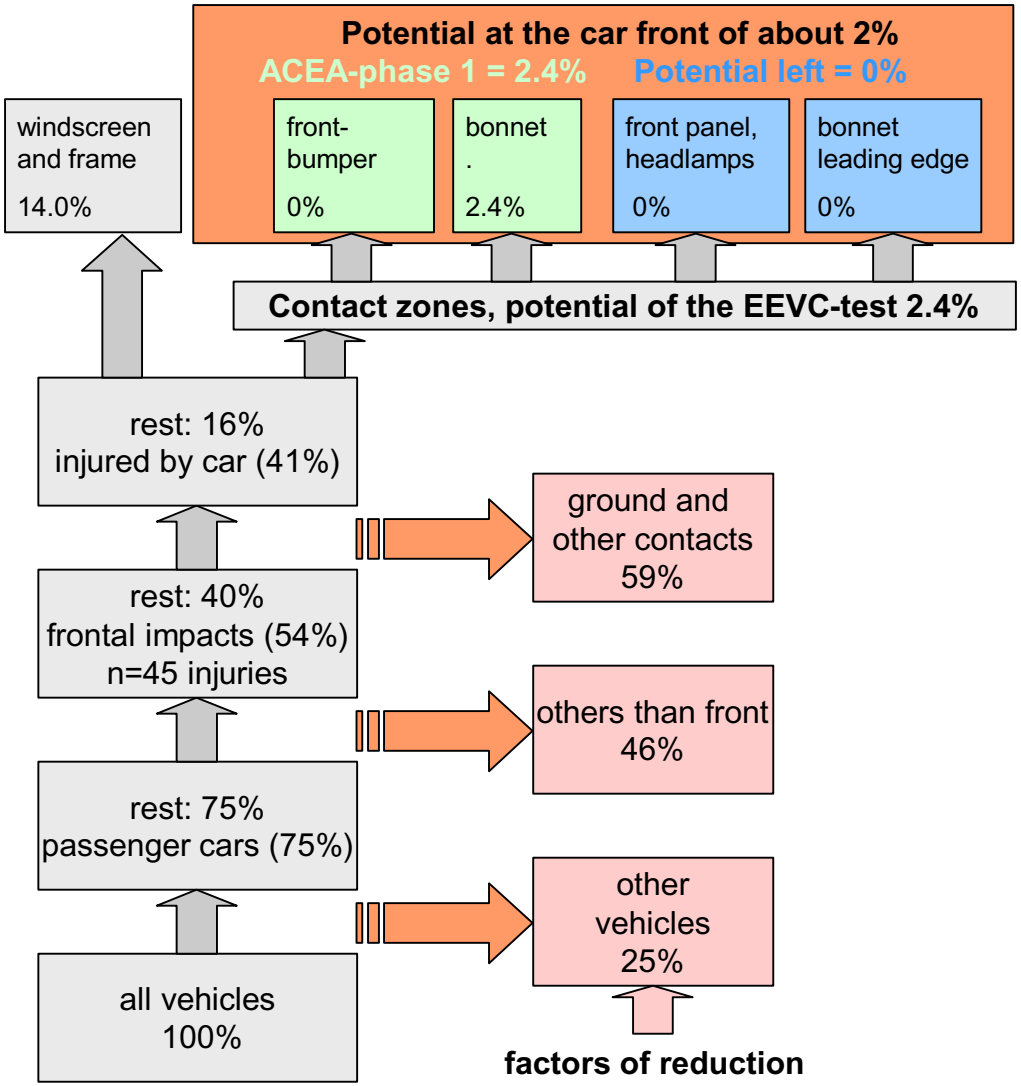
Source: GIDAS



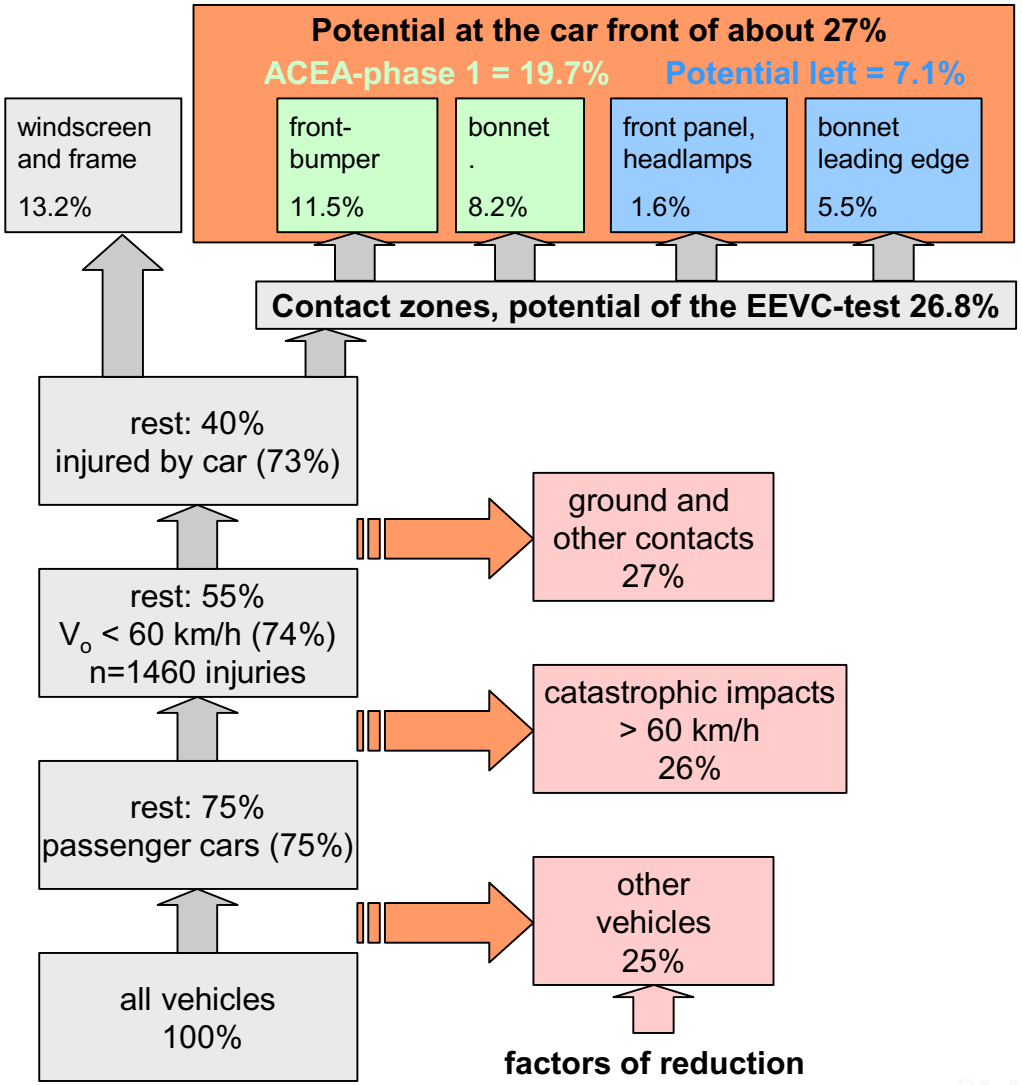
Potential to Reduce Serious Injuries in the GIDAS data, AIS 2+, all body regions



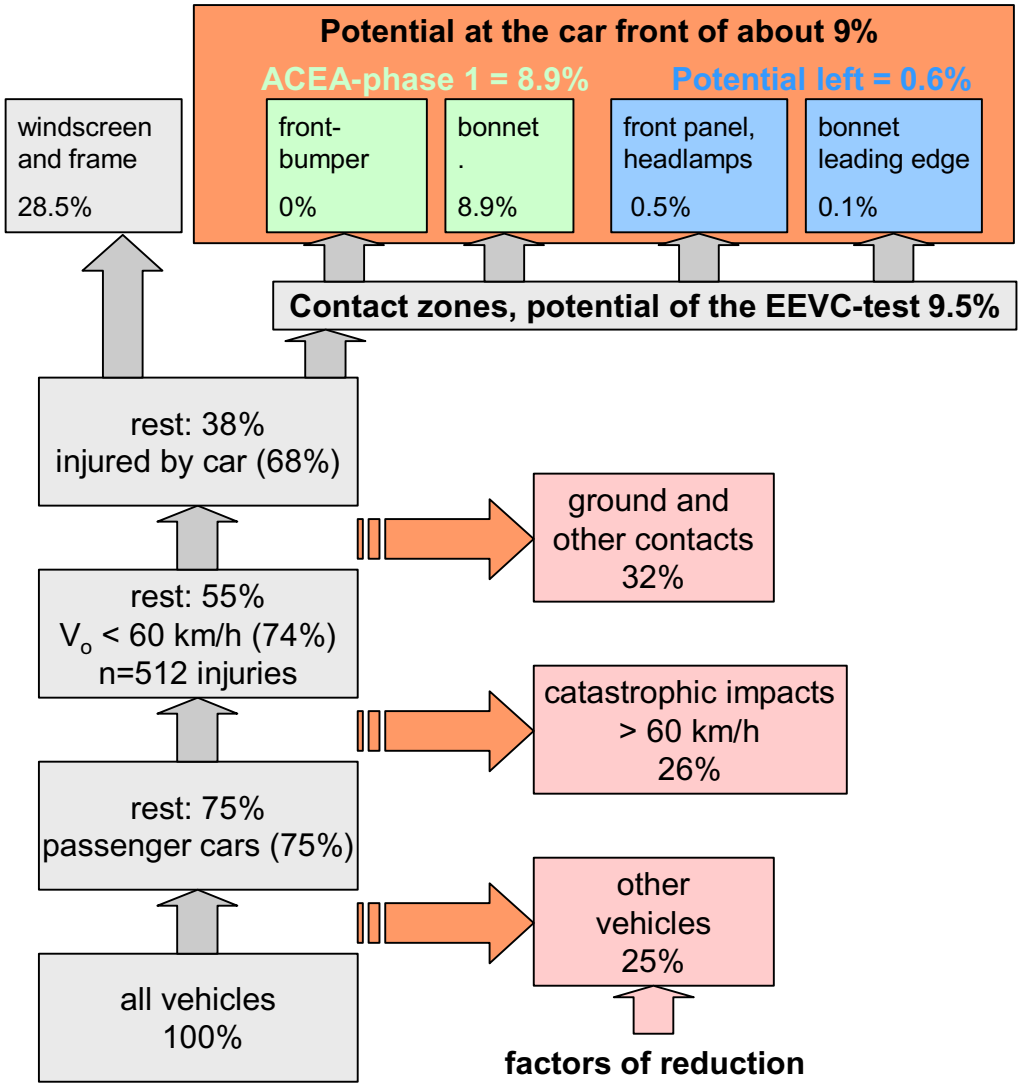
Potential to Reduce Serious Head Injuries in the GIDAS data, AIS 2+



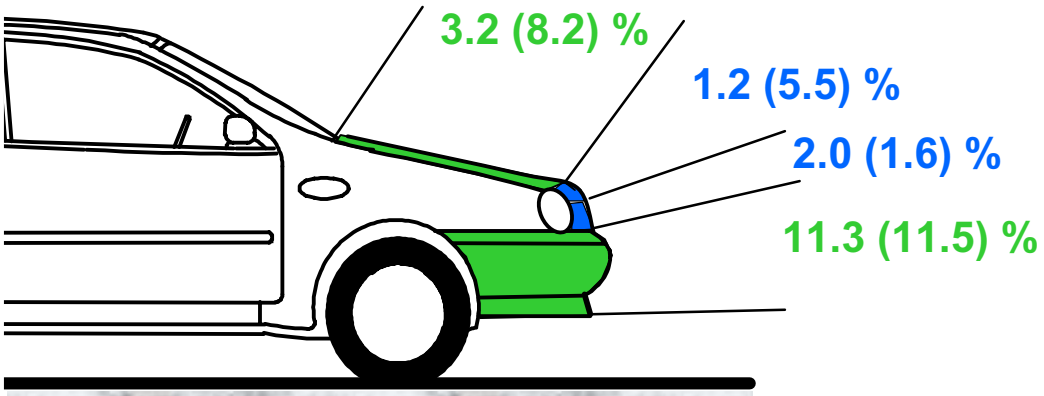
Potential to Reduce Serious Injuries in the IHRA data, AIS 2+, all body regions



Potential to Reduce Serious Head Injuries in the IHRA data, AIS 2+



Potential of the tests for ACEA-phase 1 and EEVC WG17

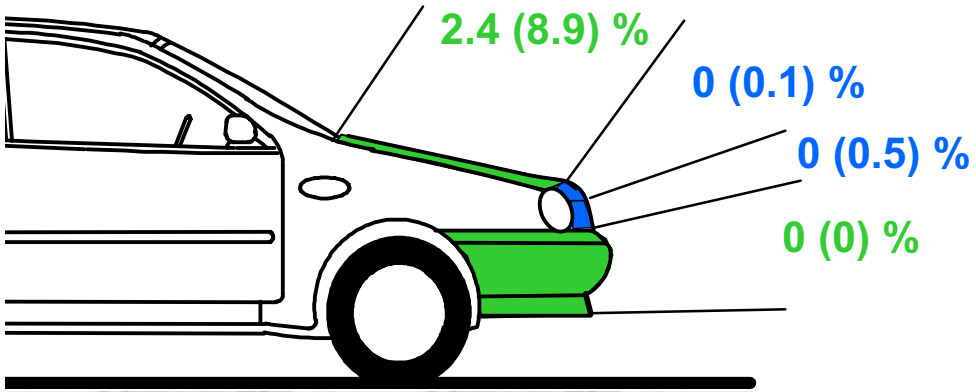


ground and other contacts: **15 (15) %**

AIS 2+, all body regions

ACEA Phase 1: 14.5 (19.7) %
potential left: 3.2 (7.1) %

potential of EEVC: 17.7 (26.8) %



ground and other contacts: **24 (18) %**

AIS 2+, head and face

ACEA Phase 1: 2.4 (8.9) %
potential left: 0 (0.6) %

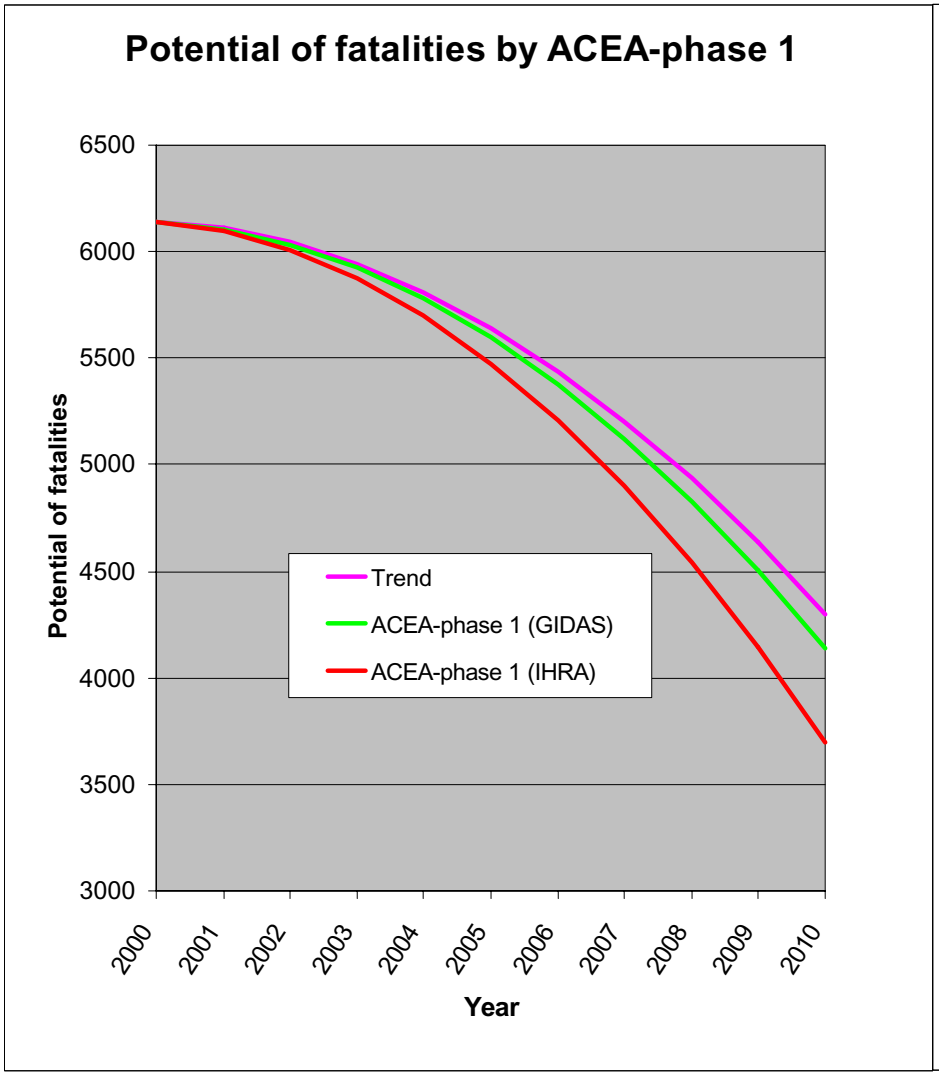
potential of EEVC: 2.4 (9.5) %

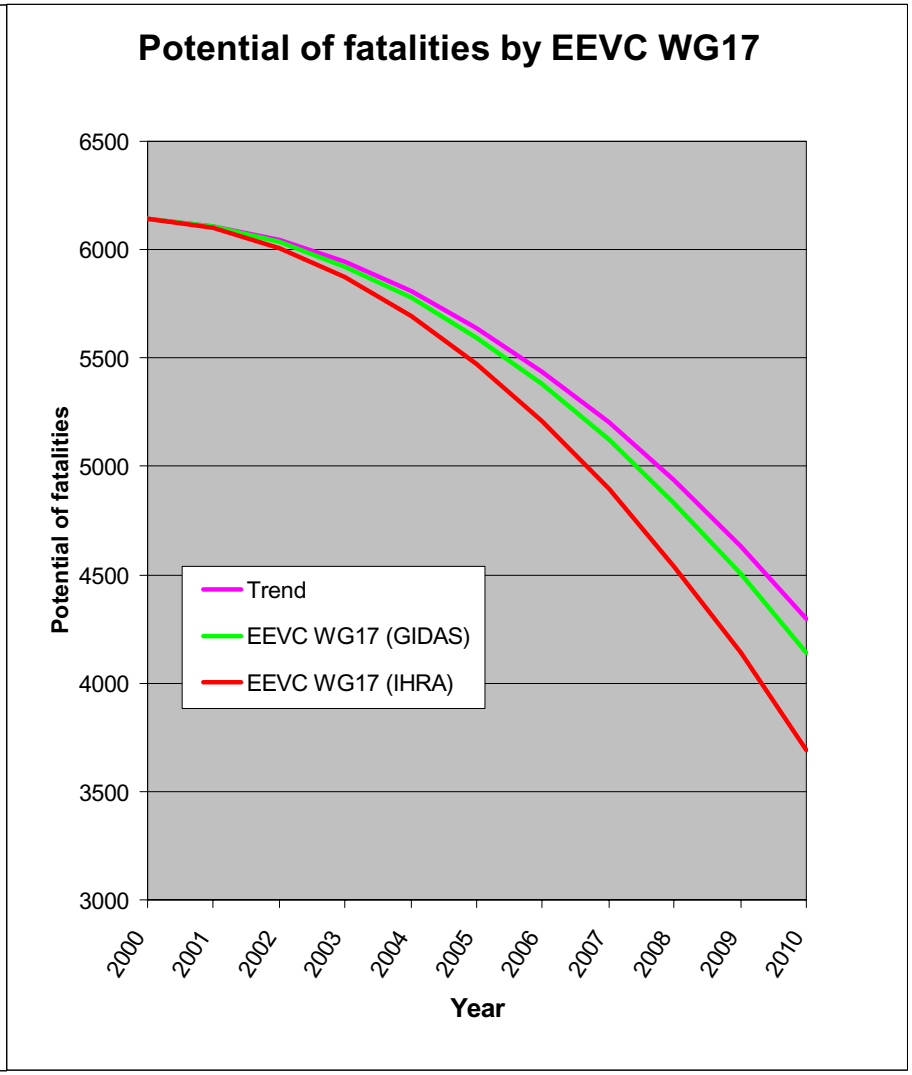
GIDAS (IHRA) data

Estimated Potentials of Pedestrian Protection Testing for Complete European Vehicle Fleet Exchange

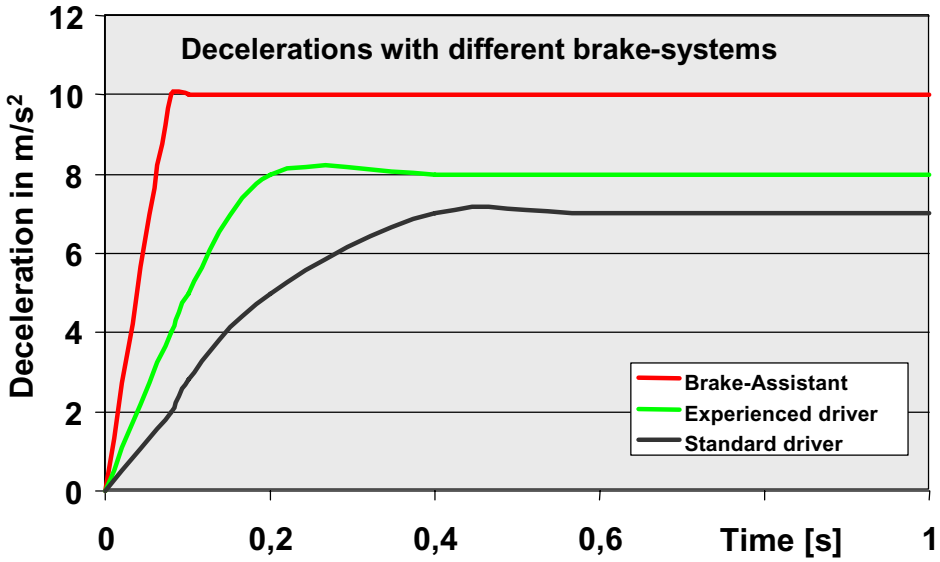
	seriously injured	fatalities
European casualties 2000	**74,494**	**6,143**
GIDAS	**8.8%** see fig. 16 (17.7%/2)	**0.5%** see fig. 17 (2.4%/5)
Potential from ACEA-Phase 1	**5,363** (7.2%)	**30** (0.5%)
Potential left	**1,191** (1.6%)	**0** (0%)
Total potential based on GIDAS-data for EEVC WG17	**6,554**	**30**
IHRA (Europe)	**13.4%** see table 19 (26.8%/2)	**1.9%** see table 20 (9.5%/5)
Potential from ACEA-Phase 1	**7,375** (9.9%)	**110** (1.78%)
Potential left	**2,607** (3.5%)	**7** (0.12%)
Total potential based on IHRA-data for EEVC WG17	**9,982**	**117**

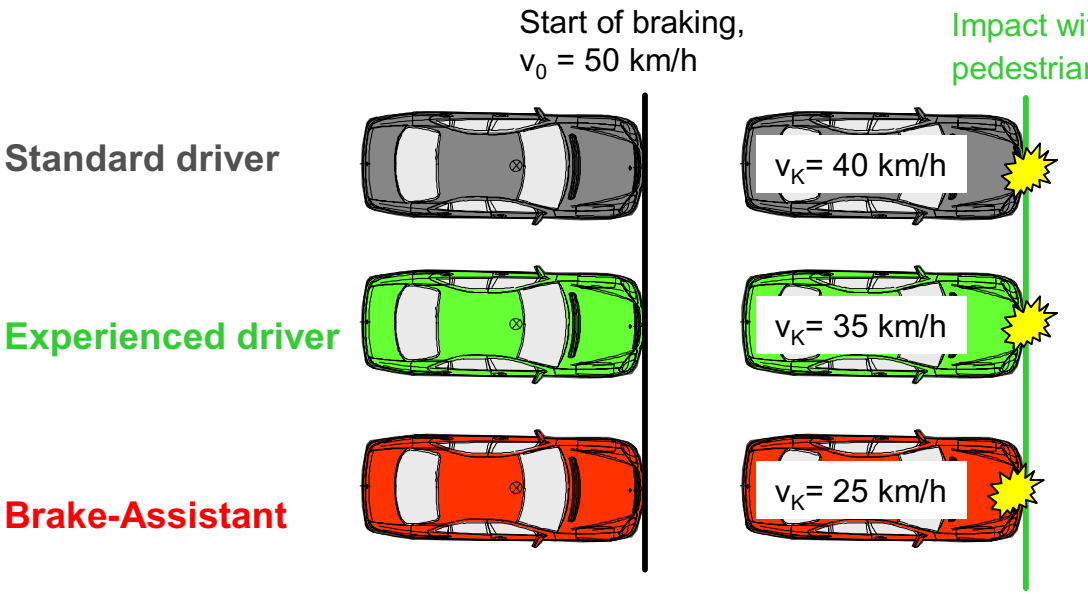
Estimated Potential ACEA-phase 1 (left) Compared to Estimated Potential for EEVC WG17 tests (right)





Reduced collision speed by using a brake-assistant





Conclusions

- Internationally, the fatality rate in Europe with 14 pedestrians per mill. Inhabitants is the lowest in the world. (US 17, Japan 23)
- Based on this positive trend , the target of the EU-Commision to reduce the fatalities by 30% and the seriously injured by 17% will be reached in 2010 without having any regulation.
- The potential of the EEVC WG17 tests is less than 2% of the pedestrian fatalities and about 8-13% of the seriously injured.
- ACEA-phase 1 is a good compromise for all parties
- Upper Leg test / Adult head test have no potential to reach targets estimated by the Commission
- Accident avoidance is much more promising to reduce casualties