Gesamtverband der Deutschen Versicherungswirtschaft e. V.

The Number And Structure Of Road Users With Life-Threatening Injuries

Sept. 18, 2010

ESAR 2010, Hannover

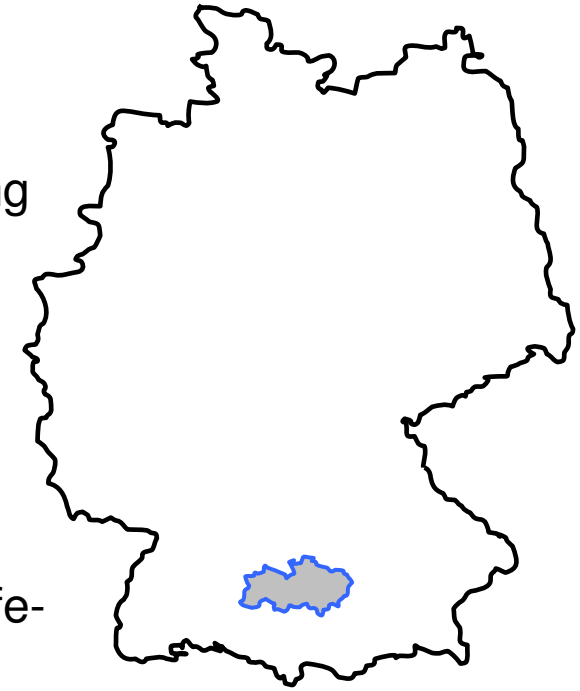
Axel Malczyk
German Insurers Accident Research

E. Mayr, M. Ecker, T. Seebauer, C. Weber, M. Helm, M. Kulla,
F. Gebhard, C. Riepl, L. Winkler, U. Liener, V. Schindler

Introduction

Background

- Incidence of life-threatening injury patterns from traffic accidents in Germany largely unknown
- National accident statistics: no discrimination among „seriously injured“ (in-patients for at least 24 hrs.)
- Hospital data: Little detail about collision mechanisms, belt use etc.



Objective

- Total accident survey of road users with survived life-threatening injuries or killed
- Study in representative region, at least 12 months
- Estimate for incidence of life-threatening injuries in Germany

Unfallforschung der Versicherer GDV

Methodology

- Data retrieval (retrospective and prospective) from trauma centers, dispatch centers, police, fire departments over 14 months

Cases included if:

- traffic accident within study region
- at least one victim with:

life-threatening injury pattern

- **multiple severe injuries („polytrauma“)**:
  - injuries in at least two body regions; ISS ≥ 16

or

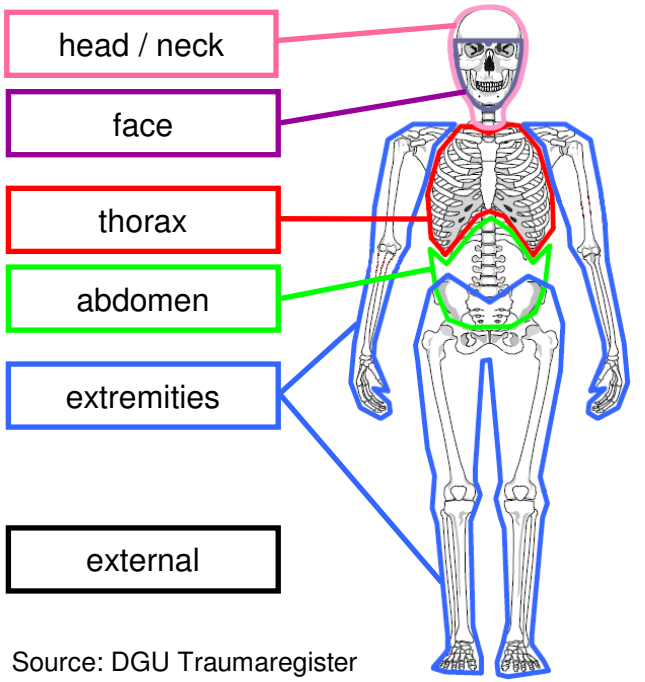
- **severe monotrauma**:
  - injuries in only one body region; ISS ≥ 16

or

- **deceased at the scene** or within 30 days

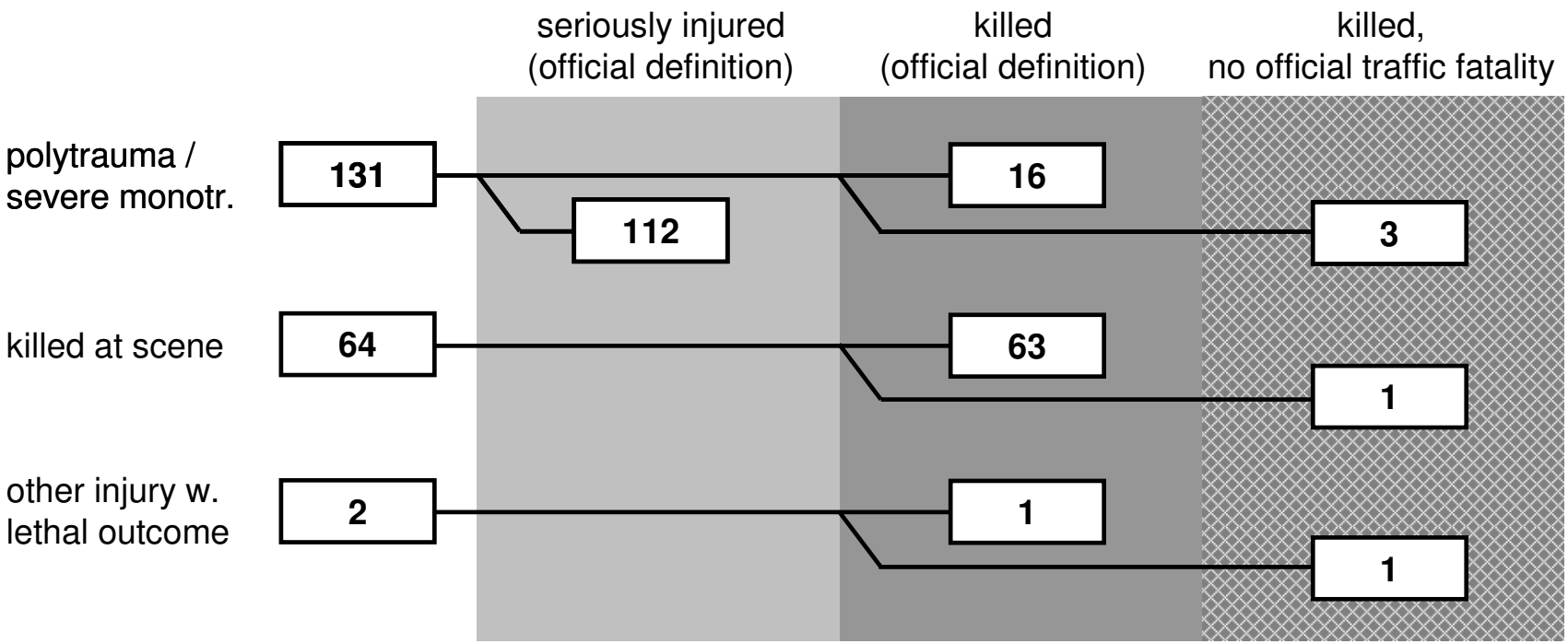
Source: Fire Department





Source: DGU Traumaregister

Results for Study Region, 2008

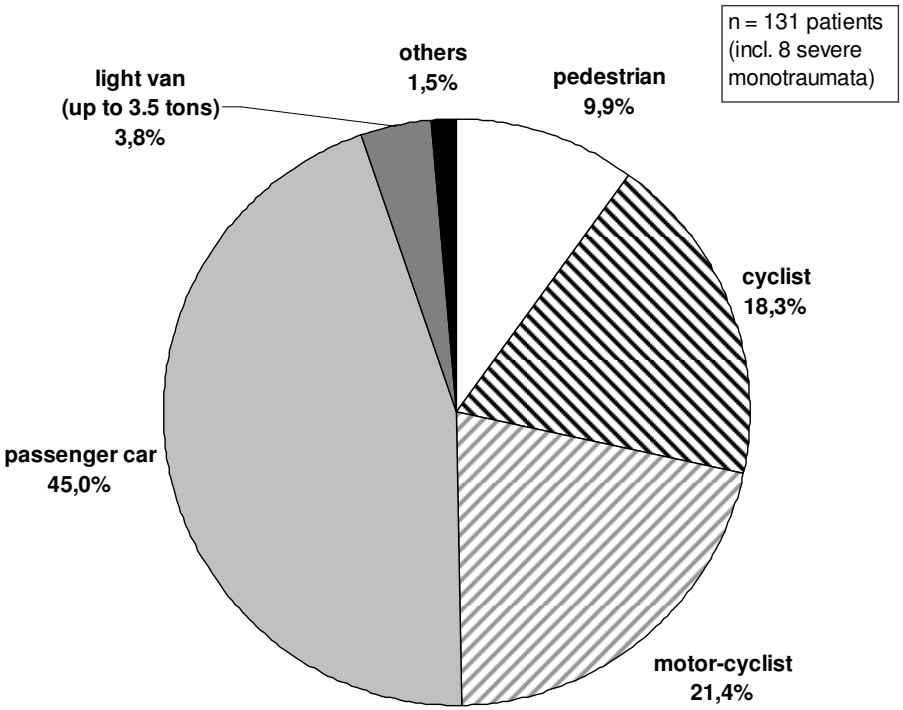


- Majority of fatal outcomes are deaths at accident scene
- Some fatalities do not appear in official statistics (suicide, health problems)
- Few fatalities caused by injuries of lower severity

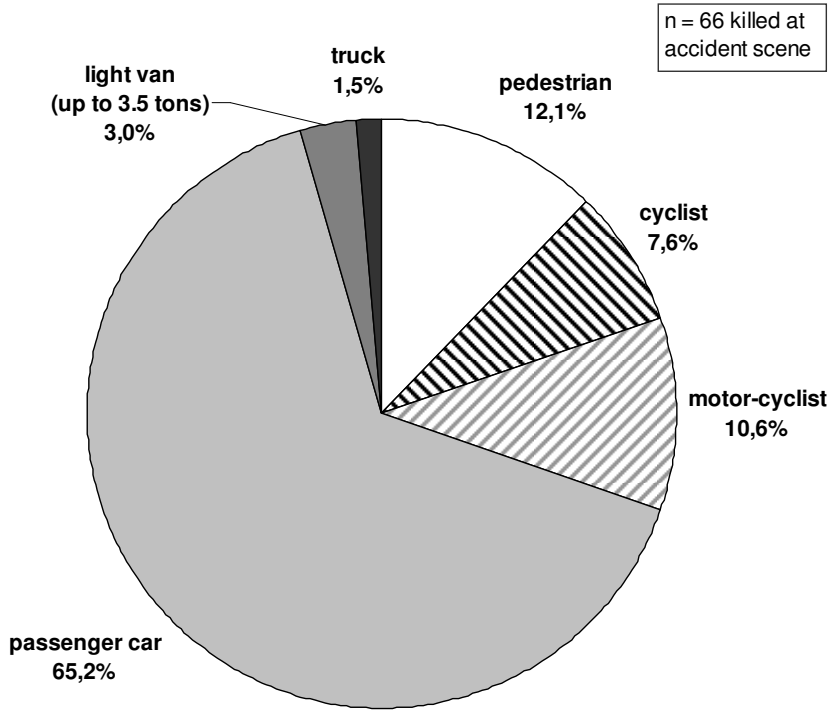
Unfallforschung der Versicherer GDV

Results for Study Region, 2008

Hospitalized road users with polytrauma or severe monotrauma



Road users killed at accident scene



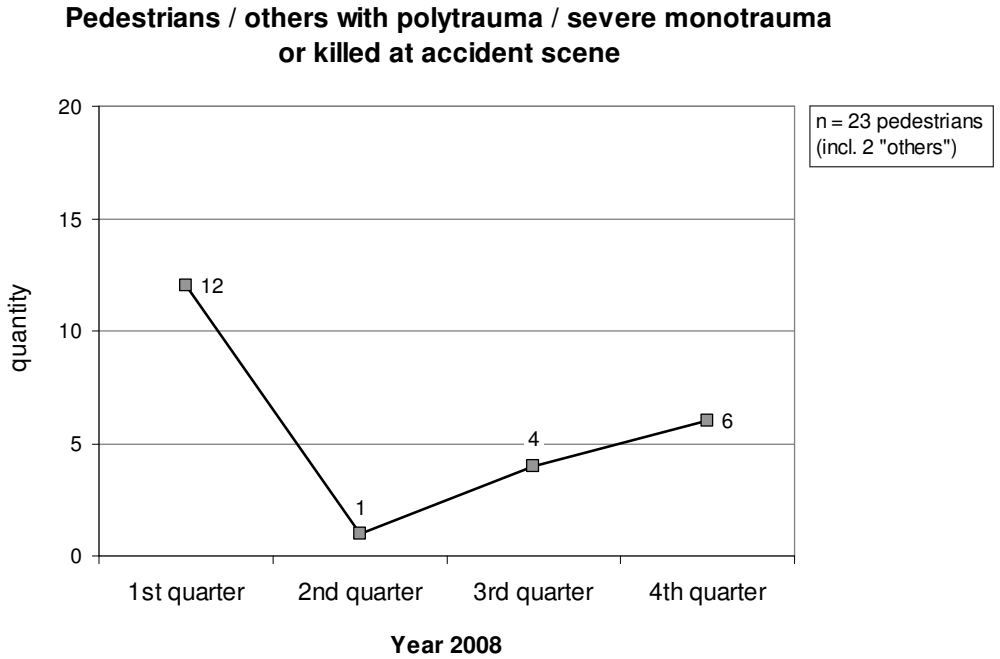
Unfallforschung der Versicherer GDV

Pedestrians

- Severe traumatic brain injury esp. when impacting perimeter of windshield or A-pillar
- Large share of seniors among victims
- Immediate death frequently due to over-rolling (esp. by trucks)
- Daytime and seasonal dependency of accidents



Source: Bavaria Police

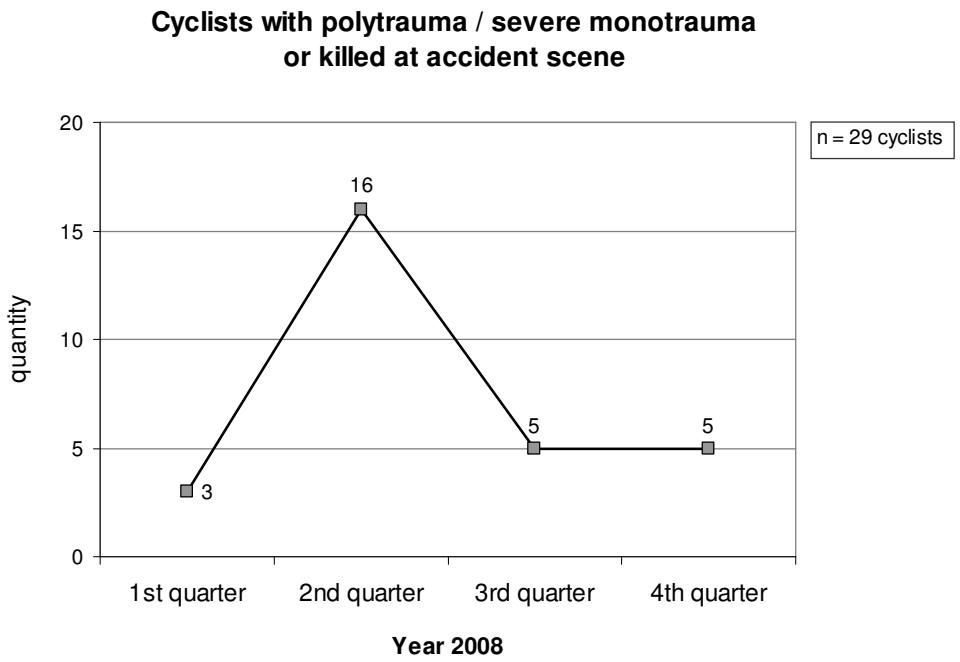


Cyclists

- ⅓ single accidents
- Several cases of severe monotraumata (traumatic brain injury)
- TBI caused by impact against perimeter of windshield or cyclist fall, low usage rate of cycle helmets
- Large share of seniors among victims
- > 50 % of cyclist accidents during 2nd quarter of 2008
- Some victims unknown to police

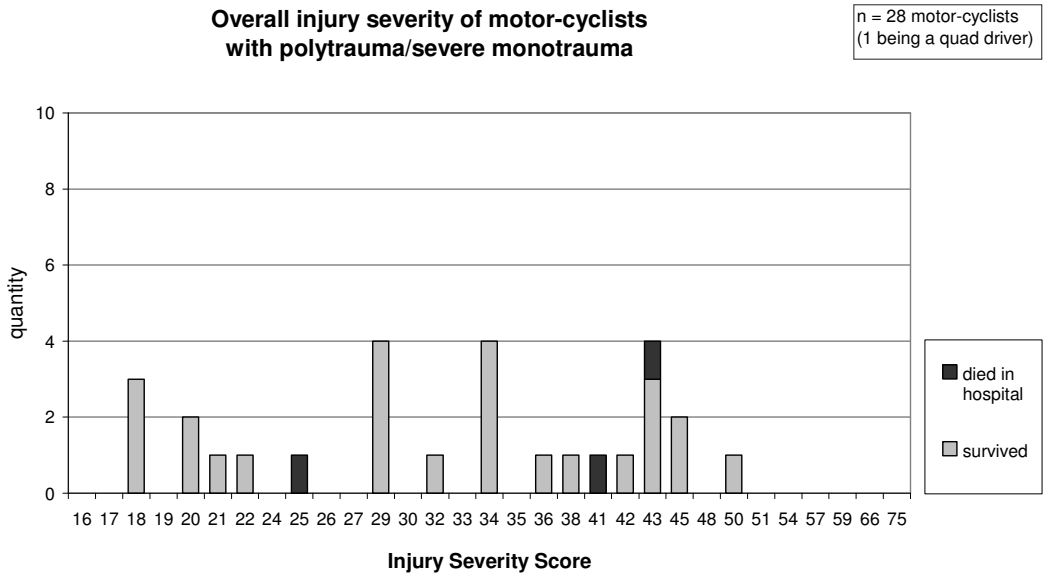


Source: Bavaria Police



Motor-Cyclists

- In average, highest injury severity (Injury Severity Score ISS)
- Frequent fractures of extremities, pelvis and thoracic spine
- Few very severe TBI‘s due to helmet use
- Large share of male riders, in mid-age and with high-performance motor-cycles
- Few single accidents
- Dominance of frontal collisions with turning cars or oncoming traffic

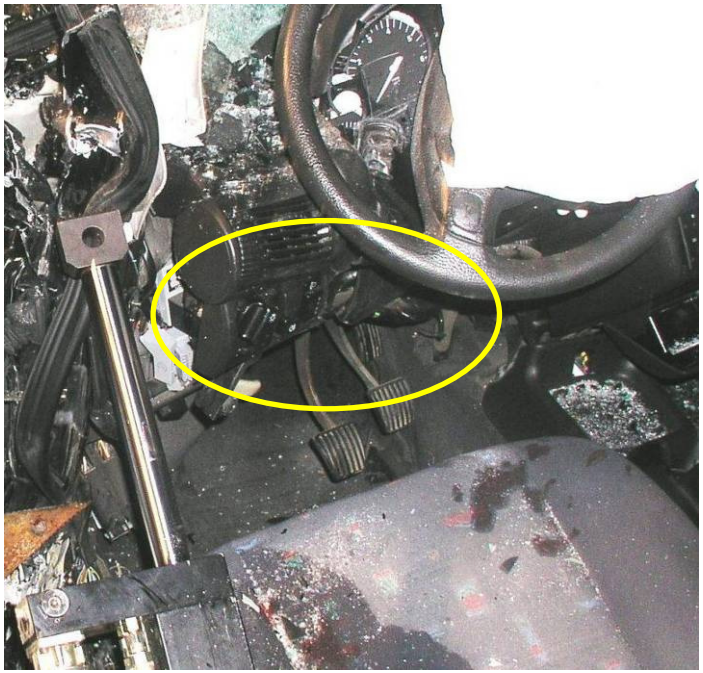


Source: Fire Department

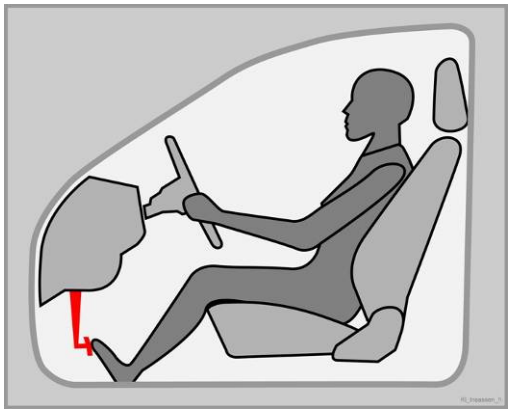


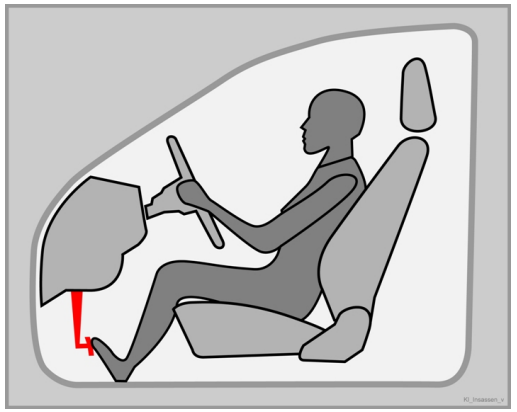
Motor Vehicle Occupants – Frontal Impact

- Intrusion responsible for overall injury severity
- Large share of thorax and (lower) extremity injuries, severe TBI‘s less frequent
- ≈ 50 % of car occupants with life-threatening injury patterns female
- Females with life-threatening injuries considerably shorter than males



Source: Fire Department





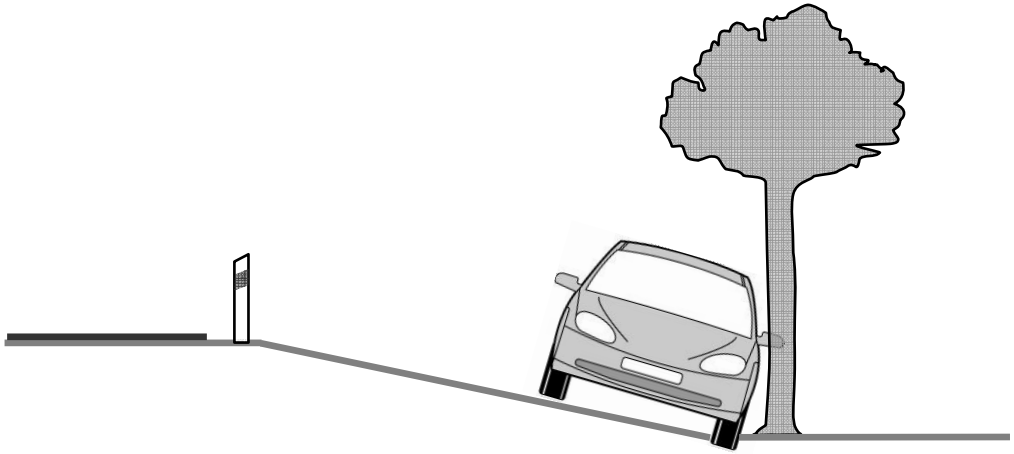
Unfallforschung der Versicherer GDV

Motor Vehicle Occupants – Side Impact

- Frequently severe TBI‘s, esp. with impact into tree, also for far-side occupants
- Car often tilted about logitudinal axis in impact, deep intrusions in roof rail area
- Still few cars equipped with curtain airbags, no activation in some cases



Source: Fire Department



Unfallforschung der Versicherer GDV

Estimate for Number of Life-Threatening Injuries

- Varying estimates from earlier studies; different data bases

- Extrapolation based on on share of victims with life-threatening injury pattern among „seriously“ injured according to accident statistics

$$\text{ratio of } \frac{\text{polytr./severe monotr. (survived)}}{\text{„seriously“ injured}} = 10\ \% \quad \text{(in study region, 2008)}$$

⇒ Applied to number of „seriously injured“ (70,664) in Germany in 2008 yields:

ca. 7,000 survivors after life-threatening injuries

however:

ca. 8,150 victims with life-threatening injuries transported to hospitals

Unfallforschung der Versicherer GDV

Conclusions

- Females represent approximately half of the car occupants with life-threatening injuries, most of them as drivers
- Motor-cyclists sustain most severe and highest number of injuries per injury pattern
- Employed definition „captures“ life-threatening injury patterns well, but requires availability of clinical data (AIS , ...)
- Incidence rate of life-threatening injuries similar to earlier estimate for incidence rate of disabling injuries (⇒ Busch S., 1994)
- 10 % incidence rate in line with recent estimates (⇒ Lefering R., 2010)

Unfallforschung der Versicherer GDV

Thank you for your attention!

Contact: a.malczyk@gdv.de

This study is funded by the German Insurance Association.

Special appreciation is extended to:

- Ministries of Interior Baden-Wurttemberg and Bavaria
- Police headquarters Ulm, Schwaben-Süd and Nord/West
- Fire departments of Alb-Donau-Kreis, Landkreis Neu-Ulm, Günzburg, Dillingen a.d. Donau, Augsburg, Aichach-Friedberg and cities of Ulm and Augsburg
- Emergency dispatch centers in Ulm, Krumbach and Augsburg
- University Hospital and Hospital of the German Armed Forces in Ulm and Augsburg Hospital

Unfallforschung der Versicherer GDV