

Gesamtverband der Deutschen Versicherungswirtschaft e. V.

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

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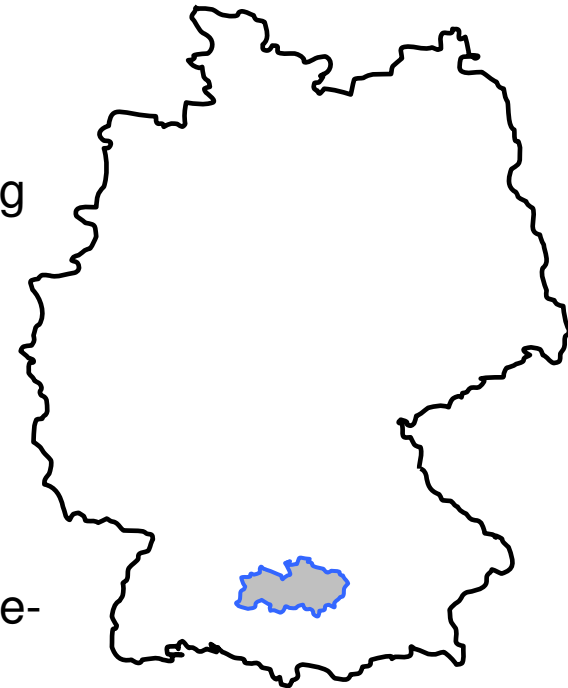
Introduction

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



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 \geq 16

or

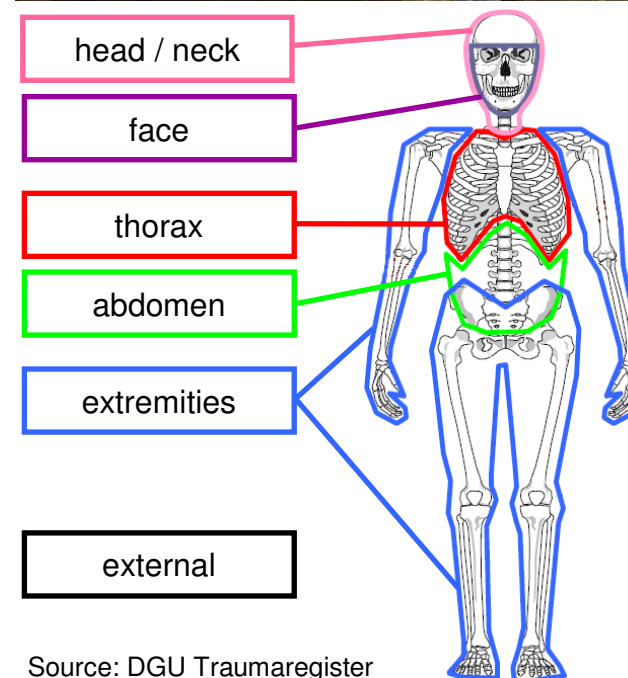
- **severe monotrauma:**

- injuries in only one body region; ISS \geq 16

or

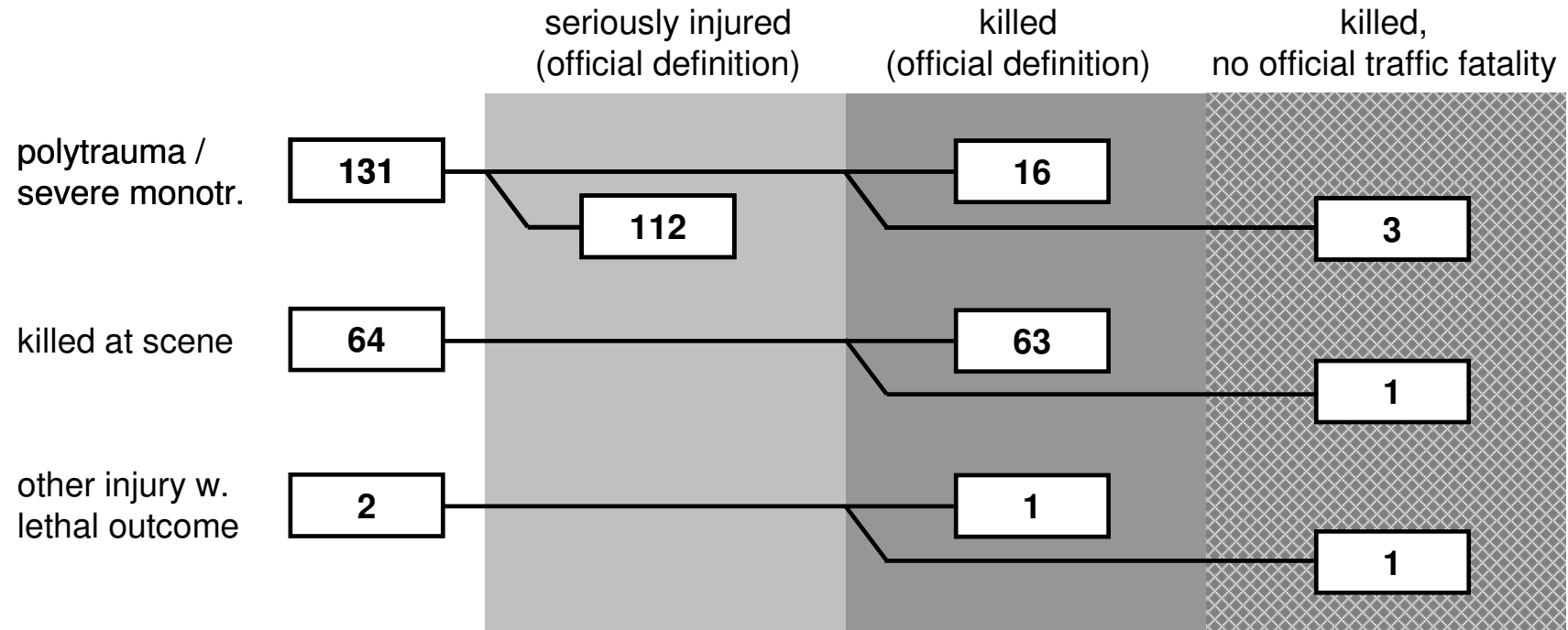
- **deceased at the scene** or within 30 days

Source: Fire Department



Source: DGU Traumaregister

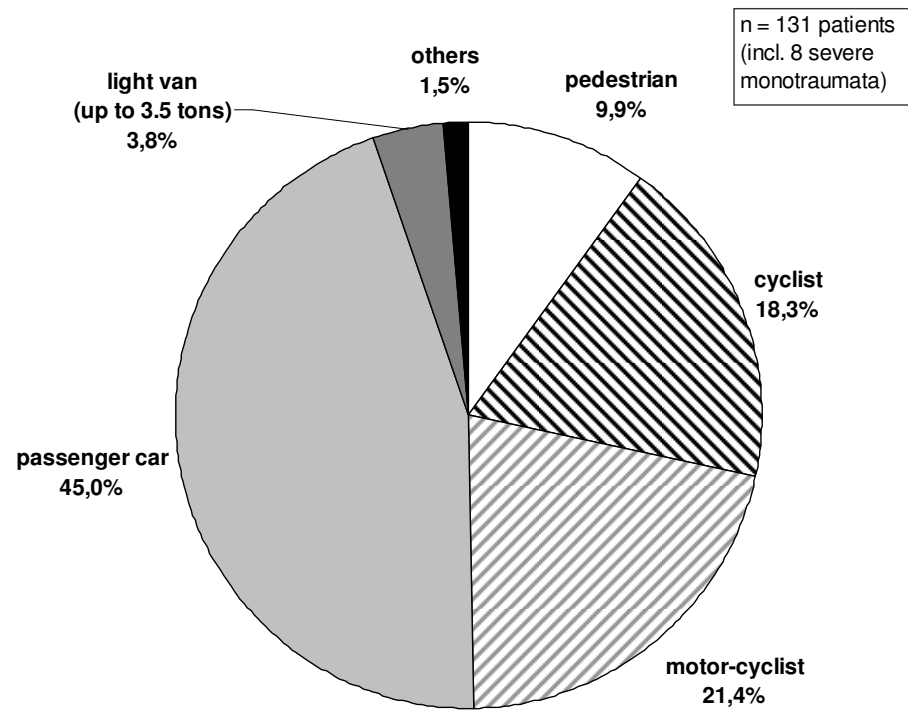
Results for Study Region, 2008



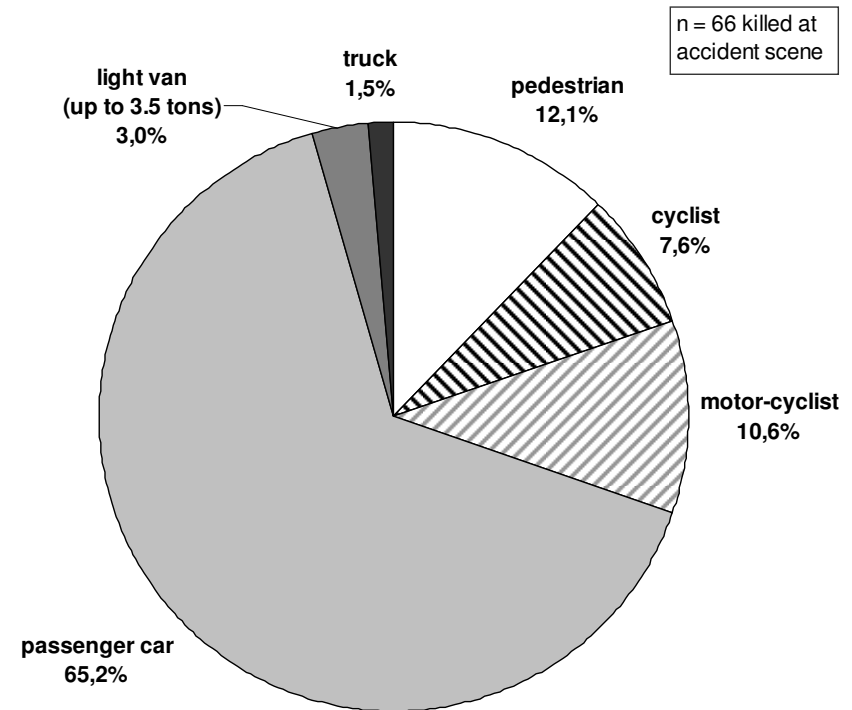
- Majority of fatal outcomes are deaths at accident scene
- Some fatalities do not appear in official statistics (suicide, health problems)
- Few fatalities caused by injuries of lower severity

Results for Study Region, 2008

Hospitalized road users with polytrauma or severe mono-trauma



Road users killed at accident scene

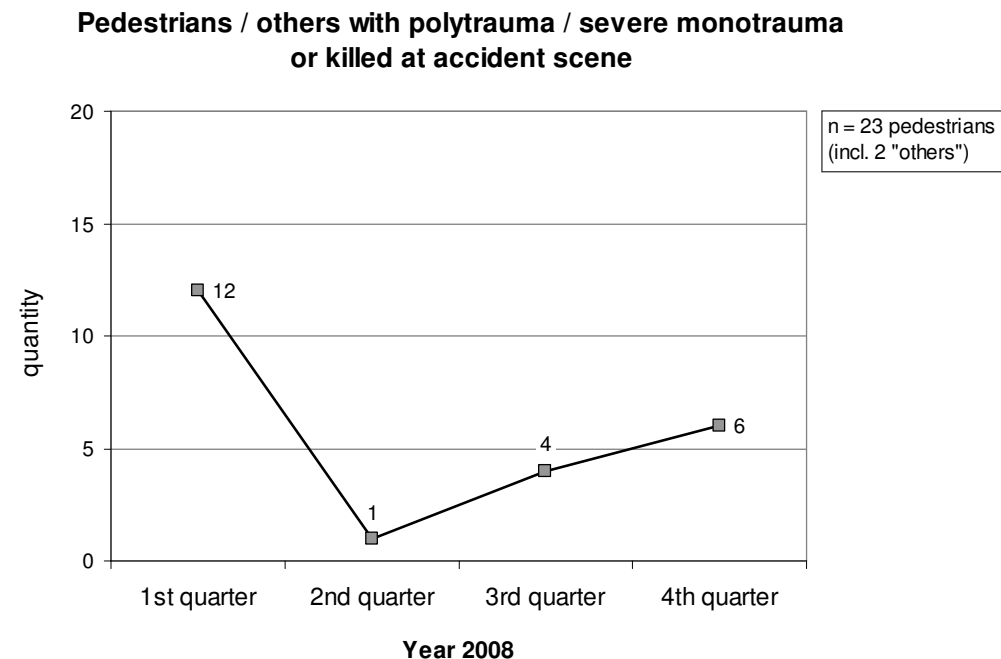


Pedestrians

- 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



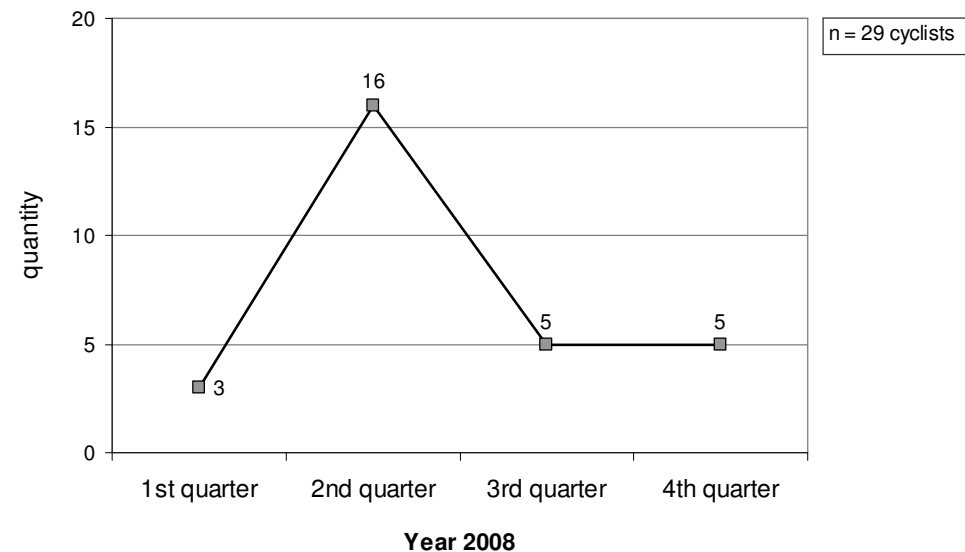
Cyclists

- $\frac{1}{3}$ 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

Cyclists with polytrauma / severe monotrauma
or killed at accident scene

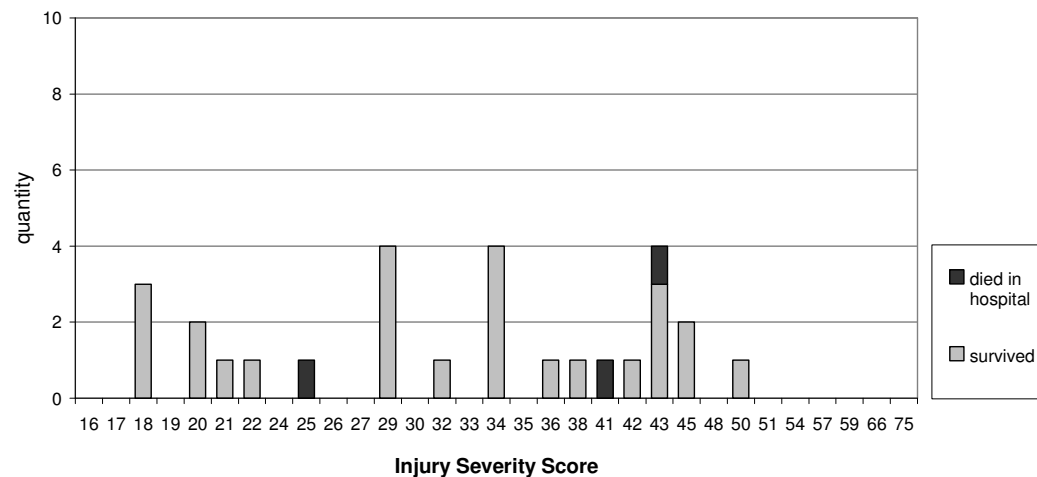


Motor-Cyclists

- 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

Overall injury severity of motor-cyclists
with polytrauma/severe monotrauma

n = 28 motor-cyclists
(1 being a quad driver)

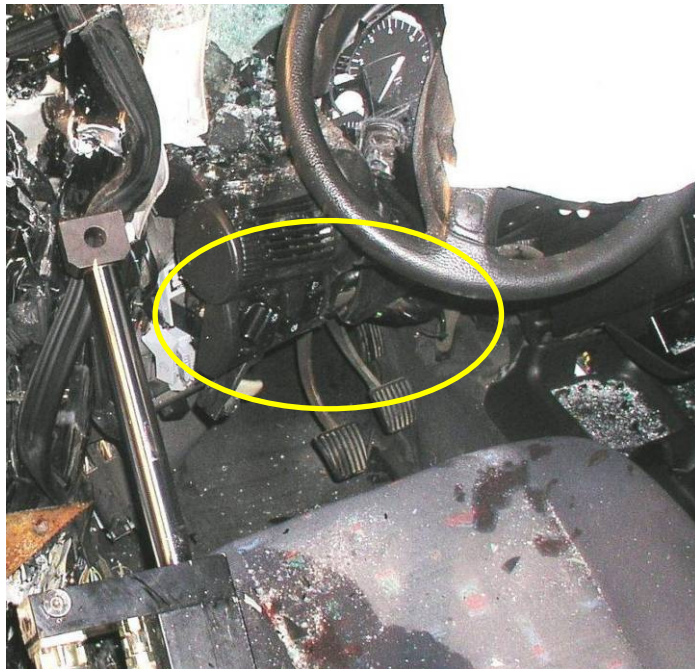


Source: Fire Department

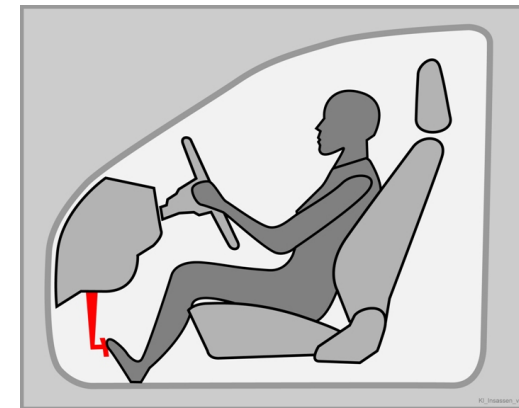
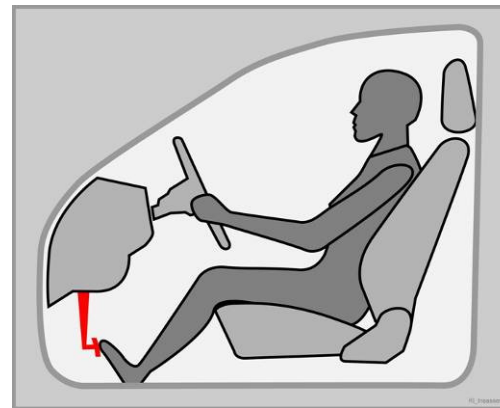


Motor Vehicle Occupants – Frontal Impact

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



Source: Fire Department

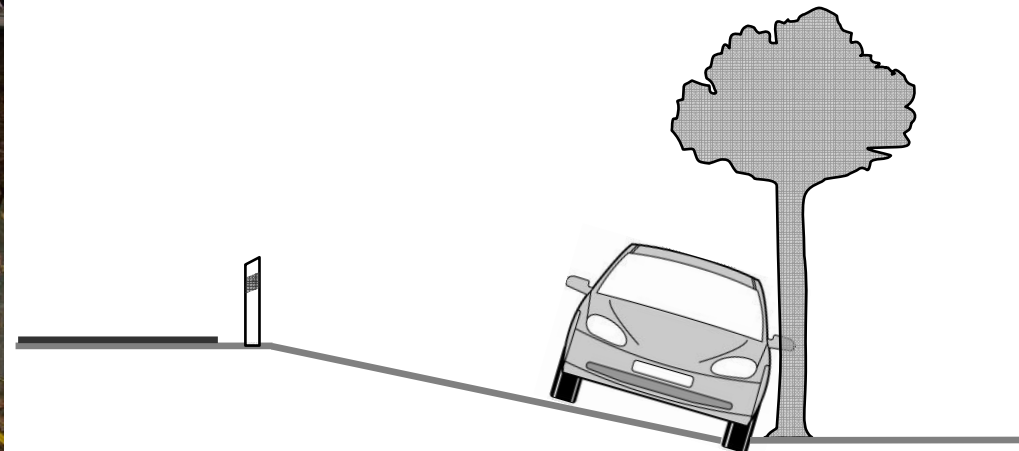


Motor Vehicle Occupants – Side Impact

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



Source: Fire Department



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

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

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)

Thank you for your attention!

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