SafetyCube

Analysis of road crash costs in EU countries

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Co-funded by the Horizon 2020
Framework Programme of the European Union

09/02/2017

Introduction

- W2Economics: research/consultancy, specialized in economic analysis of road safety
  - *Economic evaluation road safety programs/measures*
  - *Costs of road crashes*
  - *Economic valuation of saving lives, quality of life*
  - *Financing road safety measures*
  - *Impact of economic development on road safety*

- Clients:
  - *International organizations*
  - *Governments*
  - *Private companies*
  - *Other research institutes*
  - *Universities*

SafetyCube

- SafetyCube: Safety CaUsation, Benefits and Efficiency
- A European Commission supported Horizon 2020 project
- Aims at developing an innovative road safety Decision Support System (DSS), helping policy makers to
  - *Assess effectiveness of road safety measures*
  - *Prioritize measures*
  - *Assess cost-effectiveness of measures*
  - *Monitor serious injuries and the associated socio-economic costs*
- Including an Economic Efficiency Assessment (EEA) tool
  - *Cost-benefit analysis*
  - *Cost-effectiveness analysis*

Economic Efficiency Assessment tool

WP4,5,6 Info on measures	CBA calculator	WP3 Info per country
Effectiveness saved crashes per unit - per severity category	**Cost Effectiveness Analysis** • Costs per crash prevented (for each severity category separately)	Crash costs by severity category
Time horizon	**Cost Benefit Analysis** • Net present value (benefits – costs) • Cost benefit ratio (benefit / costs)	Distribution of severity categories
Measure costs		Discount rate

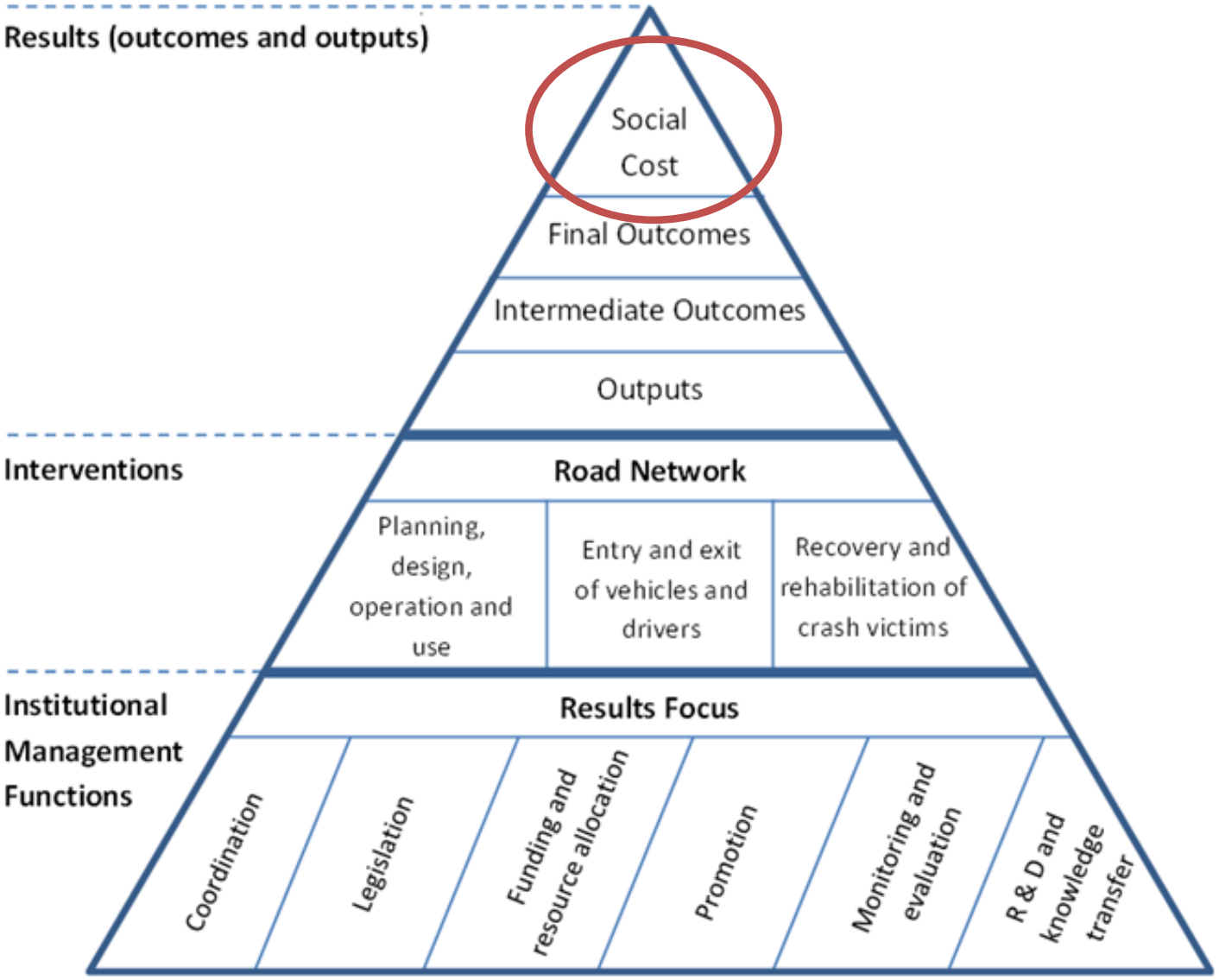
Cost-benefit analysis

Road safety investments

Road crash cost savings

(+ other impacts)

Costs as road safety indicator



Analysis of road crash costs

- Literature review to identify
  - *All relevant cost items*
  - *Methods*
- Survey among EU countries
- Descriptive analysis
- Further statistical analysis
- Developing standardized EU-values for EEA-tool.
- Data collection in collaboration with H2020 project InDeV

This presentation: descriptive analysis, preliminary results

The SafetyCube-InDeV cost team

SafetyCube partners:

- BRSI
- SWOV
- TOI
- IFSTTAR
- KfV

Previous cost reviews

Study	Year	Number of countries	Regions
COST313 (1994)	1994	14	EU
Elvik	1995	20	EU (13), other (6)
Elvik	2000	12	EU (6), other (6)
Trawen et al.	2002	11	EU (8), US, AU, NZ
Wijnen & Stipdonk	2016	17	Asia (8), EU (6), US, AU, NZ

The survey

- Survey among EU member states plus Iceland, Norway, Serbia and Switzerland
- Questionnaires received from 31 countries
- Issues:
  - *Which cost items included?*
  - *Method(s) per cost item*
  - *Total costs (value, % of GDP)*
  - *Distribution costs among cost items*
  - *Costs per casualty or crash*
  - *Total costs by severity level*
- Official values used by national governments

Methods (official figure)

Cost component	incl. in crash costs	Cost item	Method if 'other' or several options: specify in 'further comments' For explanation see blue tab below.	Database if 'other' or several options: specify in 'further comments' For explanation see blue tab below.	incl. in cost item	Cost element	Cost item is included in... fatalities	seriously injured	slightly injured	property damage only	crashes with fatalities	crashes with seriously injured	crashes with slightly injured	crashes with property damage only	Other injuries	other group, see Cost per unit
Medical costs	☑	First aid and transportation	Restitution c	Hospitals	☑	ambulance	☑	☑	☑		☐	☐	☐		☐	☐
					☑	helicopter										
					☐	*other:*										
	☑	Emergency department	Restitution cc	Hospitals			☑	☑	☑		☐	☐	☐		☑	☐
	☑	In-patient hospital treatment (overnight stay)	Restitution cc	Hospitals			☑	☑	☑		☐	☐	☐		☐	☐
	☑	Out-patient treatment (no overnight stay)	Restitution cc	Hospitals			☐	☑	☑		☐	☐	☐		☑	☐
	☑	Non-hospital treatment	Restitution c	other	☑	rehabilitation centres	☐	☑	☑		☐	☐	☐		☑	☐
					☑	general practitioners										
					☑	physiotherapy										
					☑	home care										
					☑	*other: nursing homes*										
	☐	Aids and appliances	other	other			☐	☐	☐		☐	☐	☐		☐	☐
	☑	*other items: medicines*					☑	☑	☑		☐	☐	☐		☐	☐
	1. Several types of data sources have been used for costs of non-hospital treatment have been used, including hospital data, national surveys and insurance data. 2. For some cost items, e.g. out-patient treatment of victims who have not been treated at the emergency department, national surveys have been used in addition to hospital data. 3. The severity categories for which costs of non-hospital treatment are calcuted differ between the cost items (e.g. rehabilition does not include 'other' injuries, while costs of general practitioner do include this group).															
Production loss	☑	Loss of future market production	Human capi	National su	☑	gross production loss (incl. consumption loss)	☑	☑	☑		☐	☐	☐		☐	☐
					☐	net production loss										
					☐	*other:*										
	☐	Friction costs			☐	recruiting and training new employees	☐	☐	☐		☐	☐	☐		☐	☐
					☐	vocational rehabilitation of employee (victim)										
	☐	Loss of non-market production			☐	household work	☐	☐	☐		☐	☐	☐		☐	☐
					☐	taking care of children										
					☐	voluntary work										
					☐	*other:*										
	☐	*other items:*					☐	☐	☐		☐	☐	☐		☐	☐
	Calculation of loss of future market production is based on statistics of Statistics Netherlands (production data, sick leave and inability to work) and Netherlands Bureau for Economic Policy Analysis (CPB), which are based on national surveys															

Costs per component

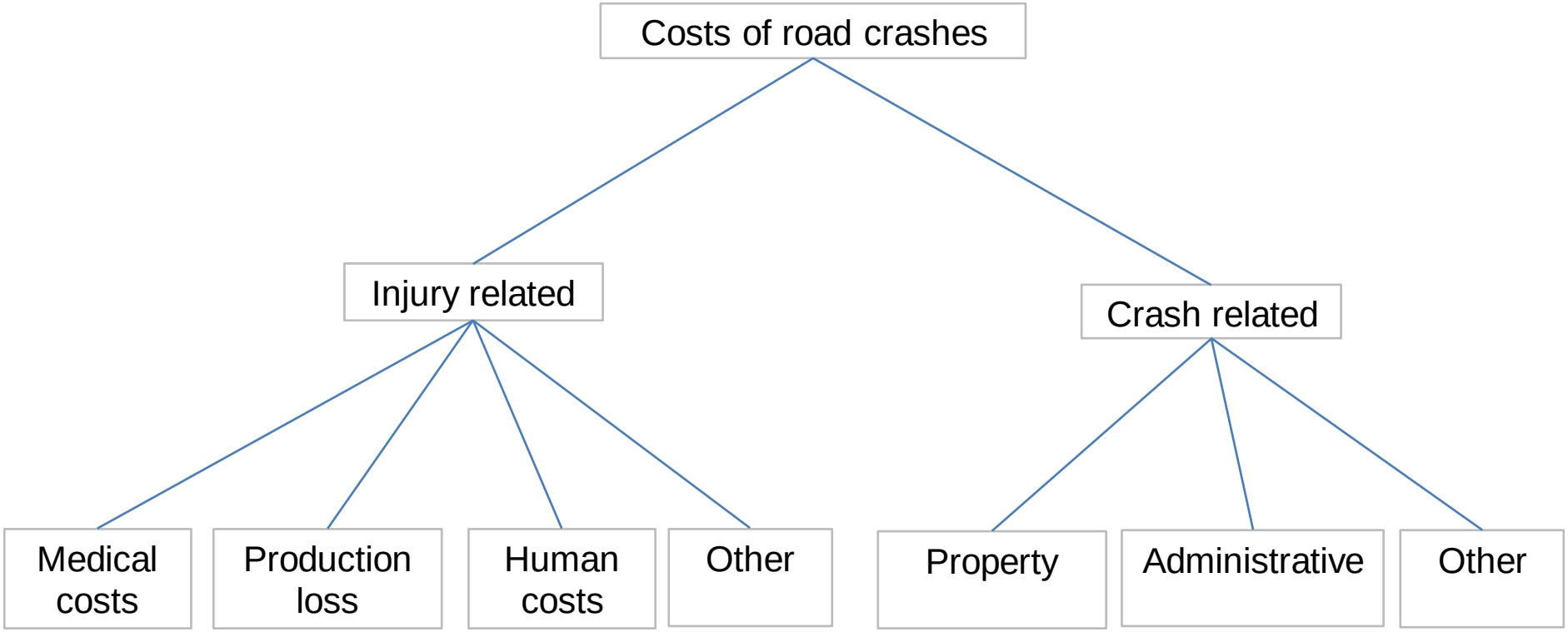
More detailed information		
Do you have more detailed information on the crash costs **per cost component** and per casualty? If so, please fill those in here. If you only have data on total costs, please choose the right tick box.		
Is the information below given in costs per casualty or in total costs?	☑ Costs per casualty (preferred)	☐ Total costs

Currency in which the official information is provided (EUR/Pound/etc.):	EUR

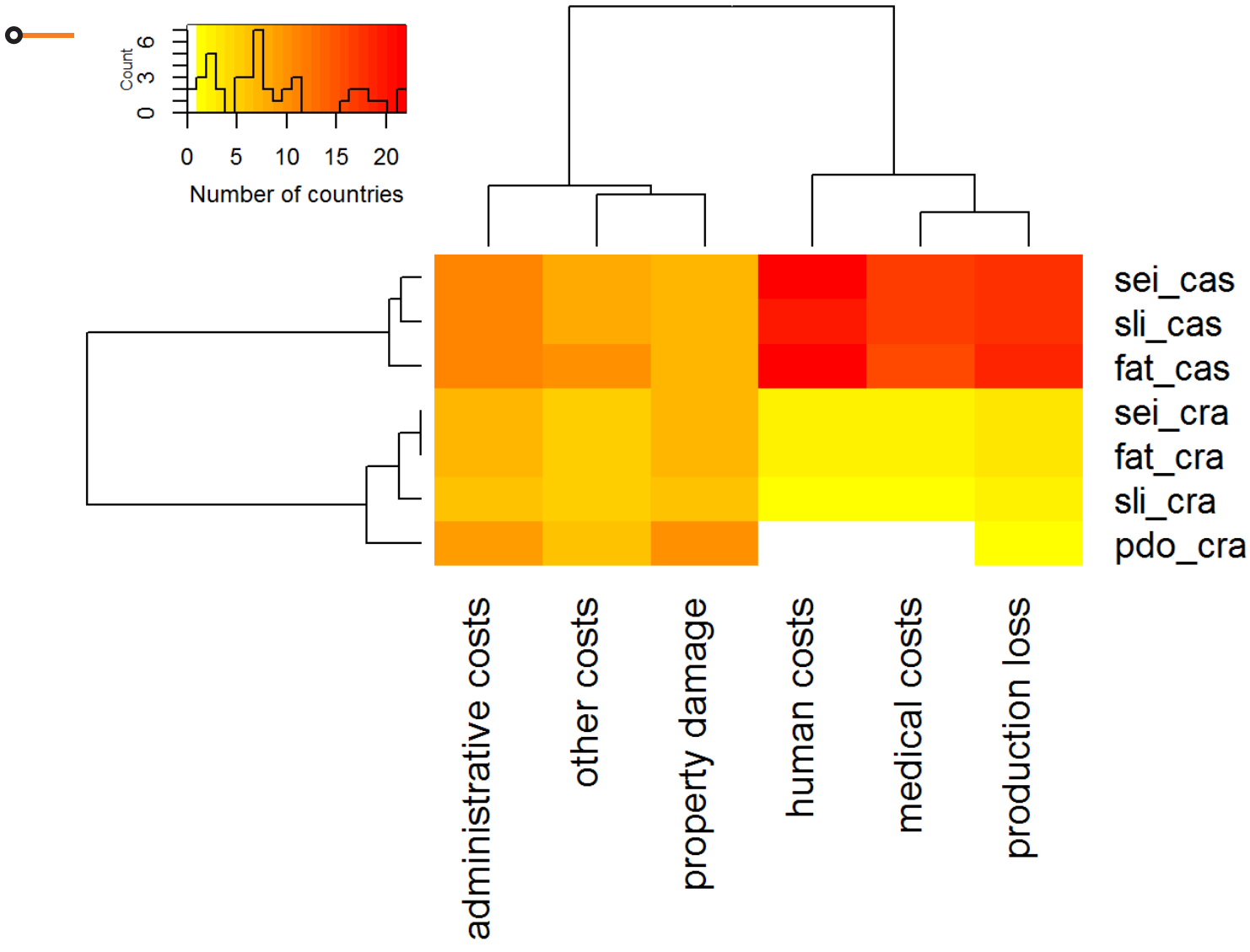
Official figure	Medical costs	Production loss	Human costs	Property damage	Administrative costs	Other costs
fatalities	9.904	576.679	1.991.083	10.805	17.462	5.566
serious injuries	10.229	20.859	232.957	10.498	5.667	431
slight injuries	1.036	1.122	-	4.323	1.747	405
fatal crashes						
serious injury crashes						
slight injury crashes						
property damage only (PDO) crashes						
Other injuries	222	-	-	3.060	965	623
[other groups] (your definition from tab **'Costs per unit'**)						
Total crashes						

Further notes:	Costs of house adaptions and visiting people in hospital are included in medical costs

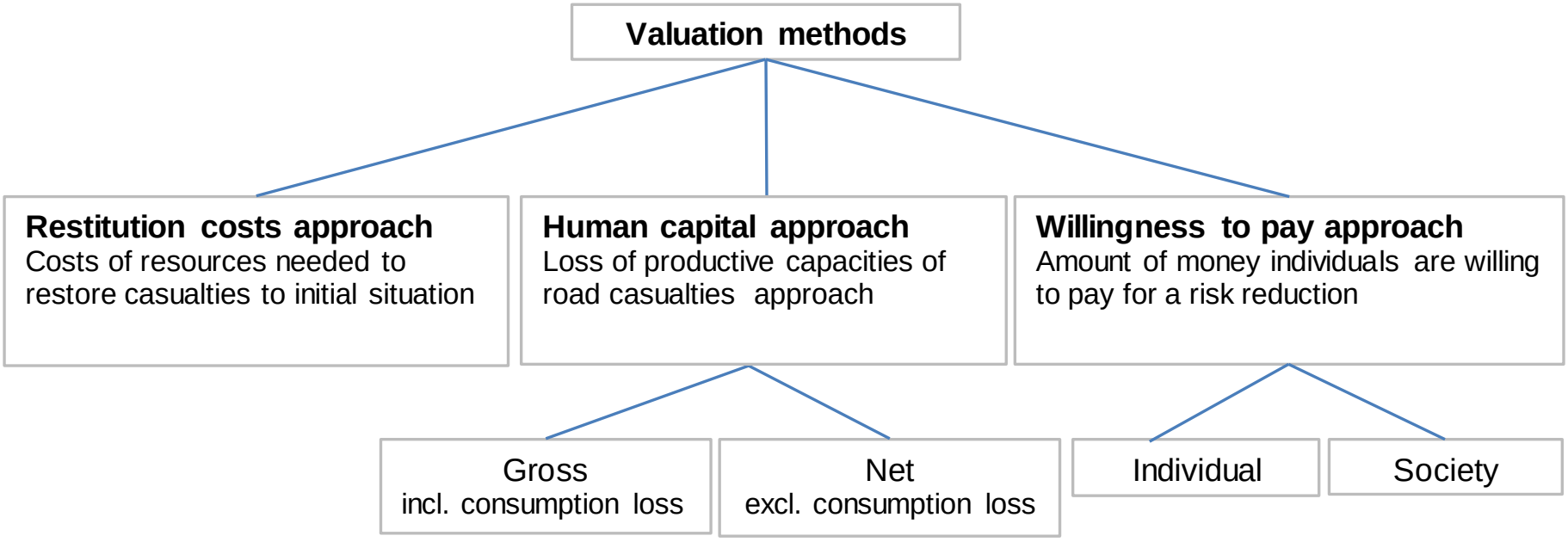
Cost components



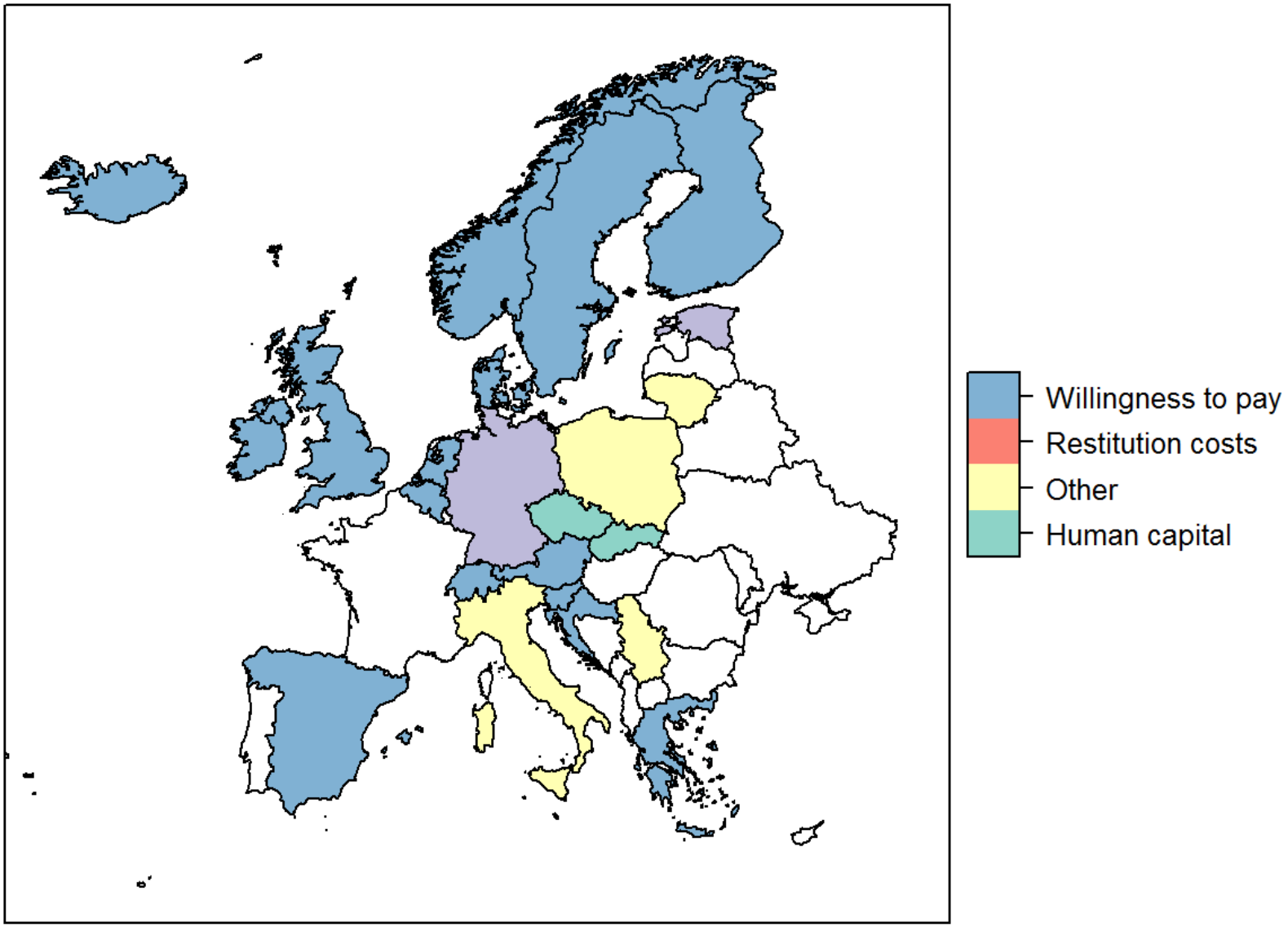
Cost components included



Methods


Valuation methods
Restitution costs approach
Costs of resources needed to restore casualties to initial situation
Human capital approach
Loss of productive capacities of road casualties approach
Willingness to pay approach
Amount of money individuals are willing to pay for a risk reduction
Gross
incl. consumption loss
Net
excl. consumption loss
Individual
Society

Value of Statistical Life - method



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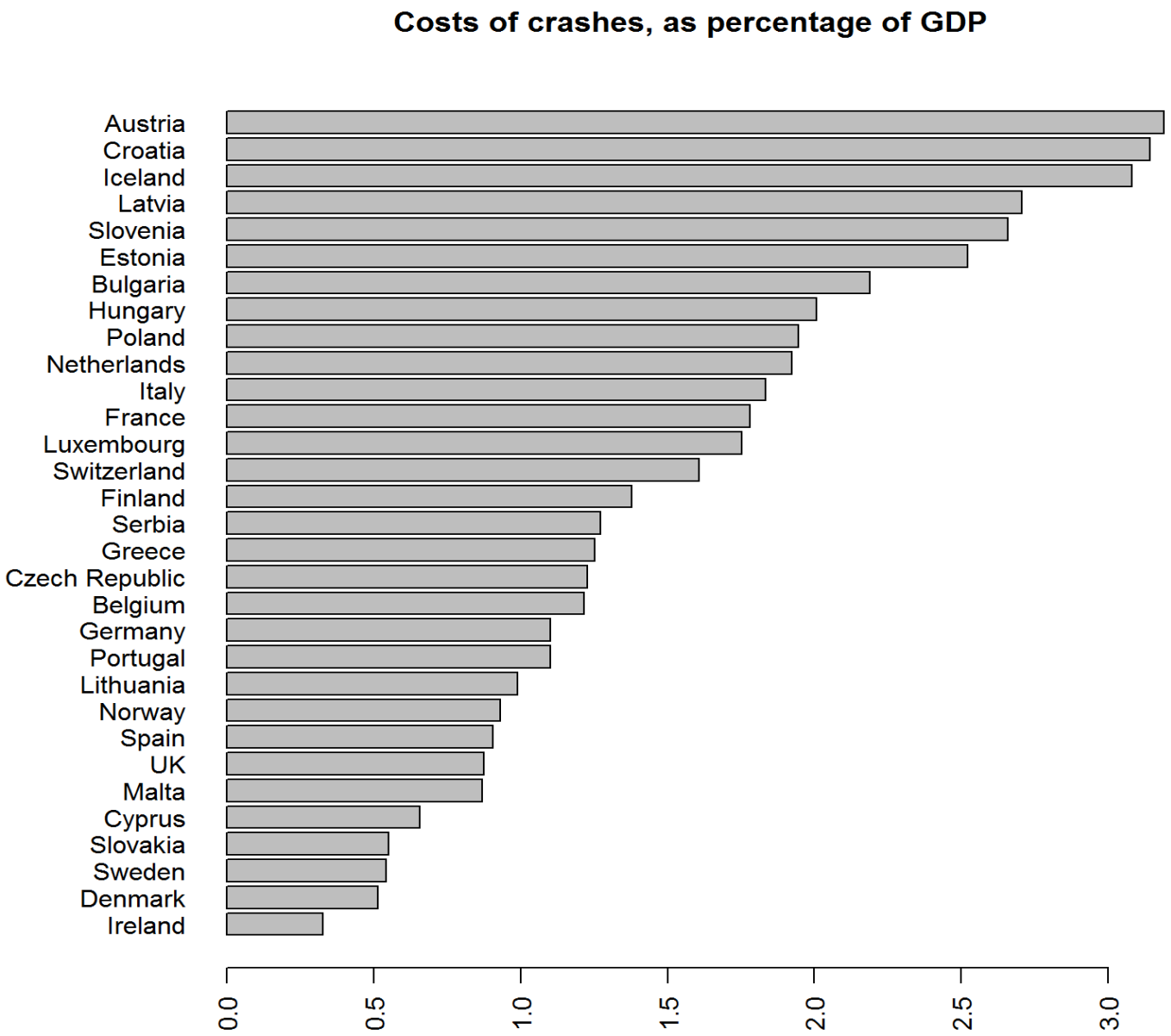
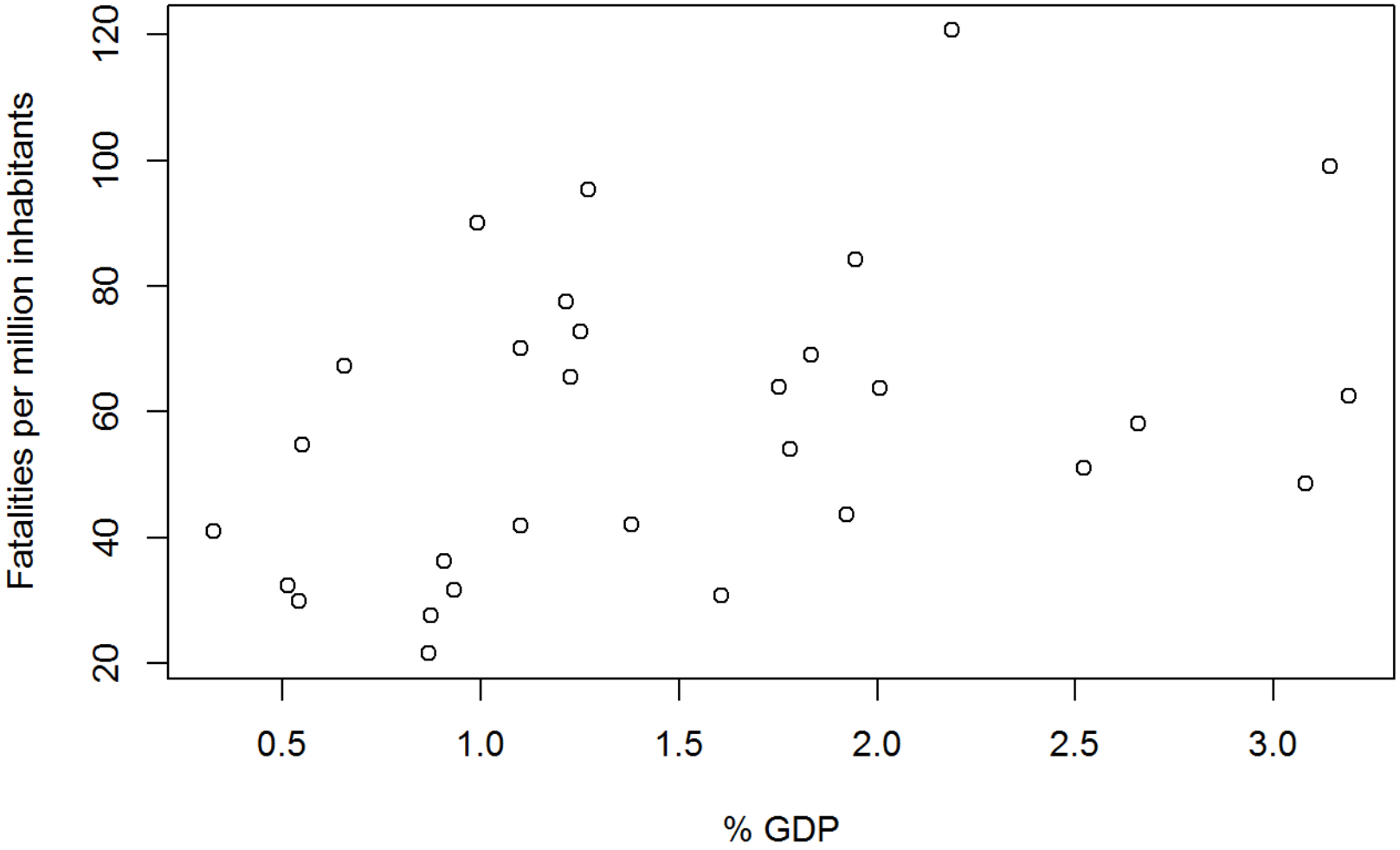
Total costs

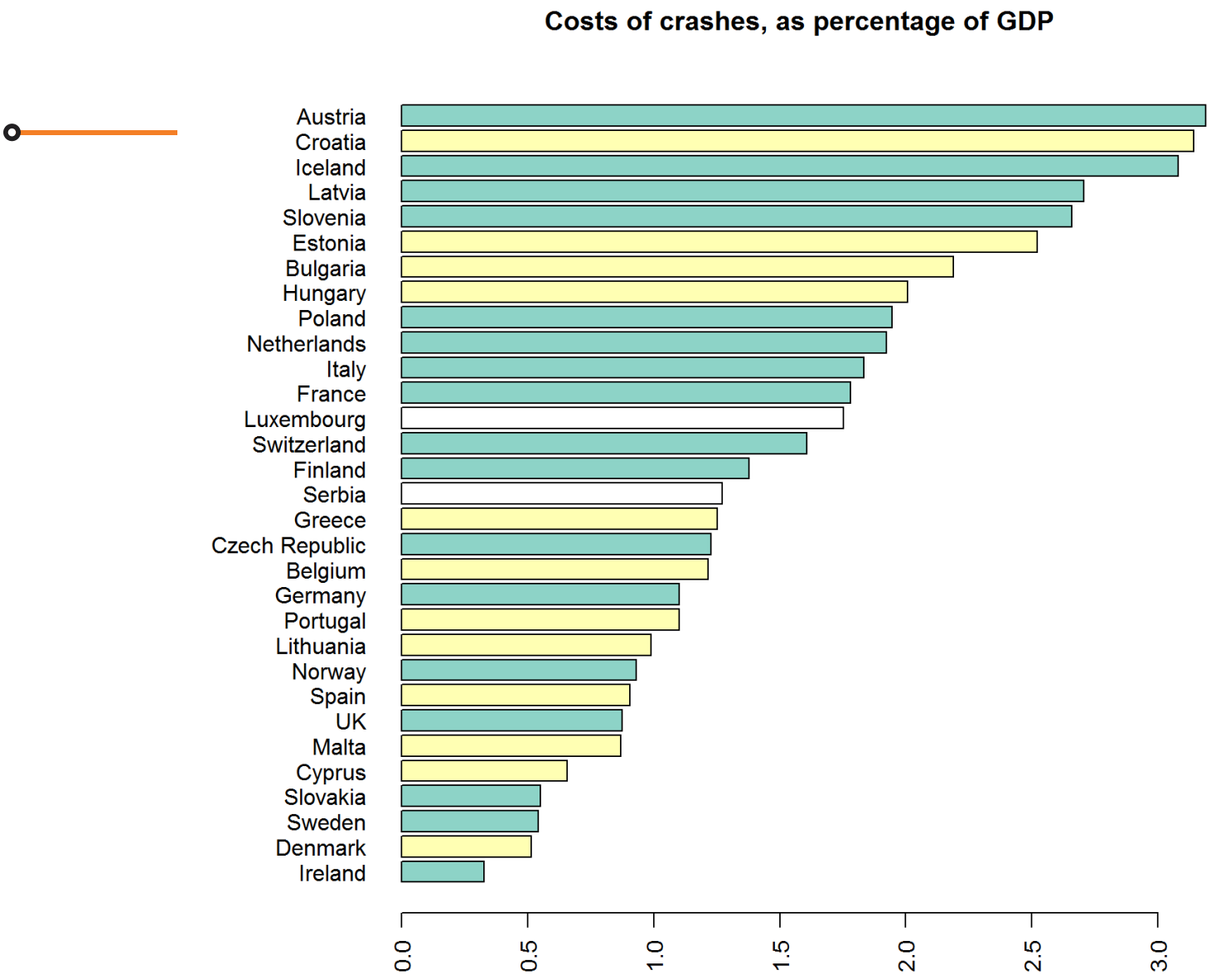

Costs of crashes, as percentage of GDP
Austria
Croatia
Iceland
Latvia
Slovenia
Estonia
Bulgaria
Hungary
Poland
Netherlands
Italy
France
Luxembourg
Switzerland
Finland
Serbia
Greece
Czech Republic
Belgium
Germany
Portugal
Lithuania
Norway
Spain
UK
Malta
Cyprus
Slovakia
Sweden
Denmark
Ireland
0.0
0.5
1.0
1.5
2.0
2.5
3.0

What explains the differences in total costs?

- Road safety level (number of casualties / crashes)
- Methodological issues:
  - *Cost items included*
  - *Methods*
  - *Severity categories included, particularly property damage only crashes*
  - *Correction for underreporting?*

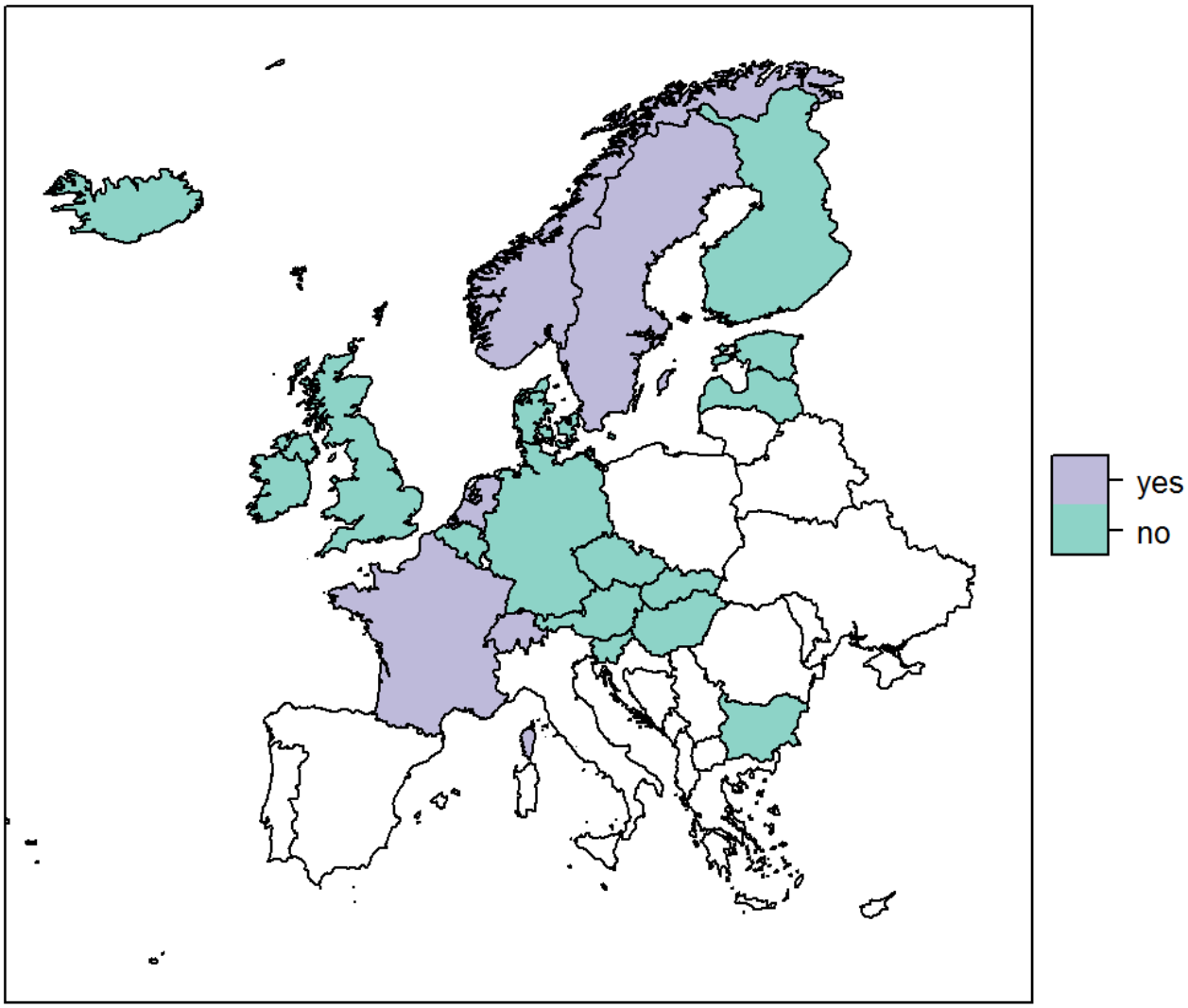
Relation mortality – total cost




Costs of crashes, as percentage of GDP
Austria
Croatia
Iceland
Latvia
Slovenia
Estonia
Bulgaria
Hungary
Poland
Netherlands
Italy
France
Luxembourg
Switzerland
Finland
Serbia
Greece
Czech Republic
Belgium
Germany
Portugal
Lithuania
Norway
Spain
UK
Malta
Cyprus
Slovakia
Sweden
Denmark
Ireland
0.0
0.5
1.0
1.5
2.0
2.5
3.0

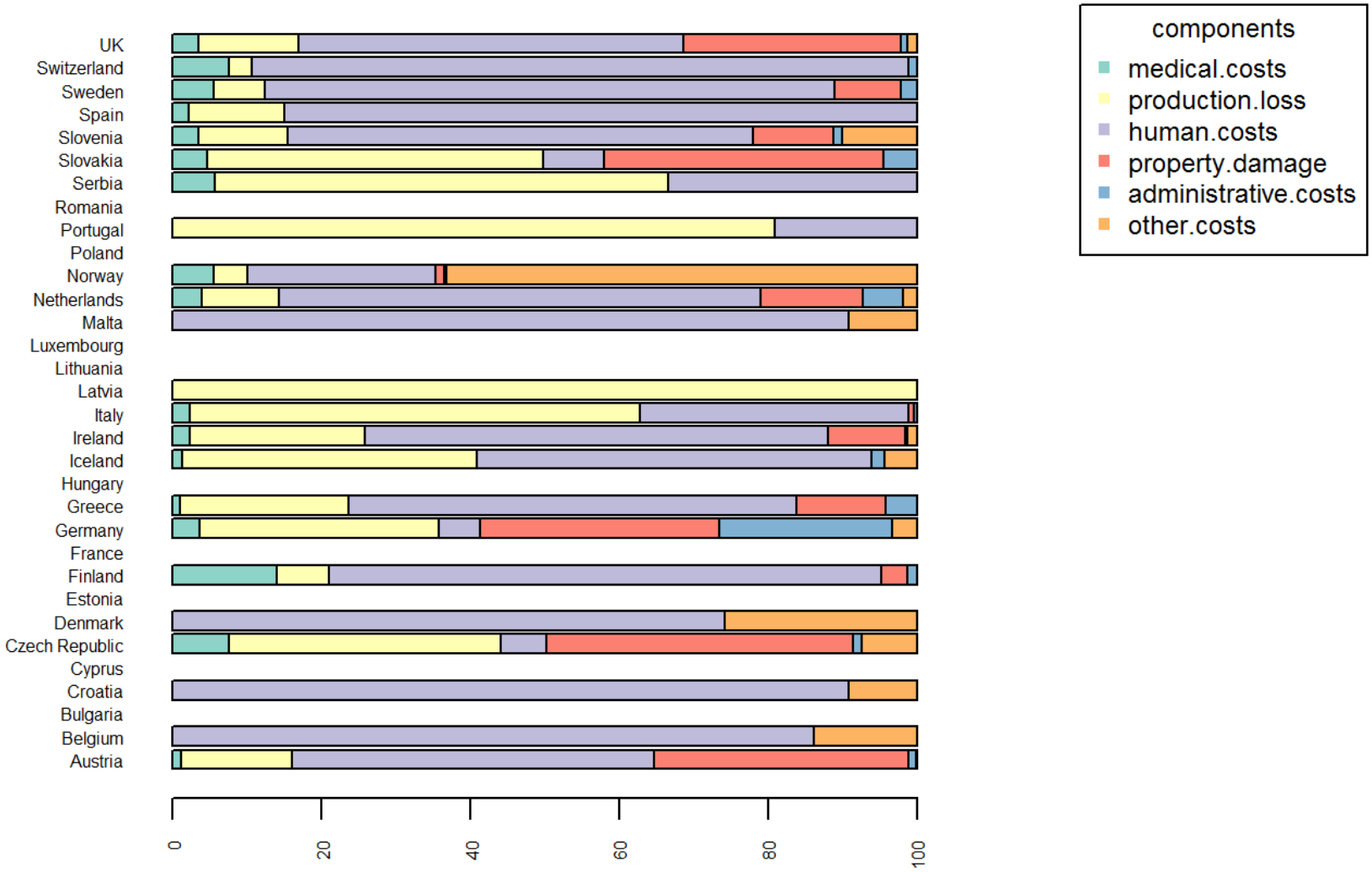
c

Compensation for underreporting of casualties



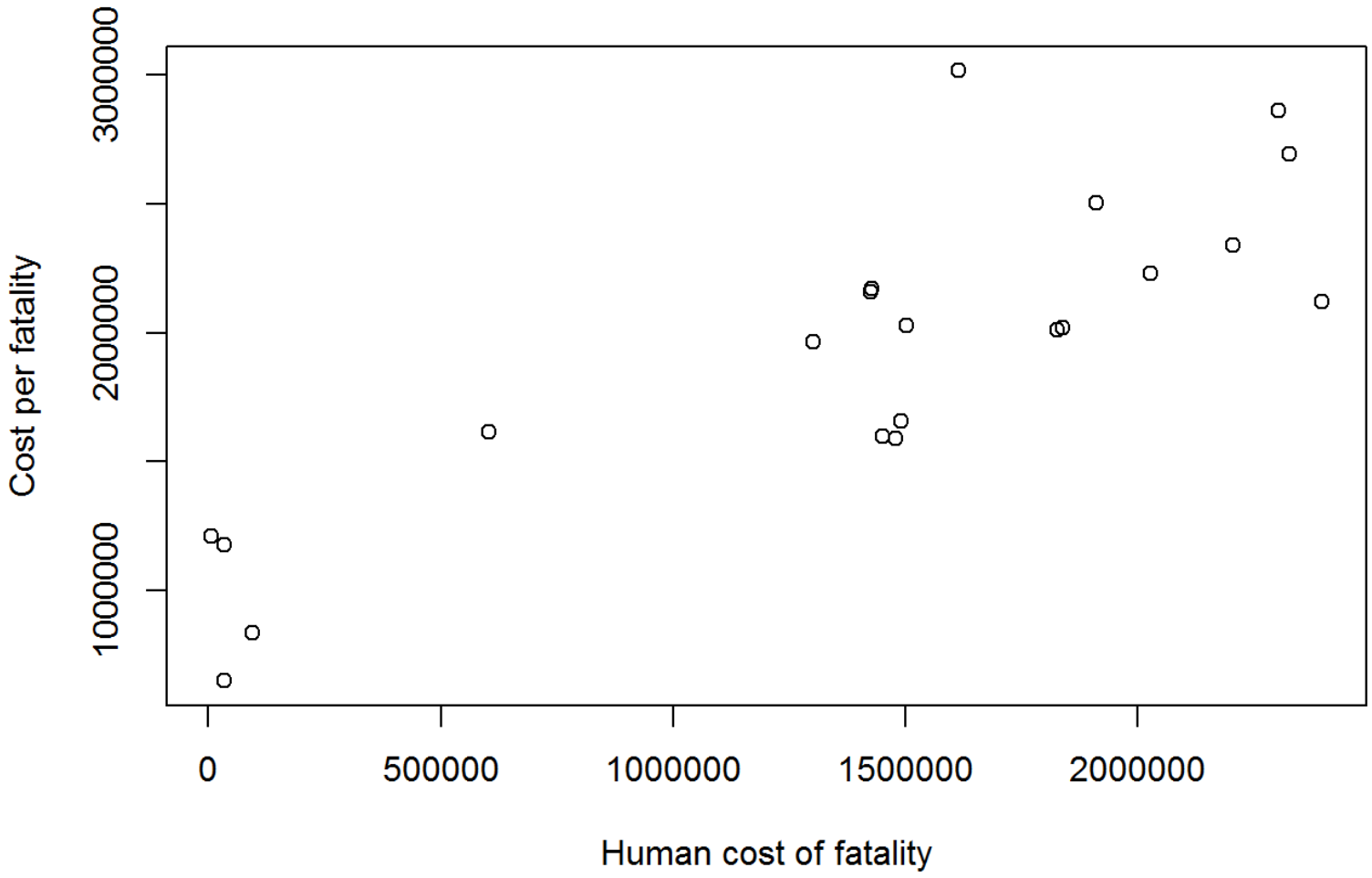
urc_cas

Costs by component



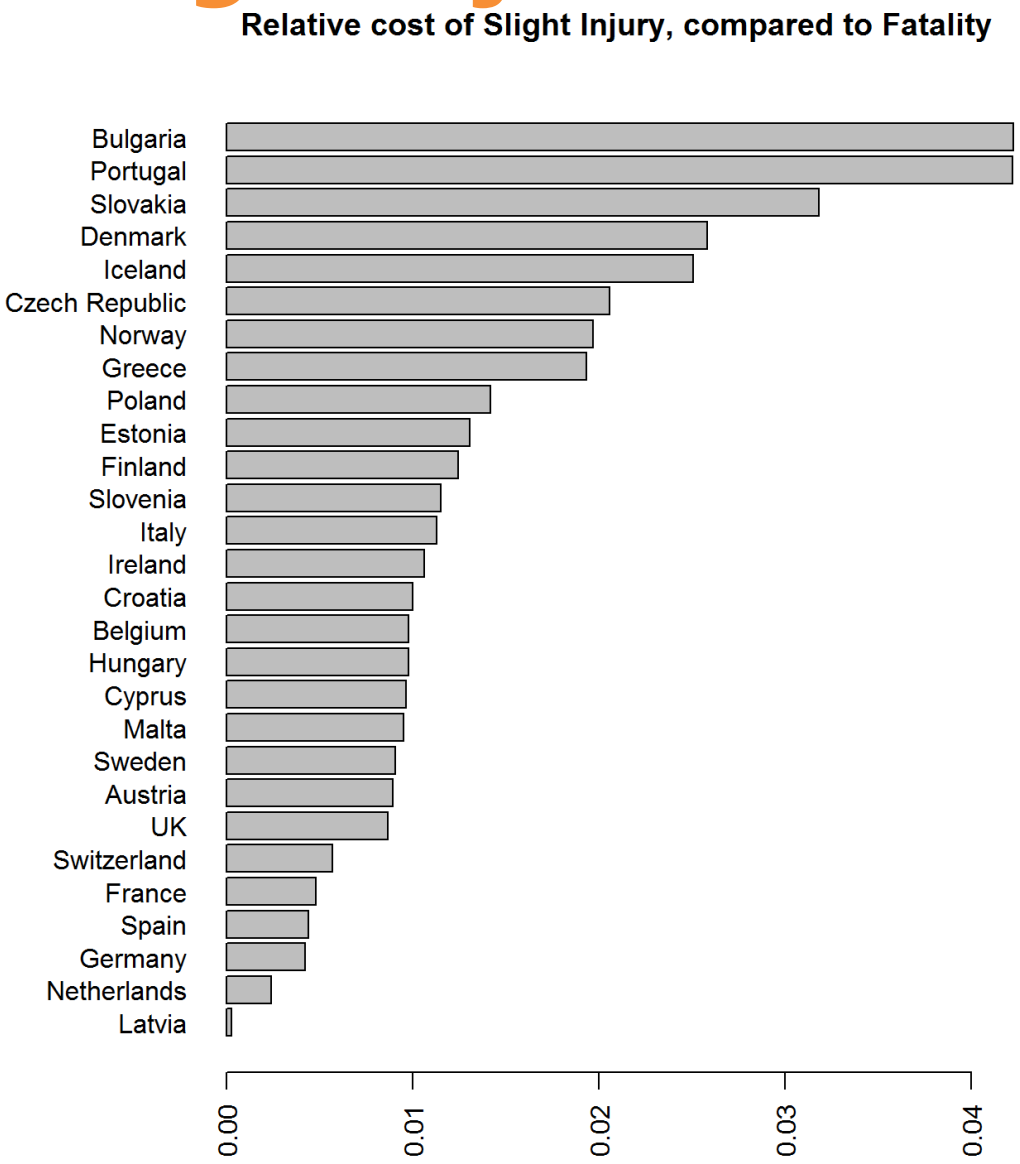
Costs per fatality

Human cost fatalities



Costs of serious injuries

Costs of slight injuries



Total costs by severity

Conclusions

- Official estimates of costs of road crashes in European countries range from 0.5 to 3.8% of GDP
- Costs per fatality range from 0.7 to 3.0 EUR (2015)
- Variations mainly explained by methodological differences:
  - *Different cost components*
  - *Willingness to pay or other method*
  - *Correction for underreporting*
  - *Inclusion of property damage only crashes*
- Harmonization of cost estimates is needed for cost-benefit analysis on EU level

Next steps

- Developing a coherent set of values for cost-benefit analysis
- Value transfer
  - *Adding missing cost components*
  - *Estimating values using methods recommended in guidelines*
- Incorporating all values in the EEA-tool of the SafetyCube Decision Support System

Thank you for your attention!

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