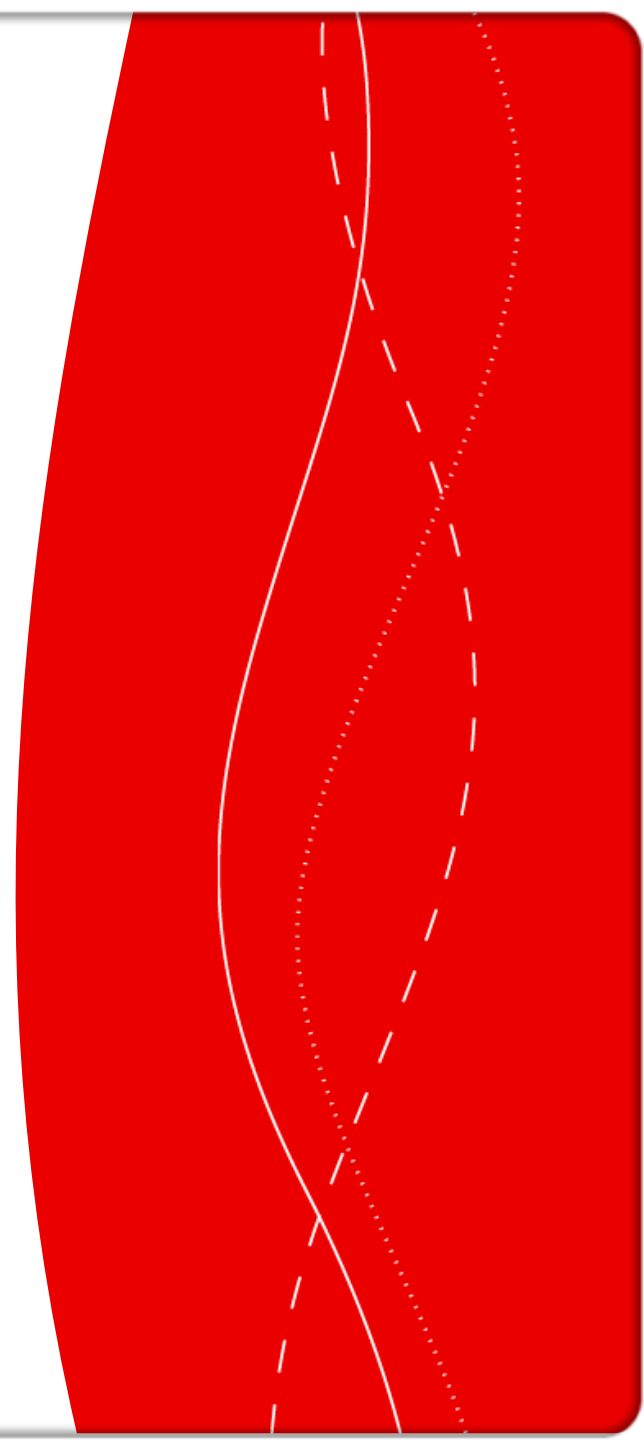




## **Vision zero and Vulnerable road users**

Magnus Hjalmdahl  
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# VTI

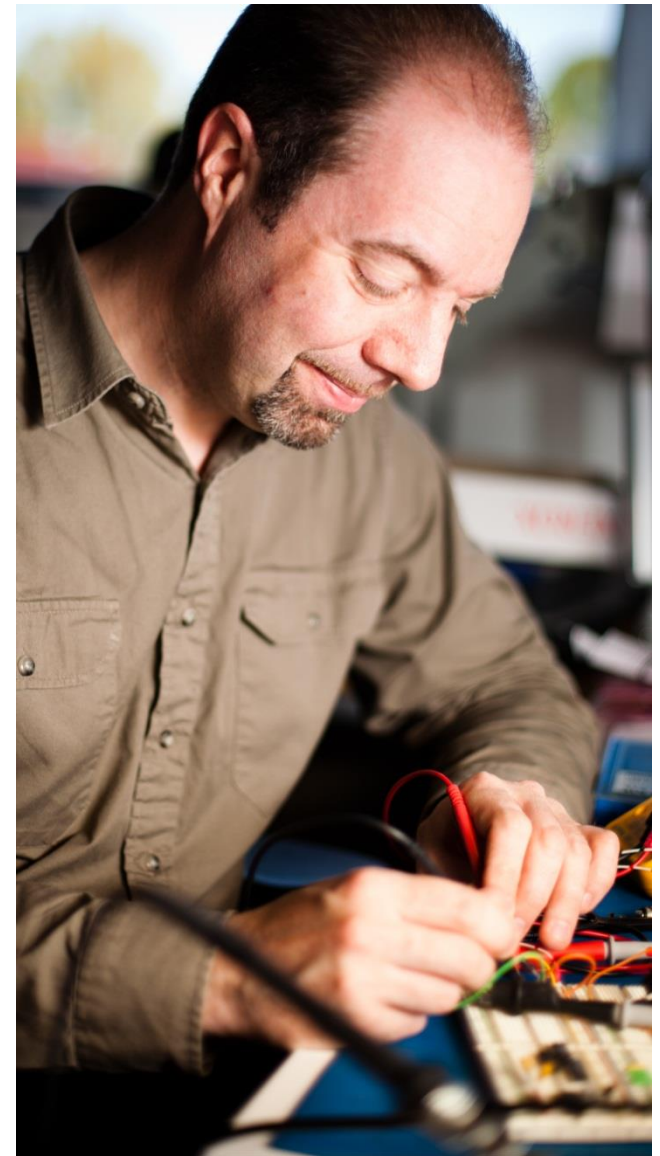
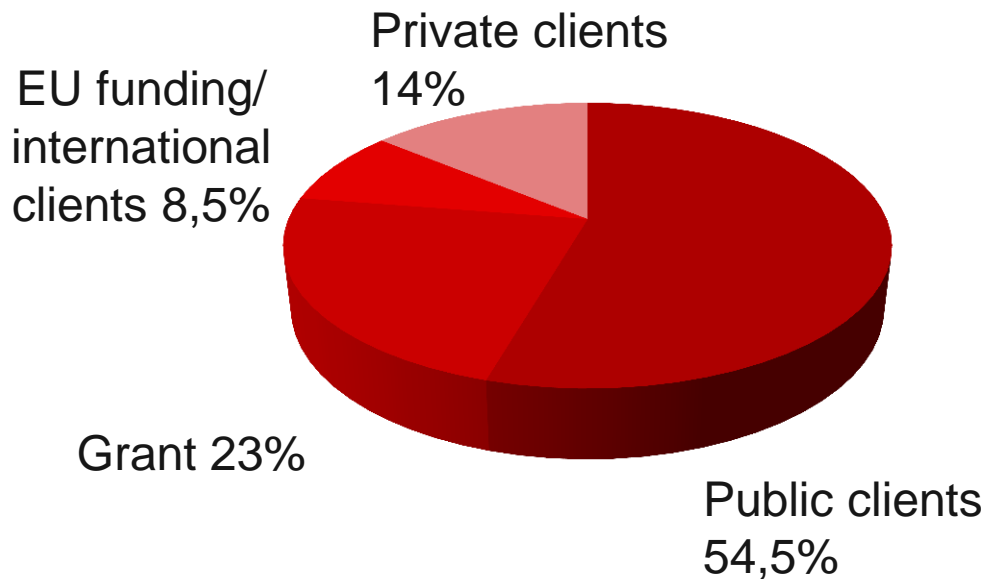
## Swedish National Road and Transport Research Institute

- is an assignment-based authority under the Ministry of Enterprise, Energy and Communications.
- founded 1923



# Services

- Research and development
- Measurement and testing
- Consultancy services
- Courses, seminars and conferences
- Library and information services



# The Vision Zero

No deaths or serious injuries on Sweden's roads

Responsibility on system design

Road Traffic Safety Bill accepted by parliament in 1997

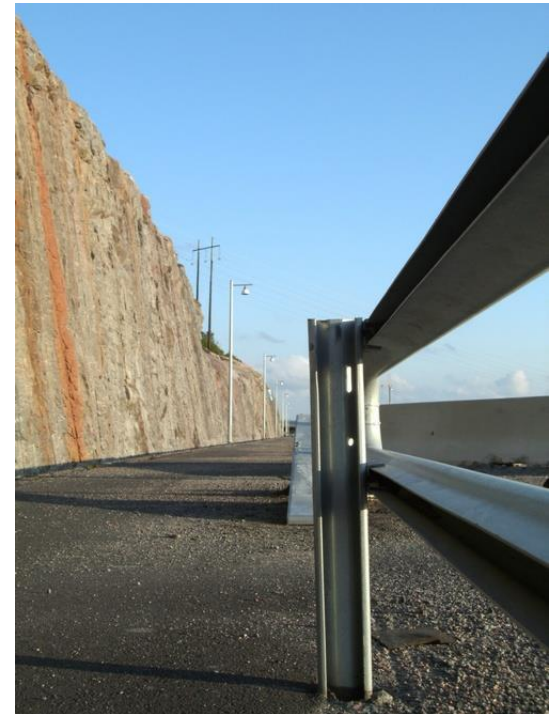


Photo: Hejdlösa bilder (left), Mikael Andersson (right)

# Human limitations are the most important factor when designing the road system

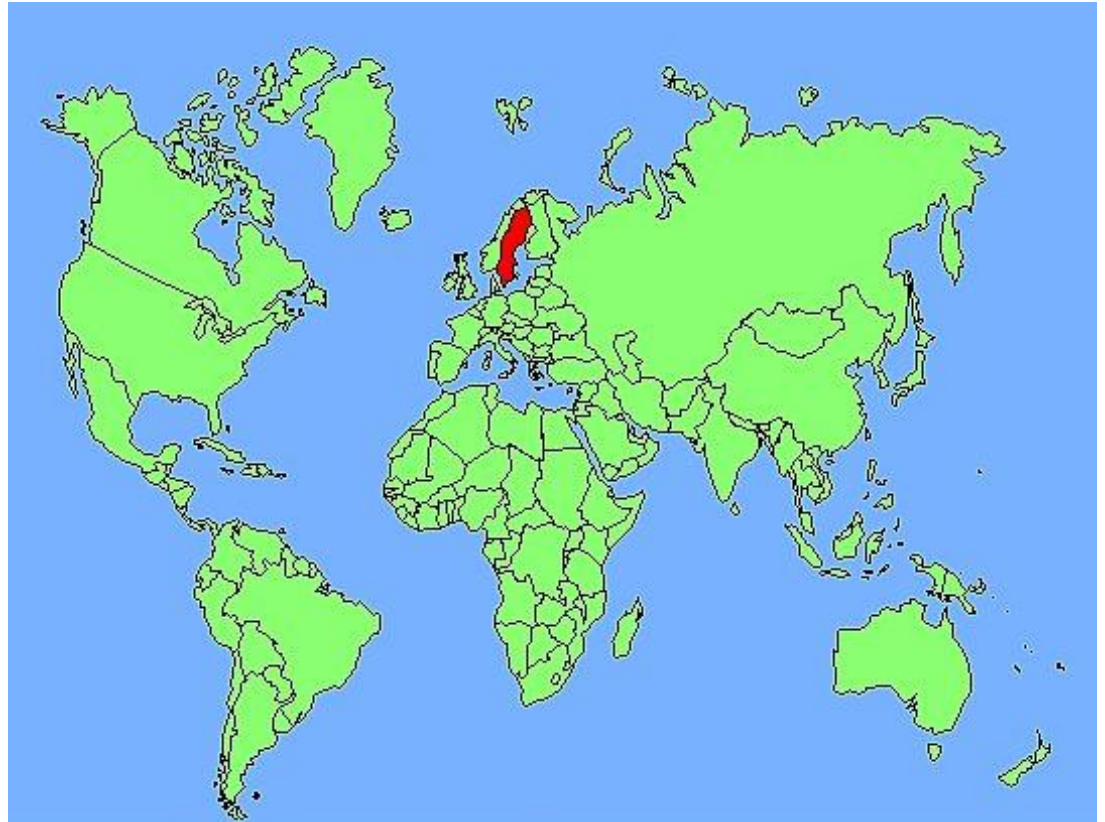
The design of the system should take into account how much force a body can tolerate and still survive:

1. Most unprotected road users survive if a car travelling 30 km/h hits them
2. A safe car can protect occupants up to 50 km/h in a side collision
3. A safe car can protect occupants up to 70 km/h in a head-on collision

## Some statistics - Sweden

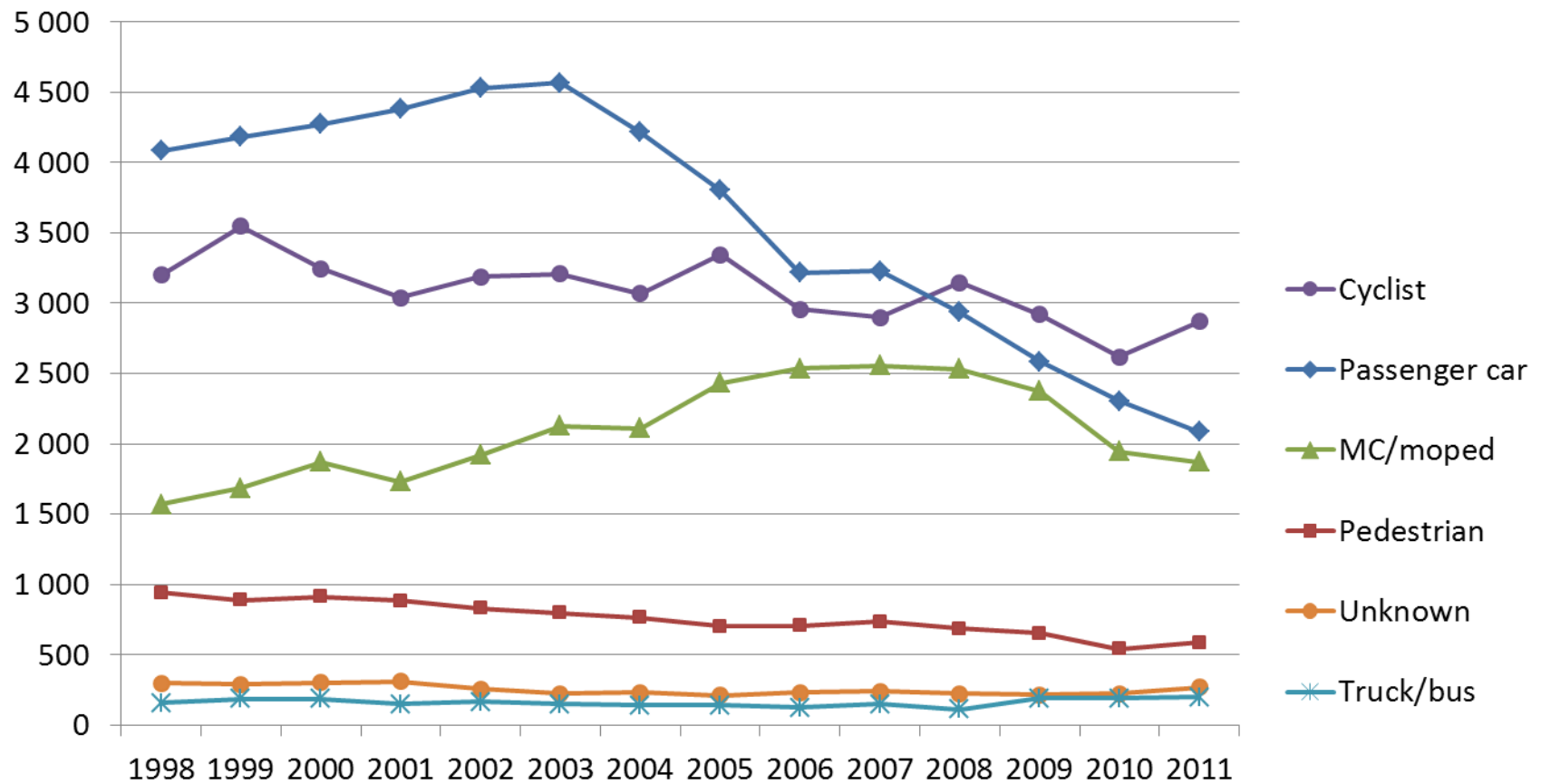
9 000 000 inhabitants

Data from Police  
reported accidents  
and/or Hospital  
reported accidents



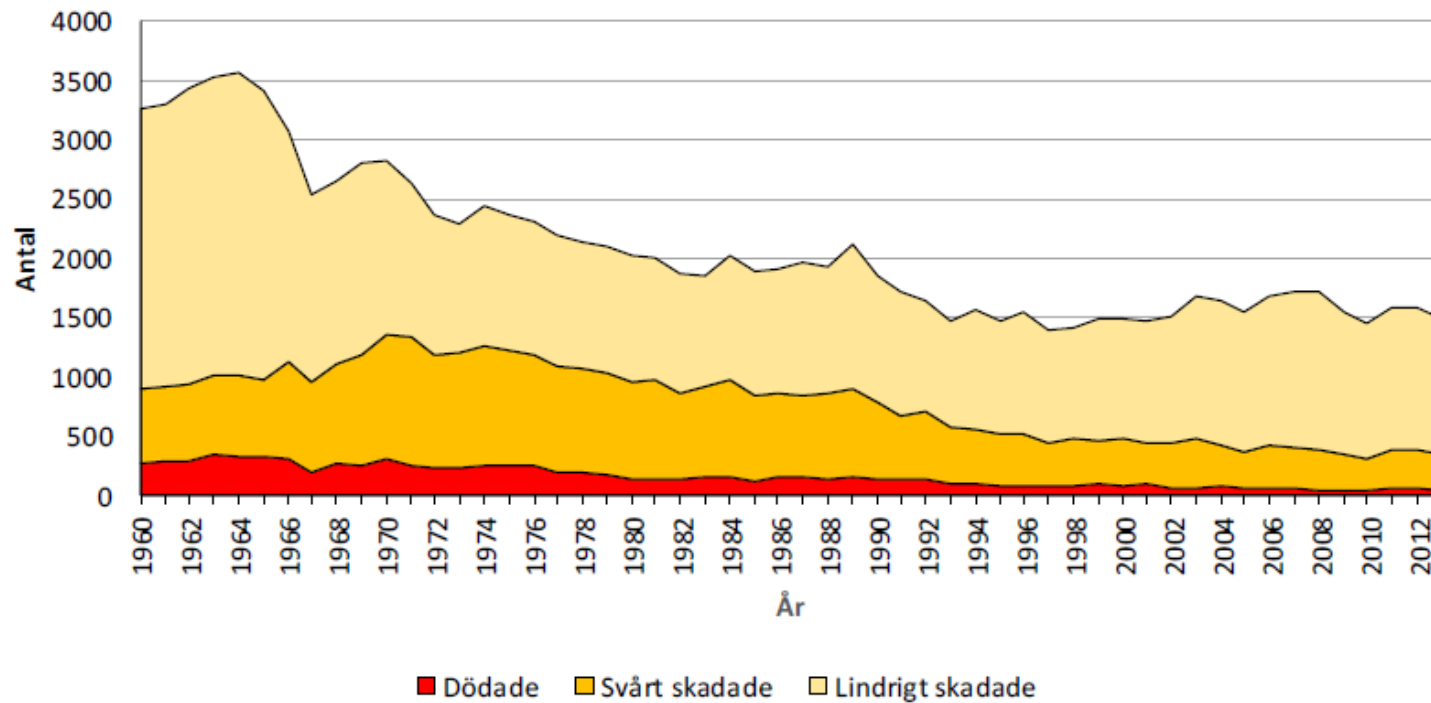
# Hospitalized road users

Number of hospitalized



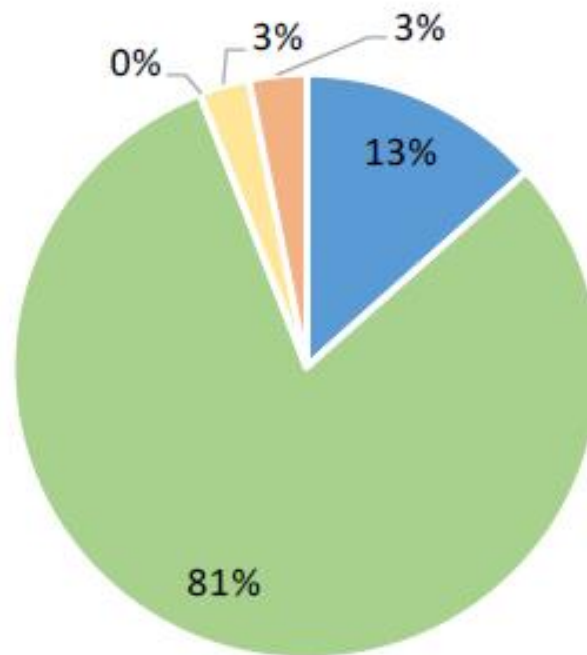
Source: PAR (Hospitalized patients >24 h)

# Killed, seriously injured and injured pedestrians



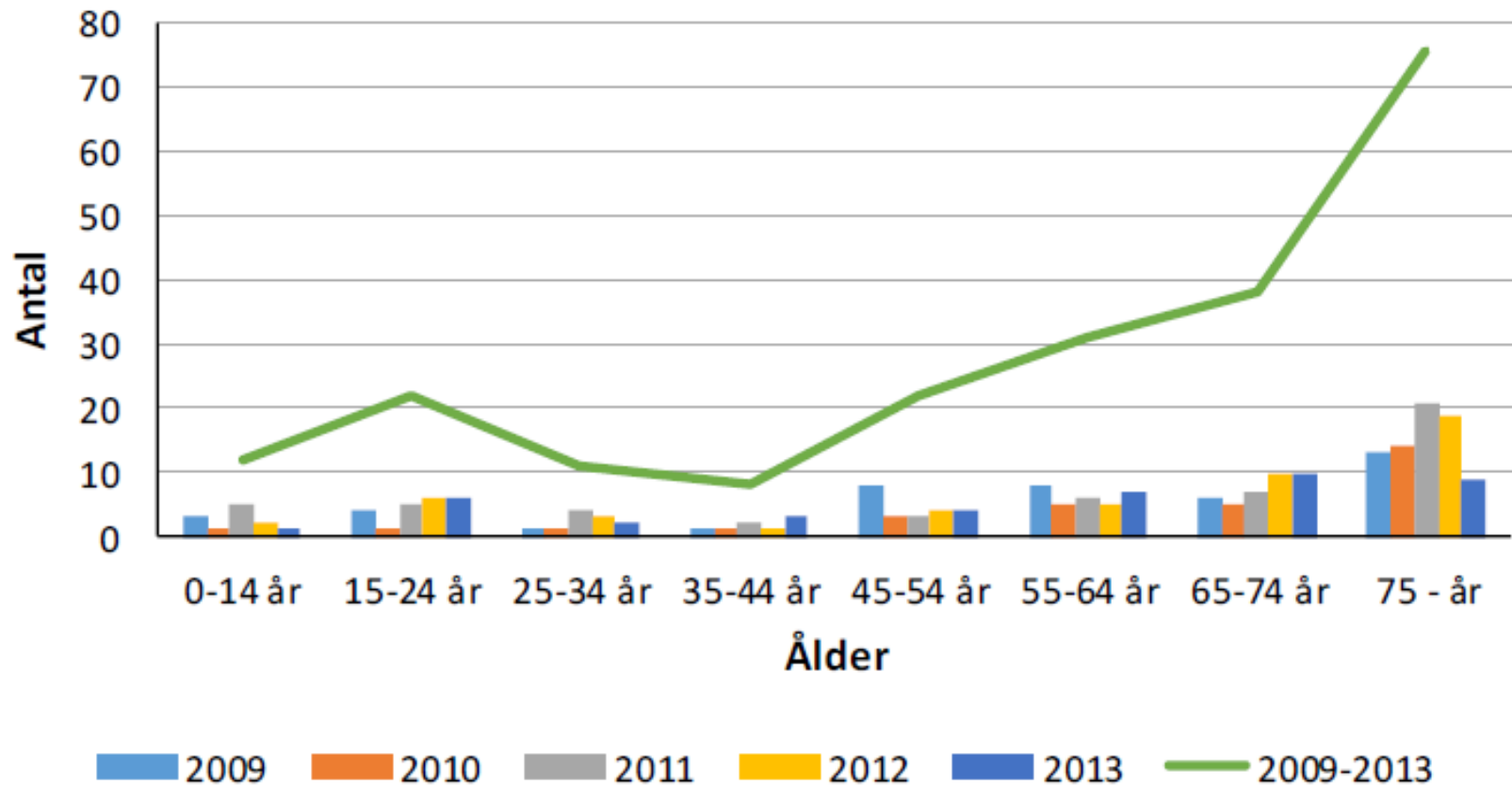


# Killed pedestrians 2009 - 2013

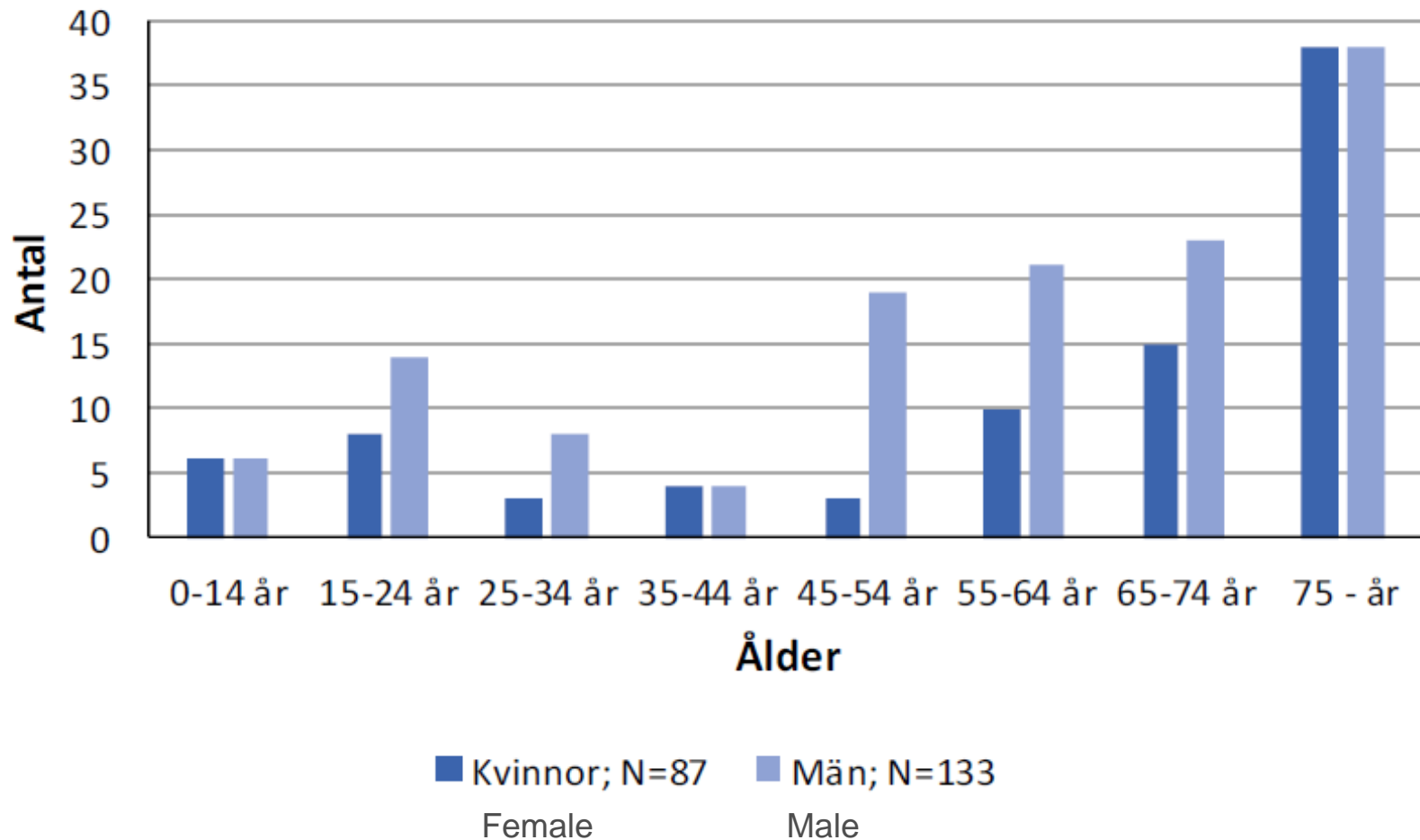


■ Fotg fallolycka n=34   ■ Fotg-Mf n=205   ■ Fotg-Mp n=0   ■ Fotg -C n=7   ■ Fotg-Övr n=8  
Falling accident   Ped - veh   Ped - Moped   Ped - Cycl   Ped - Other

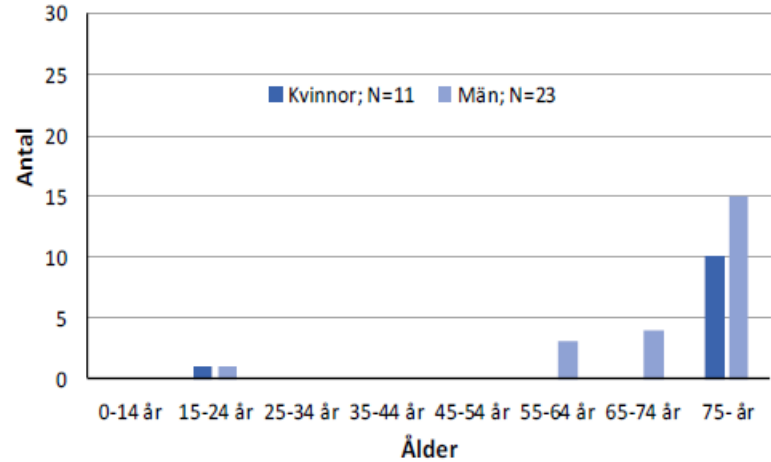
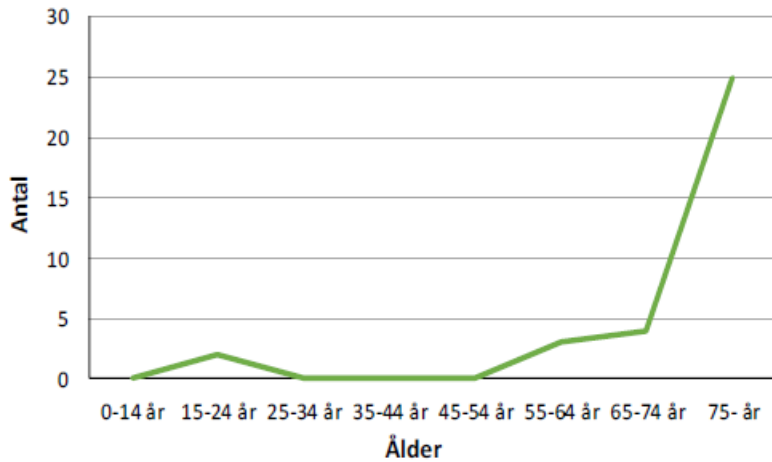
# Killed pedestrians 2009 – 2013 per age group



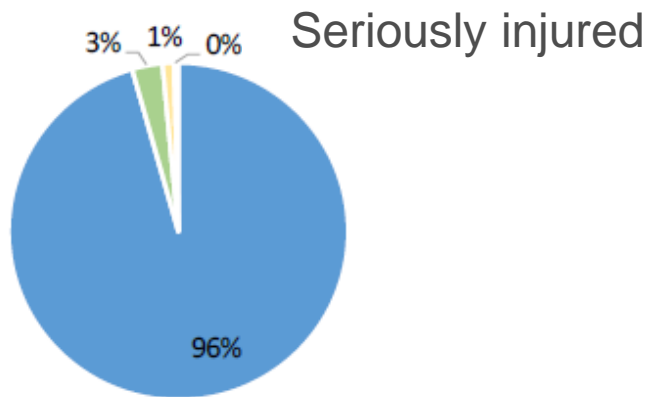
# Killed pedestrians 2009 – 2013 by gender



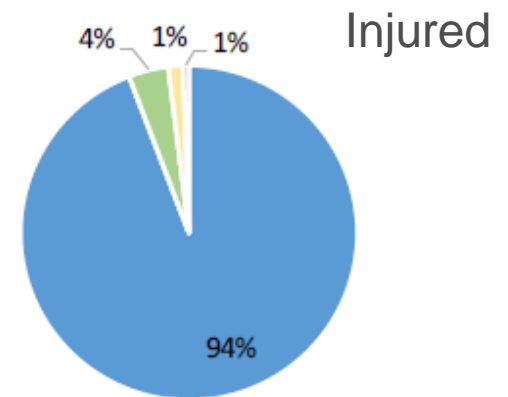
# Killed pedestrians in falling accidents 2009 - 2013



# Seriously injured and injured pedestrians 2009 - 2013



■ Fotg Fallolycka; n=15 831 ■ Fotg - Mf; n=485  
 ■ Fotg - C; n=178 ■ Fotg - Övr; n=68



■ Fotg - Fallolycka; n=62 325 ■ Fotg - Mf; n=2 529  
 ■ Fotg - C; n=921 ■ Fotg - Övr; n=378

Ped falling accident

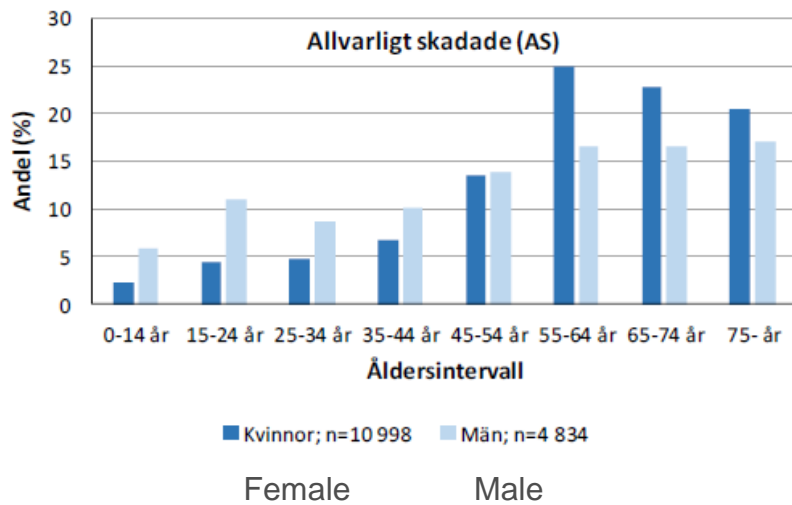
Ped - veh

Ped - Cycl

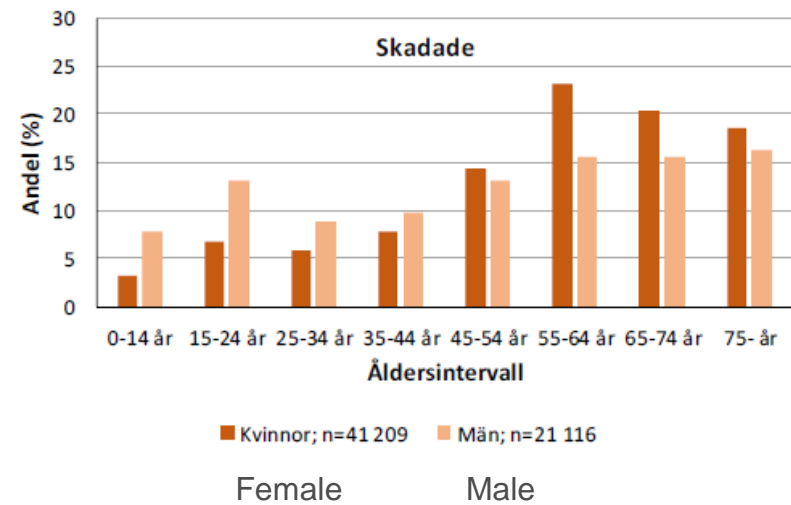
Ped - Other

# Seriously injured in falling accidents by age and gender 2009 - 2013

## Seriously injured



## Injured



# Injured pedestrians in falling accidents by time of day 2009 - 2013

	1.00-1.59	2.00-2.59	3.00-3.59	4.00-4.59	5.00-5.59	6.00-6.59	7.00-7.59	8.00-8.59	9.00-9.59	10.00-10.59	11.00-11.59	12.00-12.59	13.00-13.59	14.00-14.59	15.00-15.59	16.00-16.59	17.00-17.59	18.00-18.59	19.00-19.59	20.00-20.59	21.00-21.59	22.00-22.59	23.00-23.59	
75- år																								
65-74 år																								
55-64 år																								
45-54 år																								
35-44 år																								
25-34 år																								
15-24 år																								
0-14 år																								

## *Conclusions for pedestrians*

- Pedestrians are a vulnerable group in traffic environment
- During a five year period 34 pedestrians are killed in an accident fall and 220 in a collision accident
- Every year, 3,150 pedestrians are severely injured in an accident fall, while only approx. 100 are severely injured in a collision accident with a motorized vehicle, i.e. 30 times more are severely injured in accidental falls compared to a collision accident
- More women than men as well as more older than younger pedestrians are severely injured
- Many pedestrians are injured in accidental falls on pavements and foot/bicycle paths
- For pedestrians slipping on ice/snow is the most common cause of an accidental fall in traffic environment
- Accidental falls, not collision accidents, are thus the greatest problem for pedestrians in traffic environment



## ***Recommendations – a few general suggestions for future actions***

- The actual speed where pedestrians and vehicles interact must be low, 30 km/h ideally but 40 is better than 50 or 60.
- Pedestrians killed in an accidental fall in traffic environment should be further examined using a similar approach as the one used for individuals killed in road traffic accidents
- An accidental fall in traffic environment should be considered as a single “vehicle” accident
- The standard of winter road maintenance of pavements and foot/bicycle paths must be improved.
- A holistic approach shall be used for planning, design, construction as well as maintenance and operation of surfaces of pedestrian areas

# Acknowledgements

Much of the statistics and graphs are from:

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Department of Technology and Society, 295

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Monica Berntman

Pedestrians' accidents and injuries in traffic environment with  
focus on accidental falls

**Thank you for your attention**