

Improving vehicle safety

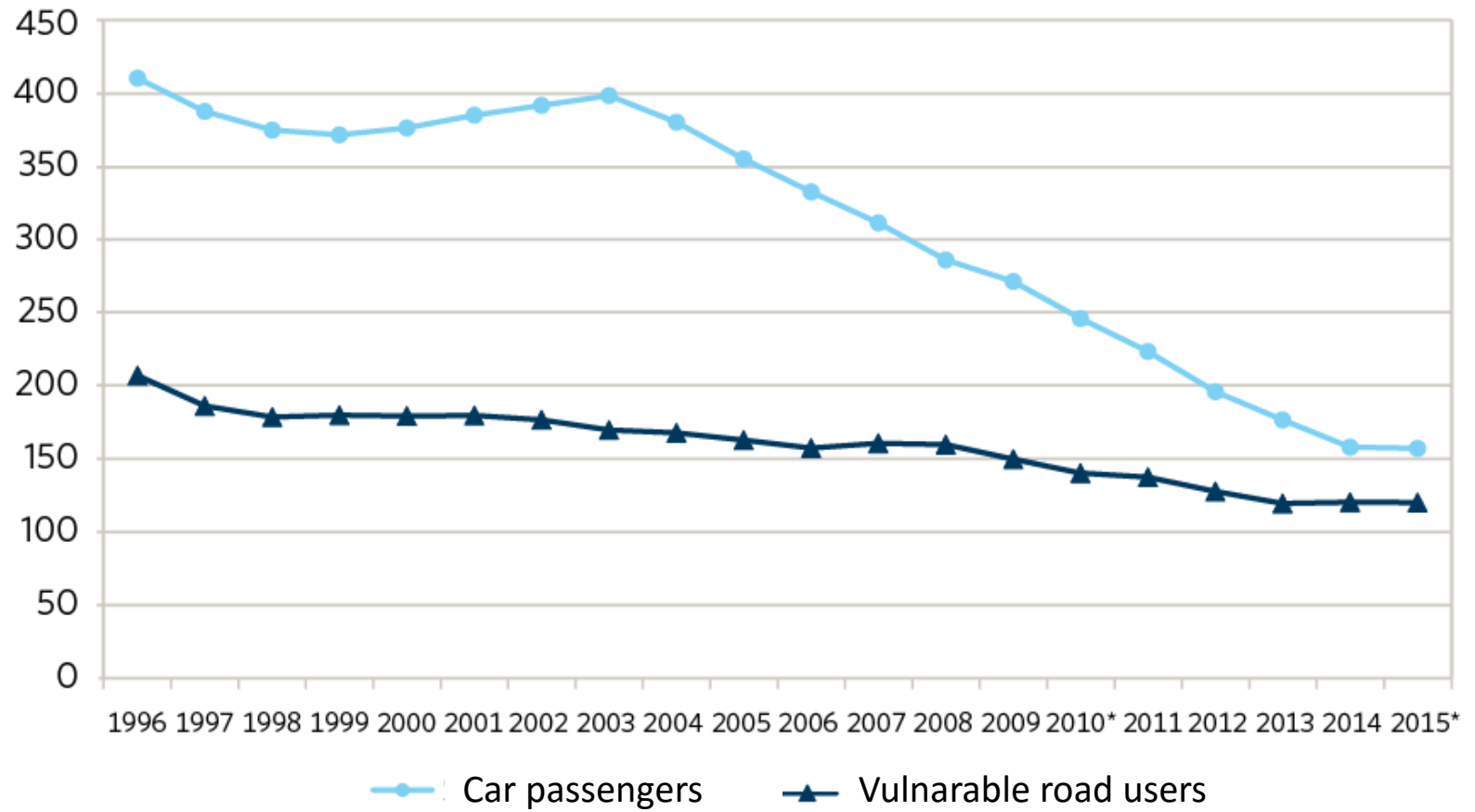


TRAFIKVERKET
SWEDISH TRANSPORT ADMINISTRATION



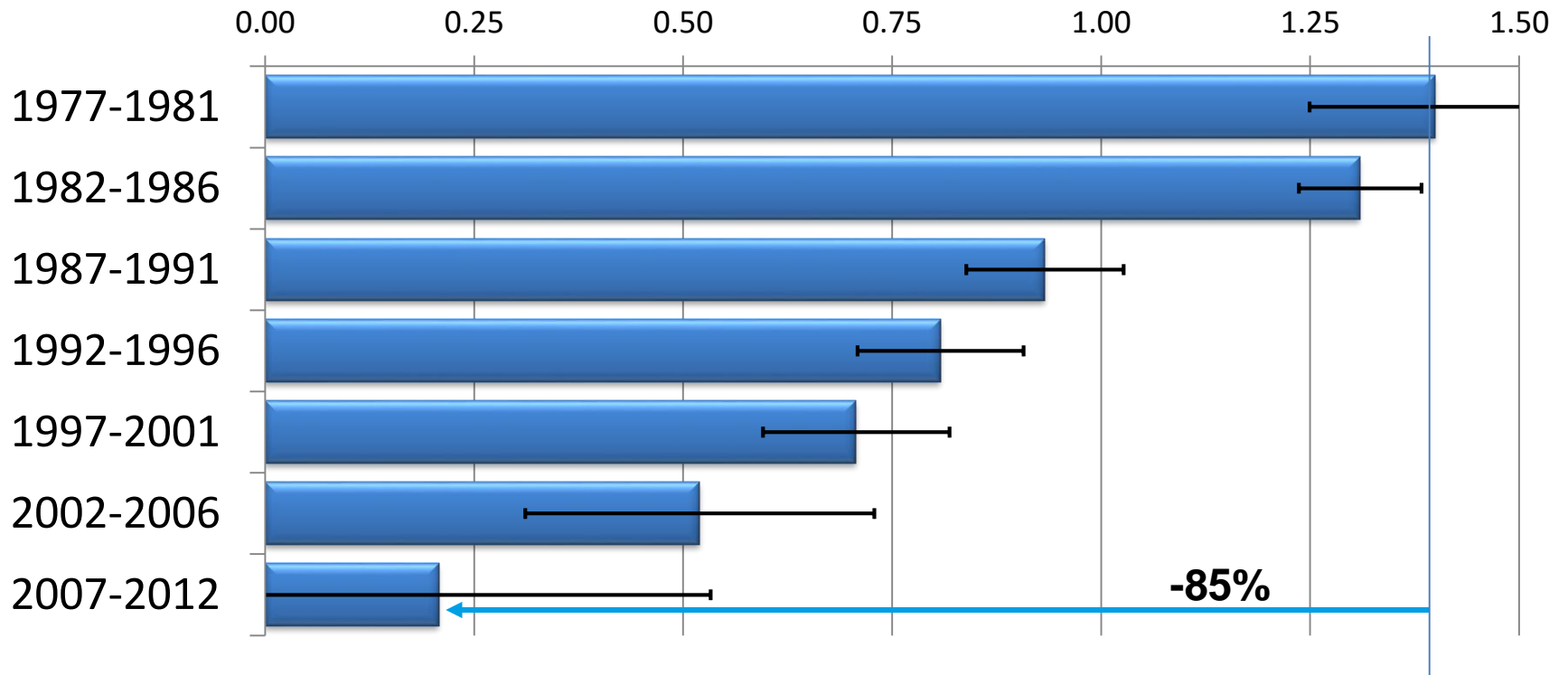
Dr. Johan Strandroth

Road traffic fatalities in Sweden, cars vs. vulnerable road users (five year average)



Improved crashworthiness

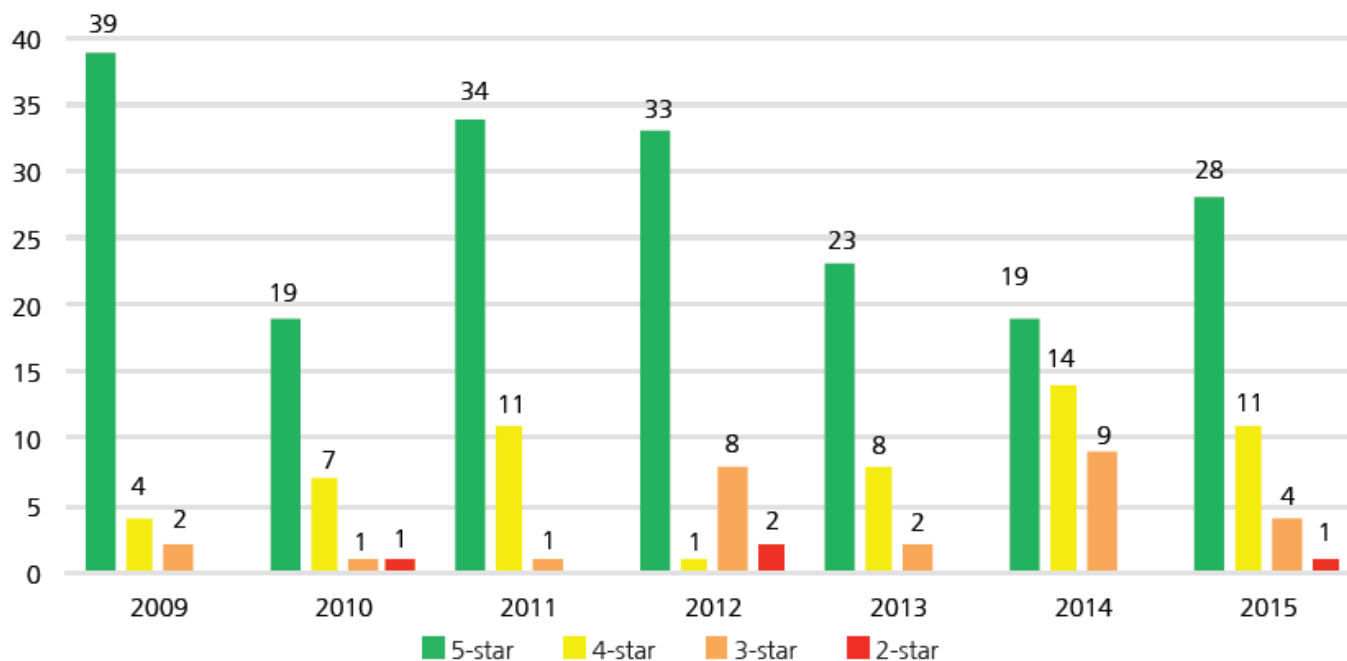
Fatality risk in passenger cars by year of introduction



Folksam Research

Euro NCAP tested car models 2009-2015

Figure 1. Number of Euro NCAP tested car models that scored 5, 4, 3 and 2 stars over the period 2009-2015. No cars tested scored 0 or 1 star.





car occupant protection

child occupant protection

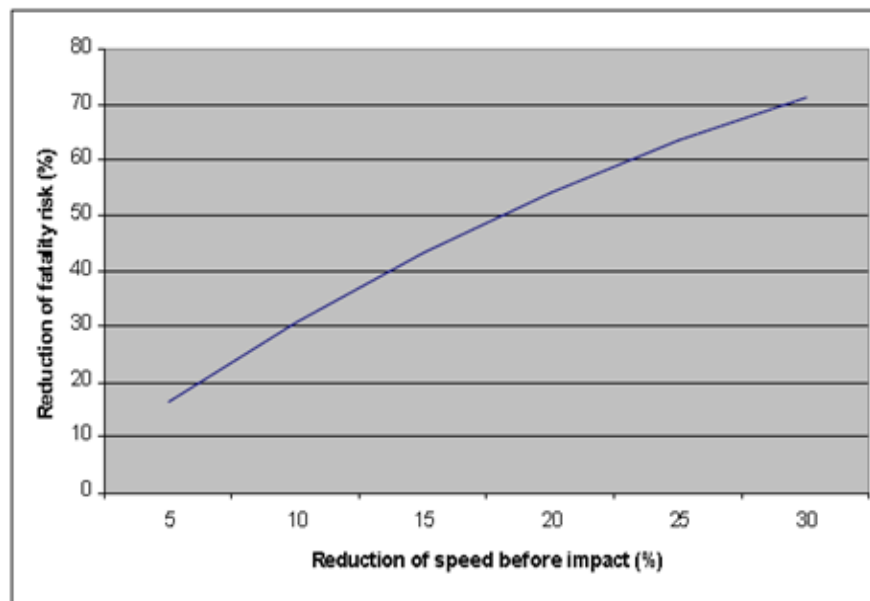
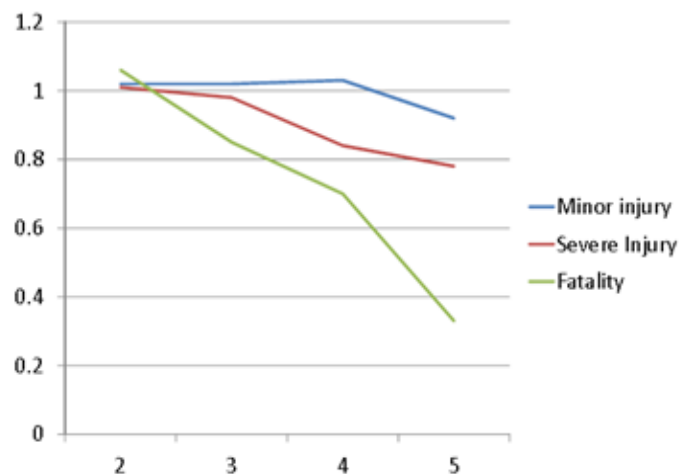
pedestrian protection

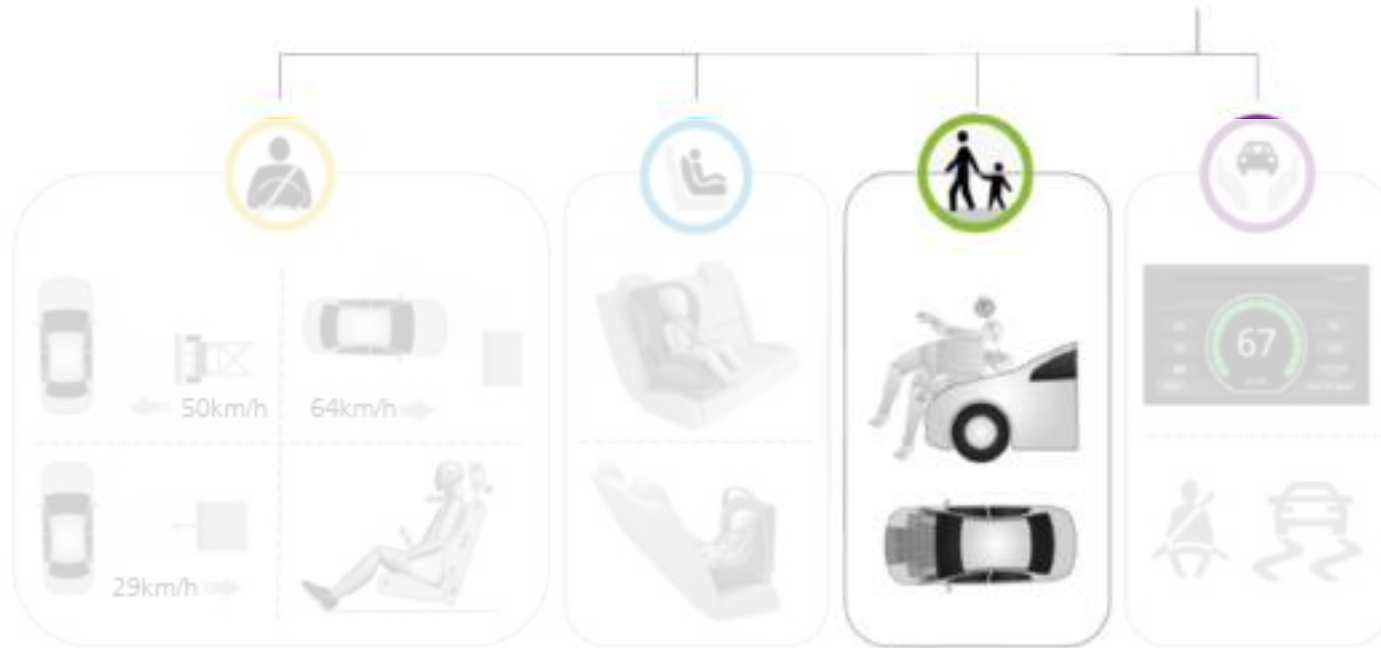
safety assist

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Safety benefits of occupant protection

Kullgren, Lie & Tingvall 2010
Risk vs Euro NCAP stars (occupant protection)





car occupant protection

child occupant protection

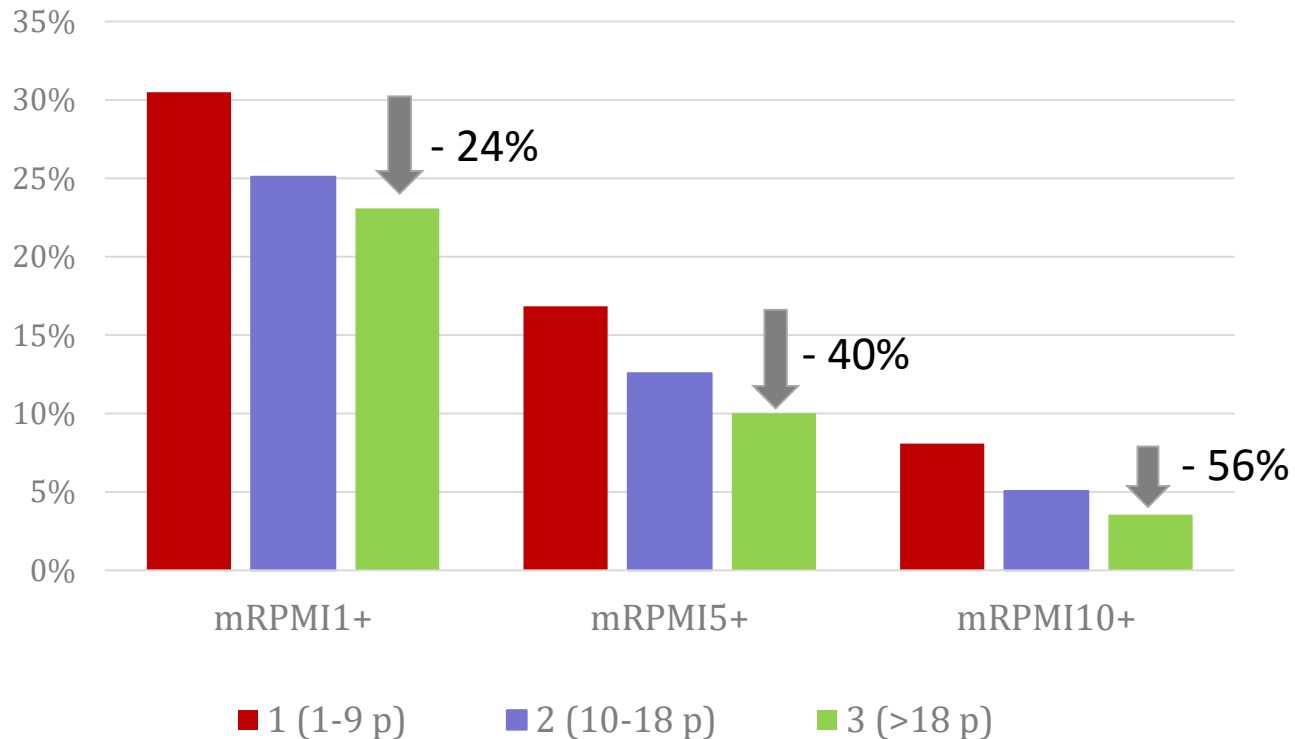
pedestrian protection

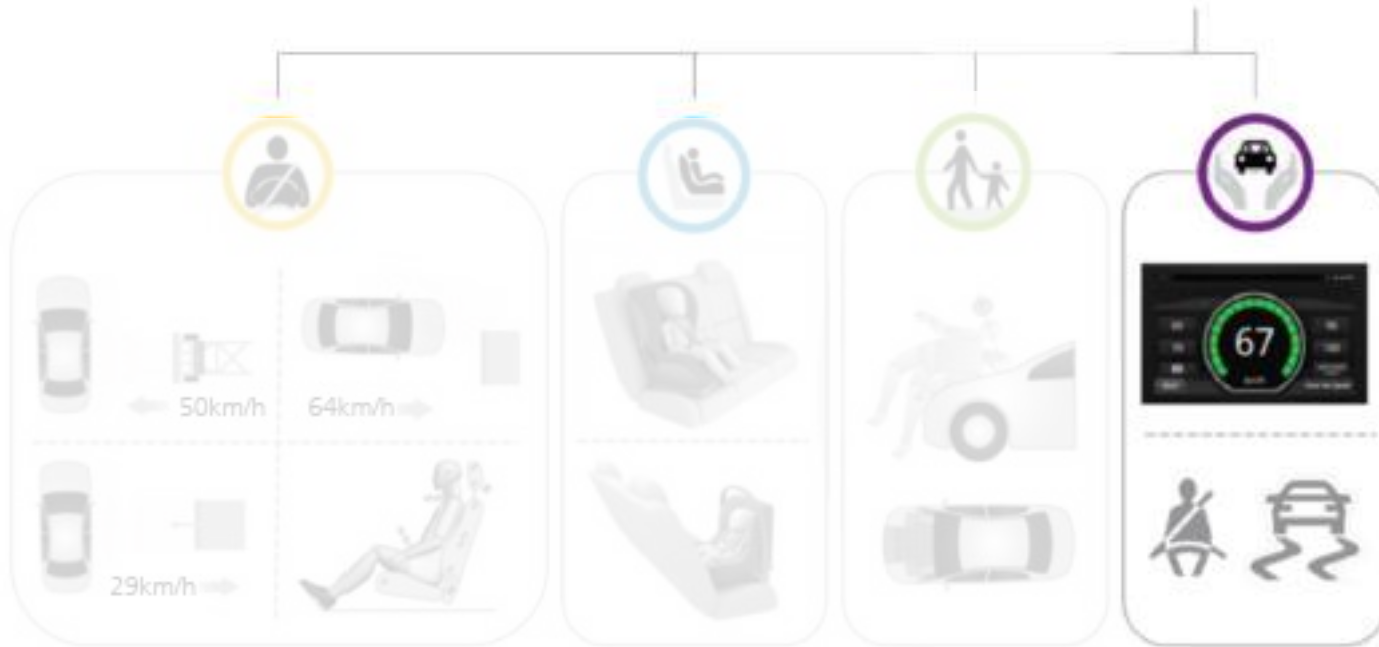
safety assist

© Euro NCAP

Pedestrian protection

mean Risk of Permanent Medical Impairment (mRPMI) on the 1%+, 5%+ and 10%+ levels





car occupant protection

child occupant protection

pedestrian protection

safety assist

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New ADAS (Advanced Driver Assistance Systems) on the market

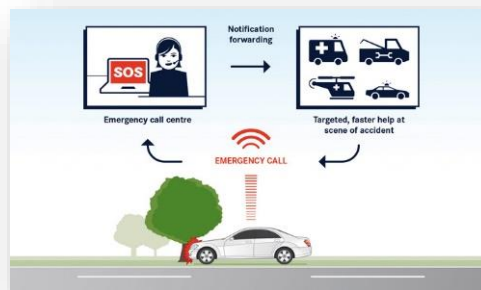
Autonomous Emergency Braking (reversing, crossing, rear-end, VRU)



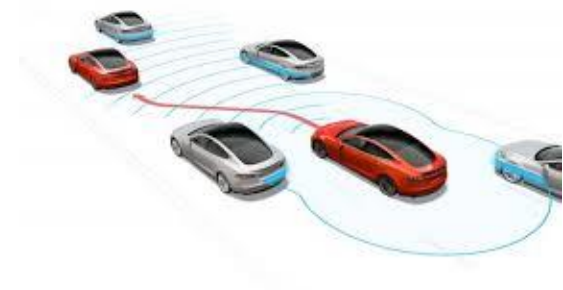
Lane Keeping Assist



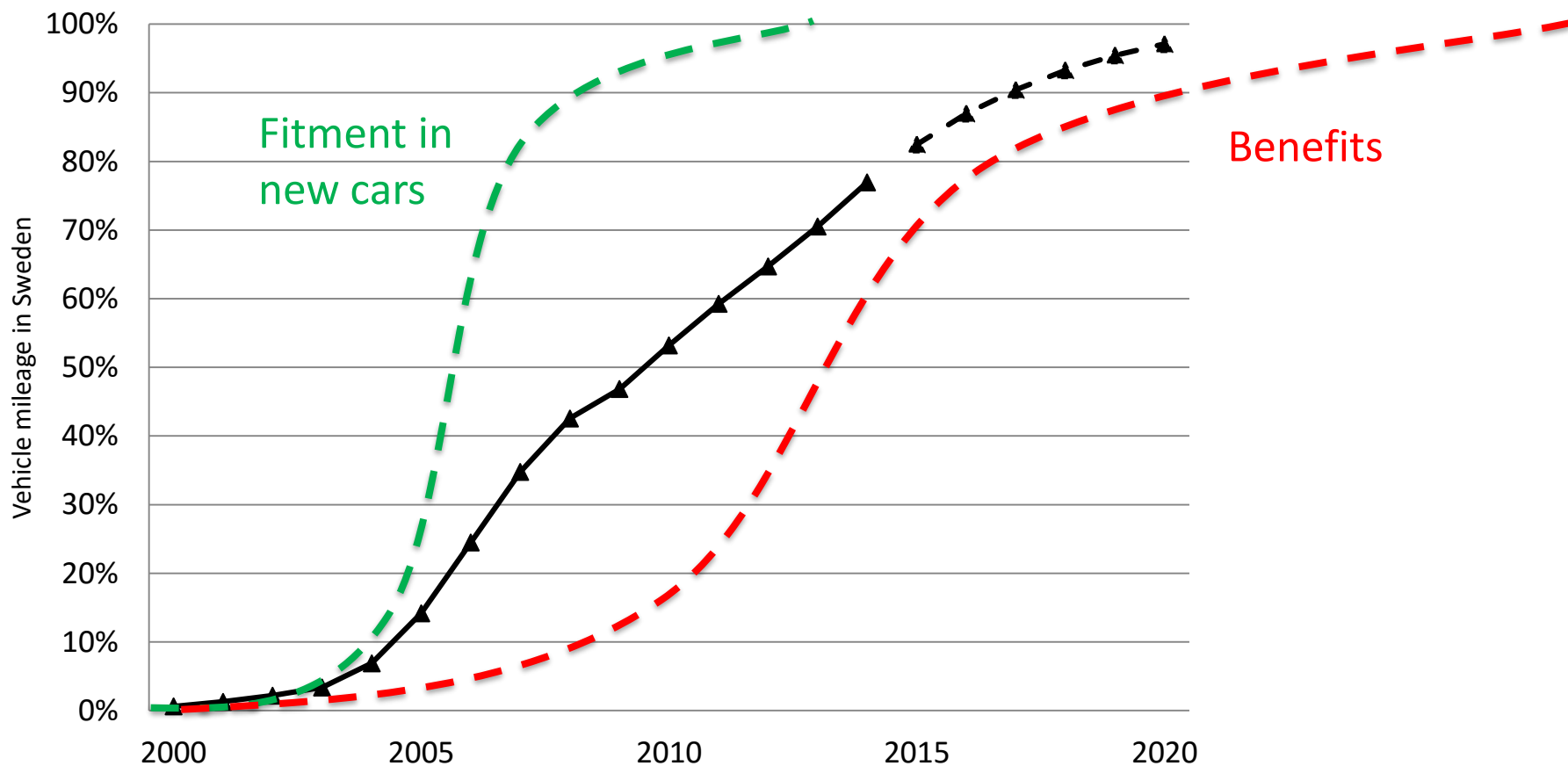
E-call/AACN



Autonomous Emergency Steering

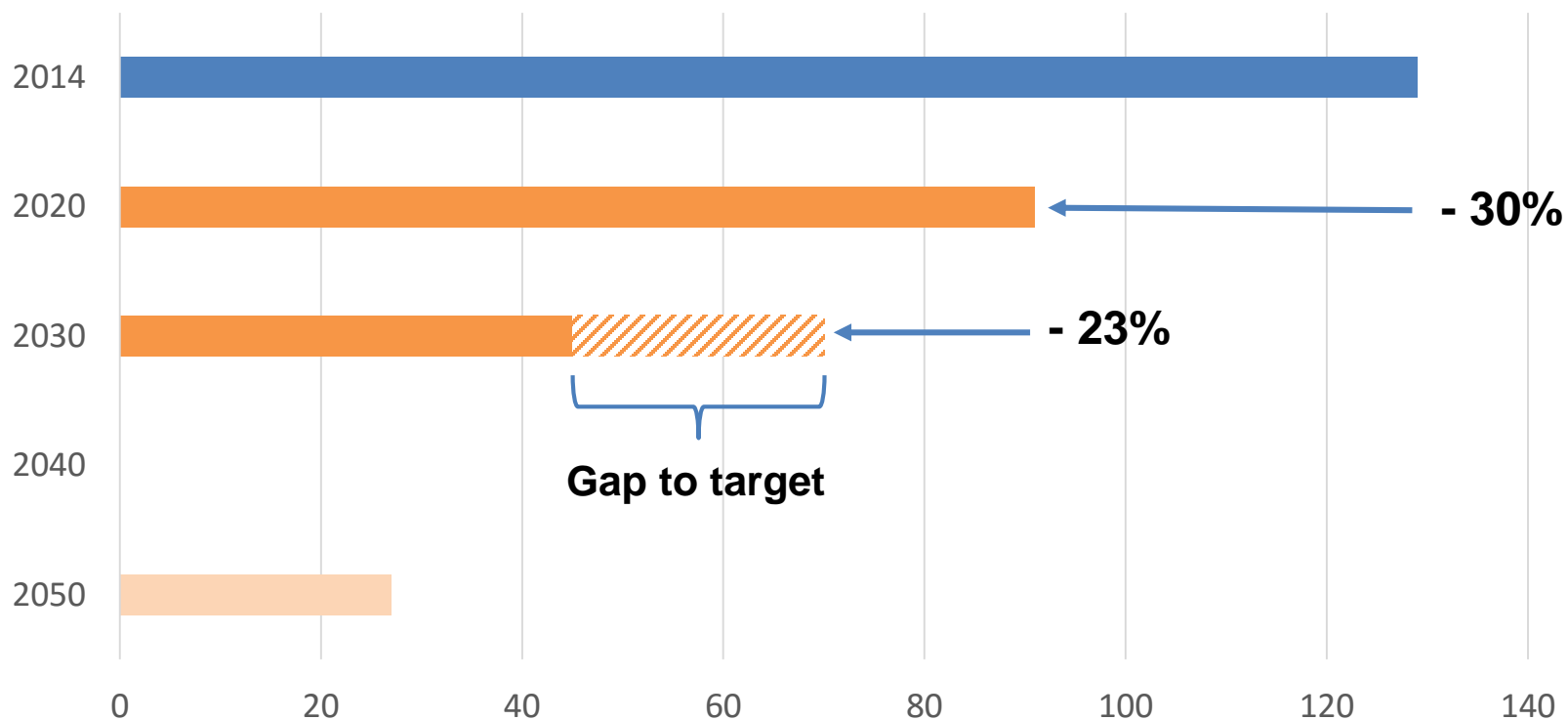


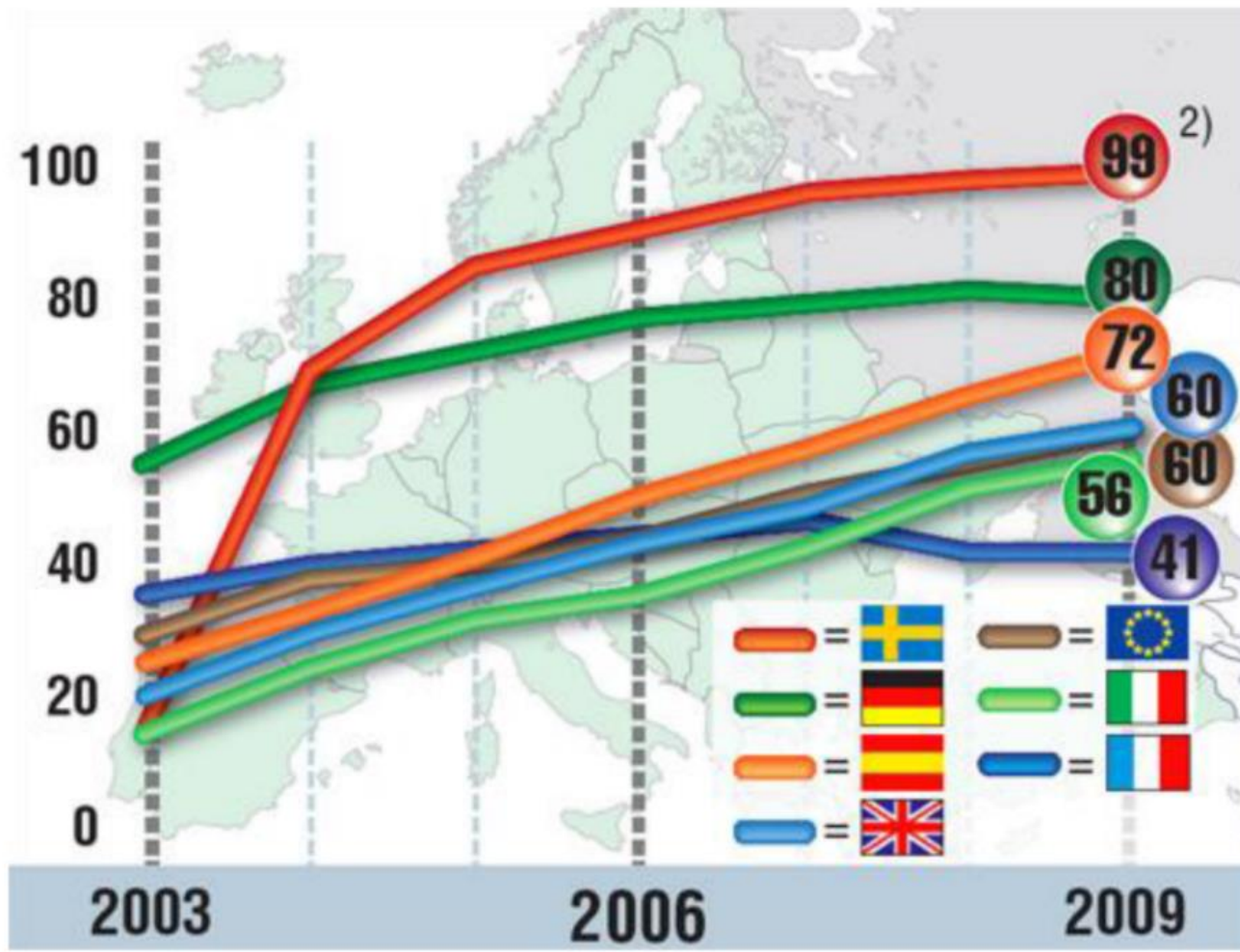
Future effects of vehicle safety indicators



What can we expect in the future?

Passenger car fatalities in Sweden, estimated 2020, 2030 and 2050












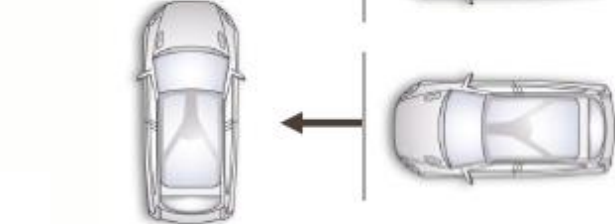












An aerial, top-down view of a multi-lane highway curving through a landscape. The road is dark grey with white dashed lane markings. Several cars are visible on the road. Two cars are highlighted with green circular sensor waves emanating from them, suggesting autonomous driving or sensor-based navigation. The surrounding terrain is rendered in a low-poly, faceted style with shades of green and grey. The overall image has a futuristic, technological feel.

"Our vision is that by 2020 no one should be killed or seriously injured in a new Volvo car."

Håkan Samuelsson,
President and CEO, Volvo Cars

Defining boundary conditions

			Passive	Active
		Head-on		+ 
		Pedestrians		+ 
		Side		+ 
		Rear-end		+ 
		Large animals		+ 

Bringing it together in a safe system approach

~ 95 % injury reduction



Speed management



Autonomous Emergency
Braking and pedestrian
protection



Protective clothing

Ohlin M, Strandroth J, Tingvall C. Combined effects of speed reduction, vehicle frontal design, autonomous emergency braking and helmet use in reducing real life bicycle injuries. Proceedings of the International Cycling Safety Conference 2014, Göteborg, Sweden

Summary

Key points for improved vehicle safety:

- Continuous assessment of new vehicles
- Rapid real life evaluations of ADAS (Advanced Driver Assistance Systems)
- Consumer awareness and other catalysts for implementation
- Collaboration between stakeholders to define boundary conditions and find the most effective way forward
- Holistic approach in defined the future safe system



Thank you for your attention!

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