

How close to zero car fatalities can we get?



TRAFIKVERKET

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Gordon Moore in 1965 said;
"Change will never be this slow again"

The Vision Zero Swedish parliament (1997)

- Long term target is that no one should be killed or receive long term disability

Volvo Cars Vision 2020 (2007)

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



The Vision Zero European Commission (2011)

"By 2050, move close to zero fatalities in road transport. In line with this goal, the EU aims at halving road casualties by 2020. Make sure that the EU is a world leader in safety and security of transport in all modes of transport."

United Nations (2015)



THE GLOBAL GOALS
For Sustainable Development

Vision Zero ≠ Zero Fatalities (At least not only)

Vision Zero = 5 dimensions (or more?)

1. Ethical platform
2. Vision for many stakeholders
3. Driving force for change
4. Shared responsibility
5. Safety philosophy



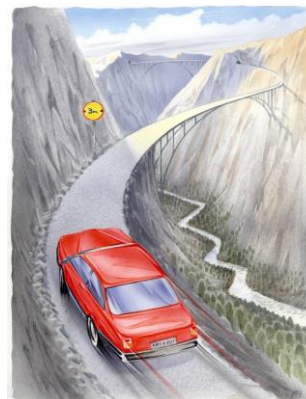
We are blind to speed, not to height

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SWEDISH TRANSPORT ADMINISTRATION

Vision Zero Safety Philosophy

1. Severe injuries not crashes
2. Humans make errors, mistakes and misjudgements
3. Humans have a biomechanical tolerance
4. Energy control is key
5. Eliminations is the target (backcasting)

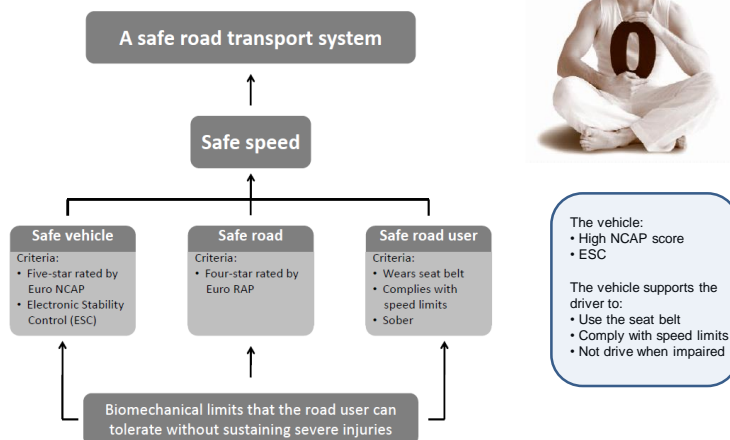


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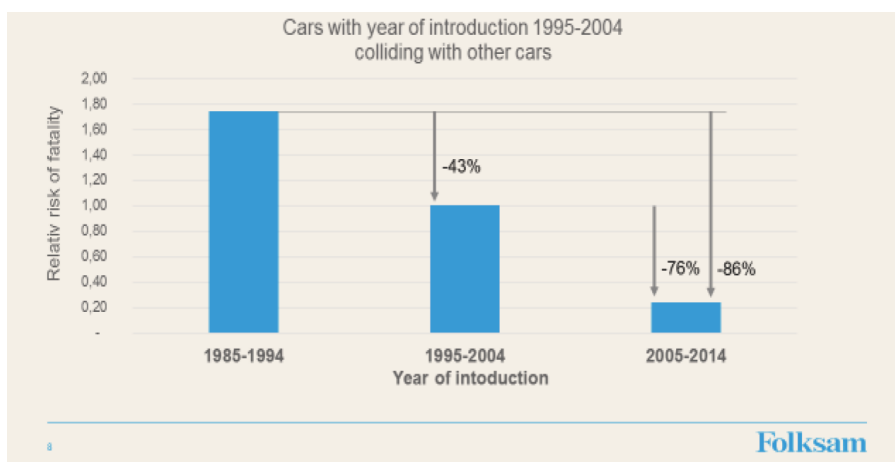
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Vision Zero model for safe traffic



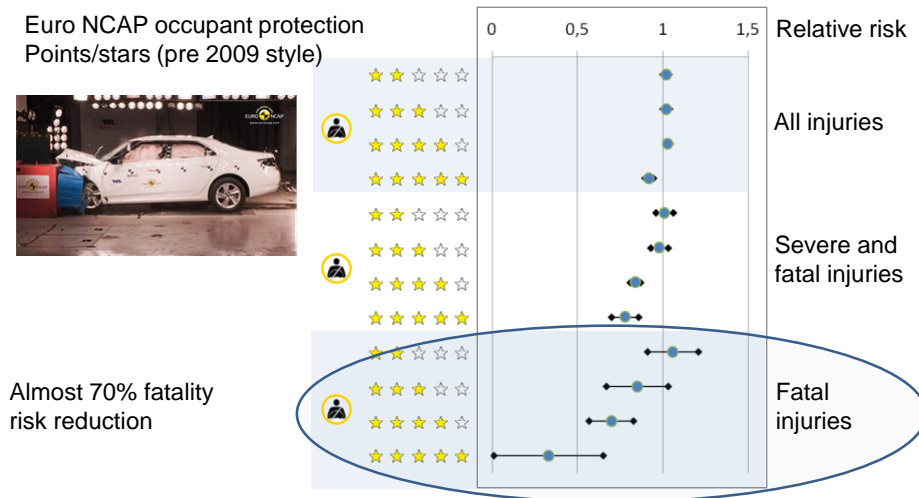
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Crashworthiness - fatality risk for car occupants



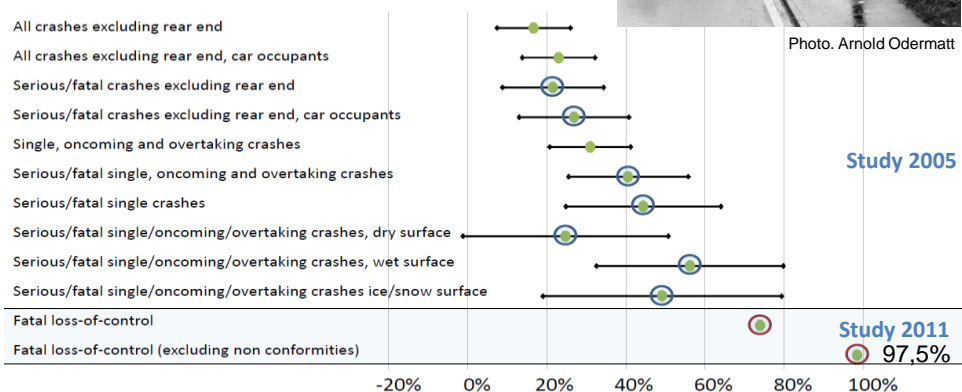
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Effects of high Euro NCAP score (study 2010)



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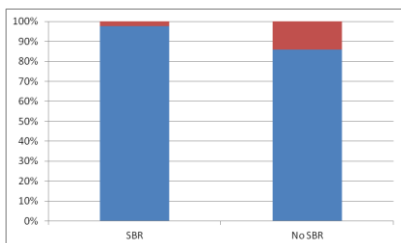
Effects of ESC, two Swedish studies



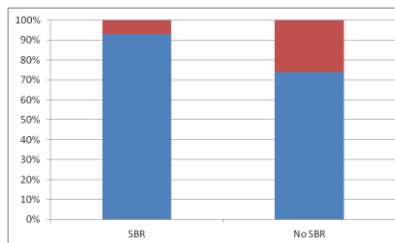
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The effect of Seat Belt Reminders

Road side observations, Europe



Fatal crashes, Sweden



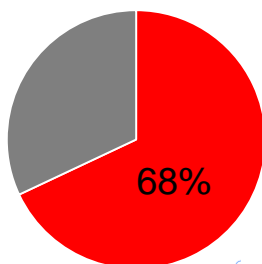
Increase of seat belt use
82,2 +/- 8,6%



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The effect of Lane Departure Warning

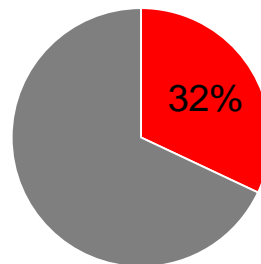
Without LDW



Head-on and
single

Rear-end

With LDW



→ -53%

(70-120 km/h no snow or ice)



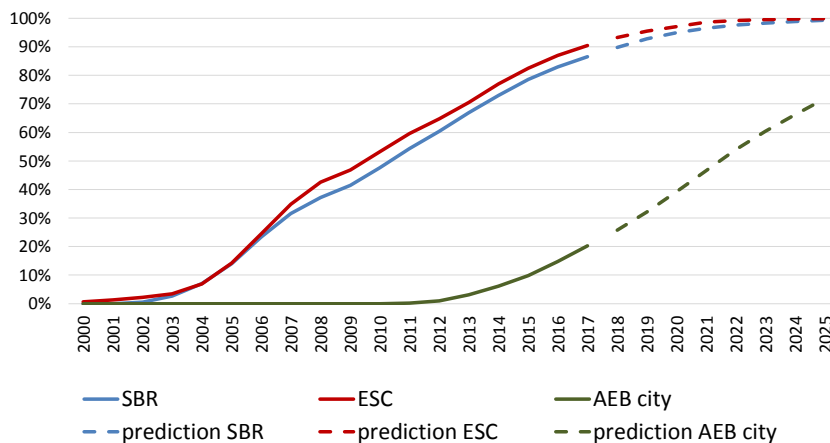
Traffic Injury Prevention

The effectiveness of lane departure warning systems – a reduction in real-world passenger car injury crashes

Simon Sternlund, Johan Strandroth, Matteo Rizzi, Anders Lie & Claes Tingvall

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Proportion of car mileage driven on Swedish roads with ESC, SBR and AEB city 2000-2025



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Fatalities in vehicles (Sweden)



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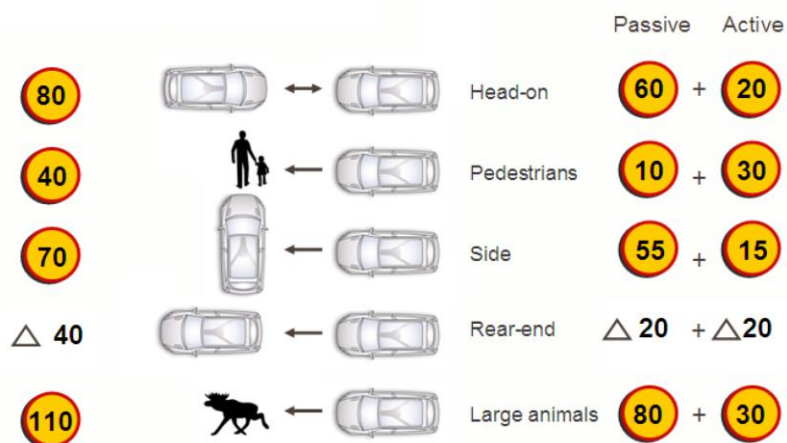
Clear results in EU

- It is estimated that 2/3 of the reduction in road fatalities comes from replacement of the car fleet
- Better results than reduction of heart attacks during the same period



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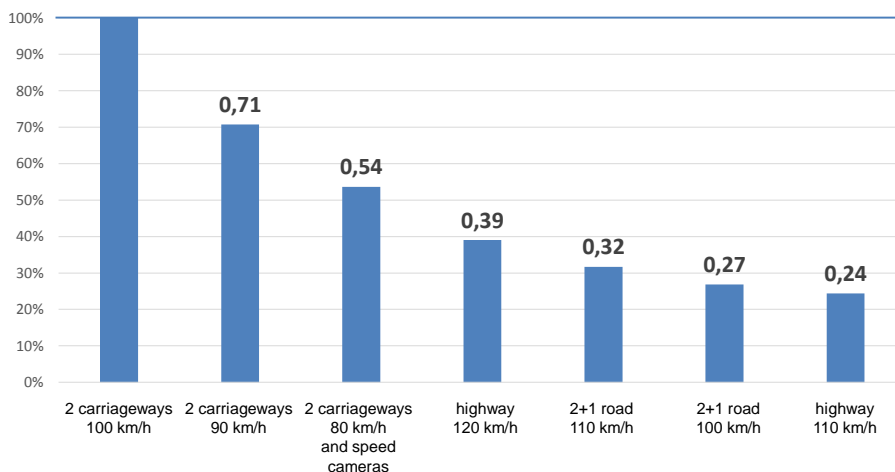
Joint effort to define boundary conditions



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Relative fatal and serious injury-ratio for car occupants on different road types



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How close to zero car fatalities can we get with...

- Cars MY 2030 or later have a 5 stars (today's system) Euro NCAP rating, standard AEB and AES (autonomous emergency steering)
- Median barriers in speed areas > 80 km/h and daily traffic > 4000 vehicles
- Roundabouts in urban intersections
- Safe road sides on speed areas > 80 km/h



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Prevision of implementation of safety technologies on passenger cars

safety technology	target population	standard from MY	standard from MY
		normal implementation rate	fast implementation rate
ESC	Loss-of-control crashes with over-steering. Violations excluded	2008	2008
SBR	Unrestrained occupants that would have survived with seat belt. Violations excluded	2009	2009
AEB city - FCW	Rear-end up to 50 km/h. Violations excluded	2020	2020
AEB interurban including large animals	Rear-end and wild life crashes, over 70 km/h. Violations excluded	2030	2025
AEB VRU - FCW	Pedestrians and cyclists hit by car fronts, excluding reversing crashes and cases with poor sight distance. Violations excluded	2030	2025
AEB rear VRU	Reversing crashes involving VRU. Violations excluded	2030	2025
AEB crossing	Crashes at intersections, where the crash opponent entered the intersection. Violations excluded	2030	2025
LDW - LKA	Lane departure on dry or wet roads with speed limit > 60 km/h and visible road markings. Violations excluded	2030	2025
AES - Autonomous Emergency Steering	Crashes avoidable by swerving 1 meter, where possible. Violations excluded	2030	2025

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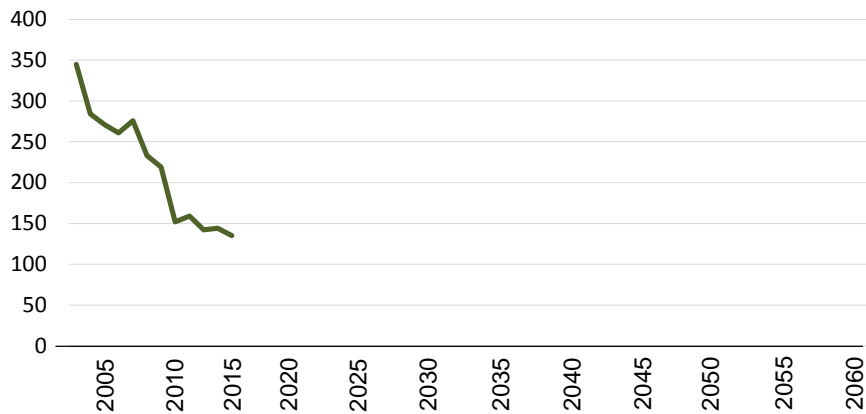
Prognosis built on real-life fatal crashes

(Sweden performs in-depth analysis of all fatal crashes since 1998)



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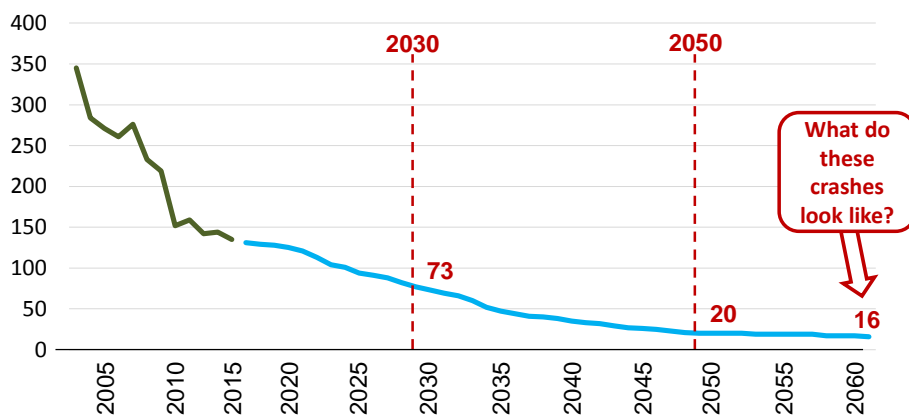
Number of killed car occupants in Sweden



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Number of killed car occupants in Sweden

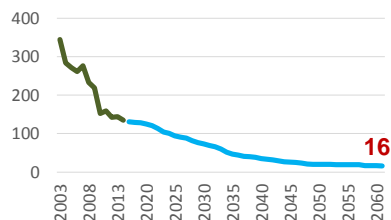


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Which fatal crashes are left in 2060?

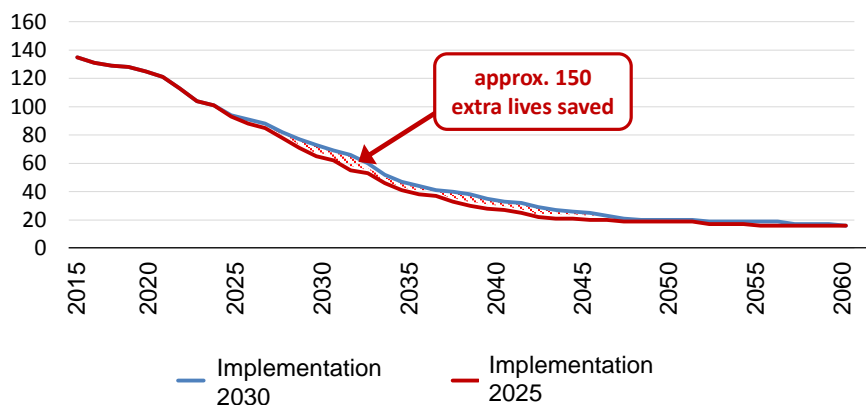
- 6 level crossings (5 w/o barriers)
- 5 extreme violations
- 3 head-on crashes with HGV, small overlap
- 2 disease-related cases



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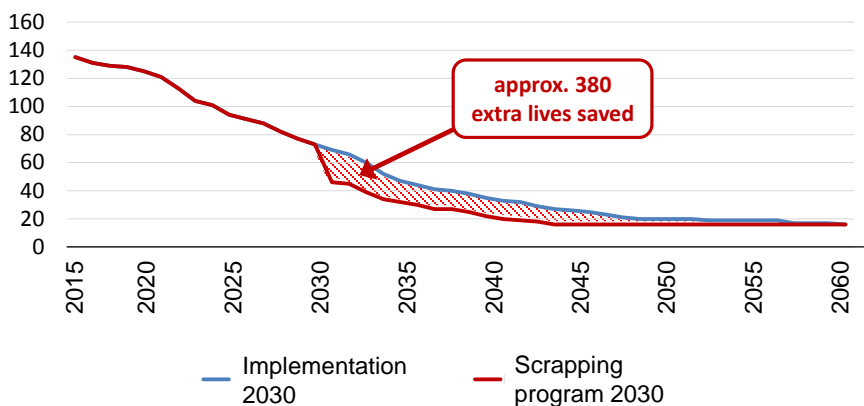
5 years earlier implementation of car safety technologies (2025 instead of 2030)



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2030 scrapping program for 15 years old cars (or older)

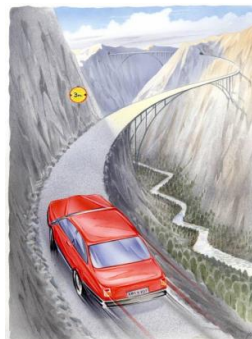


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Summary

How close to zero car fatalities can we get?

- Very close, but we need the road infrastructure too
- With full implementation of current safety strategies for a safe road transport system we can get close to zero car fatalities by 2050
- We can get there even faster with (for instance) car scrapping programs



Gordon Moore in 1965 said; "Change will never be this slow again"

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Teaser - how close to Zero can Volvo cars get?

Analysis of fatal crashes involving modern Volvo cars MY 2010 or later

- 16 killed car occupants under normal driving conditions since 2010
➔ **2 fatalities/year**

- Models: V70 (11), V60 (4), V40 (1)**
- ESC, SBR and most of them with AEB city
- None of them with LKA/LDW, AEB interurban,

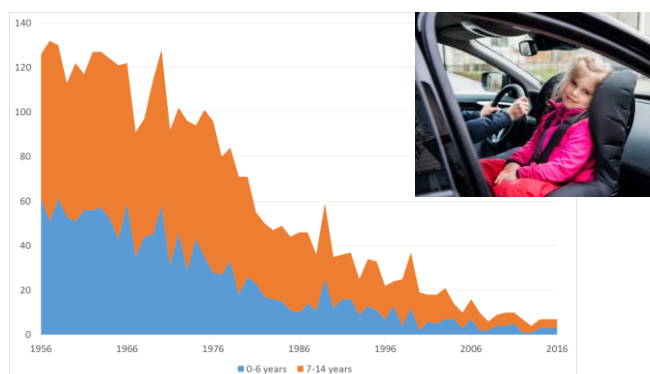


- 11 head-on collisions, 1 single-vehicle, 3 rear-end with HGV, 1 train
- 14 fatalities could have addressed by known vehicle safety technologies

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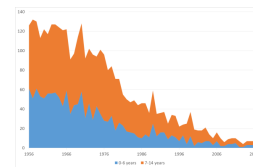
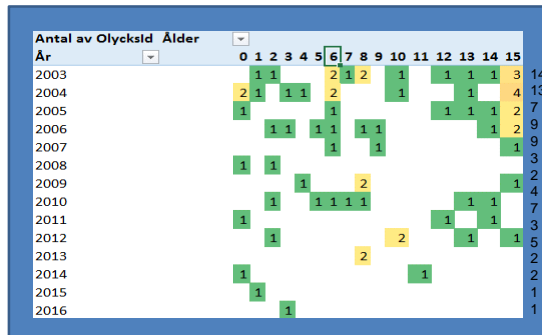
Children killed in traffic 1956-2016



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Children killed in cars 2003-2016



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Thank you!



Swedish Transport Administration

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