Intelligent Speed Assistance: Why Do We Need It?

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Speed

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"Speed remains a very important risk factor. It has a greater effect on the number of accidents and injury severity than almost all other known risk factors."

Rune Elvik, *The Power Model of the relationship between speed and road safety: Update and new analyses* (2009)

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We know a lot about speed and risk

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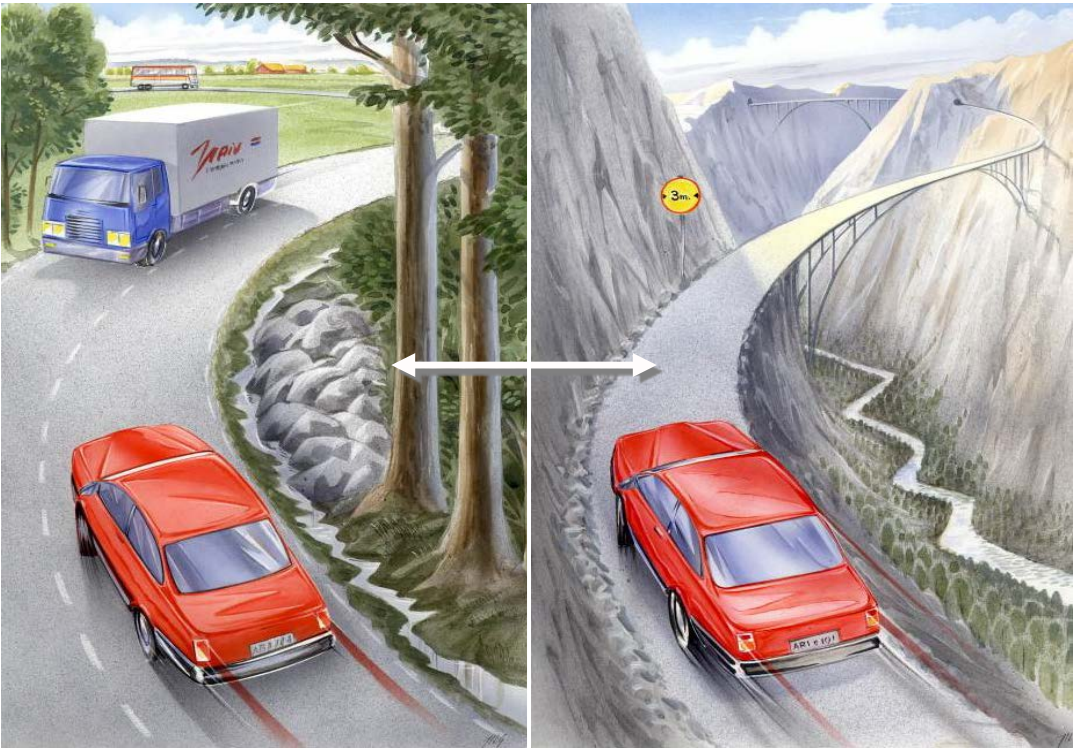

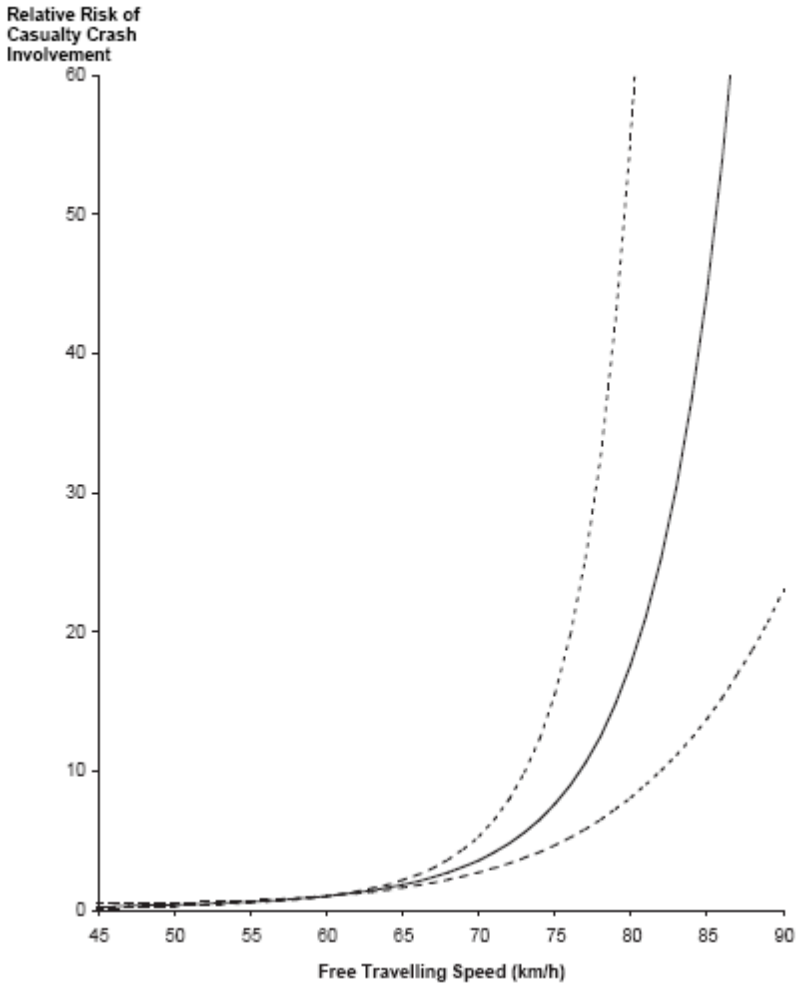

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Severity: the power model

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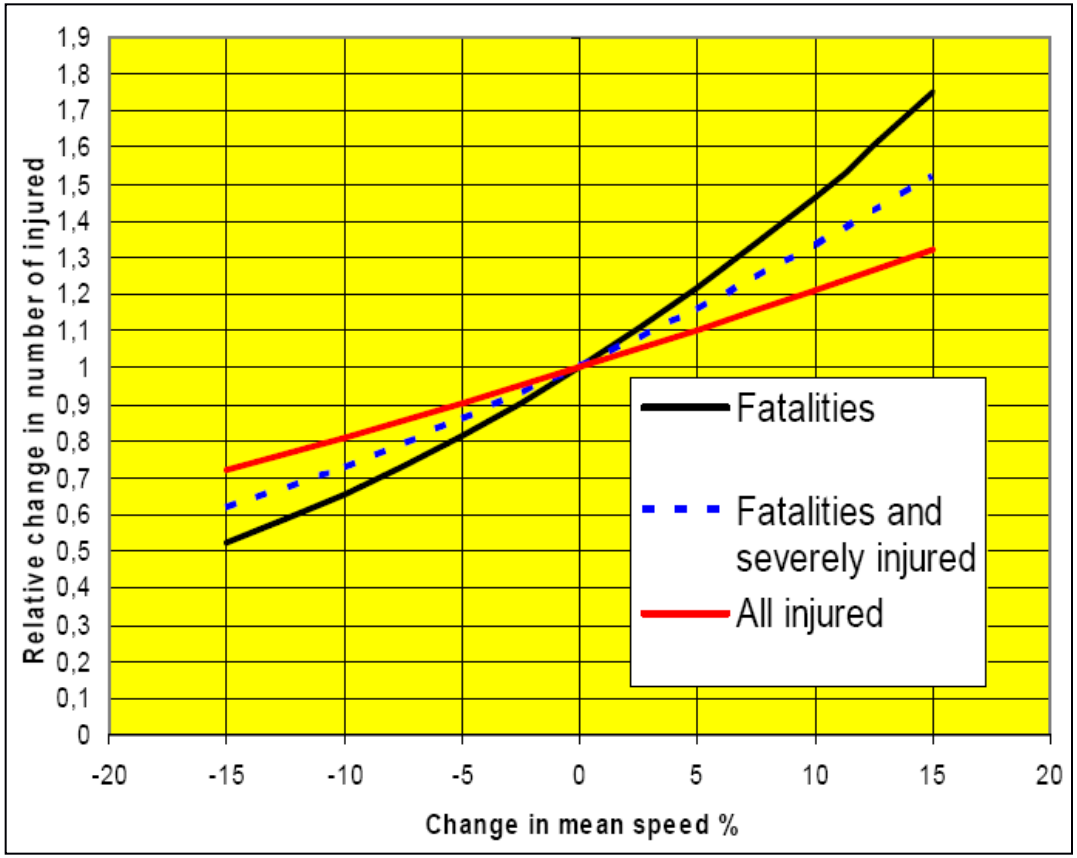
Andersson and Nilsson,1997; Nilsson, 2004; Elvik et al., 2004; Elvik, 2009; Elvik, 2013:

- Injury accidents go up approximately with the proportionate change in speed squared for a length of road
- Serious injury accidents approximately with speed cubed
- Fatal accidents approximately with speed to the fourth power



Source: Nilsson, 2004

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UK On-the-Spot Data:
Collision speed and the risk of car driver death in frontal collisions

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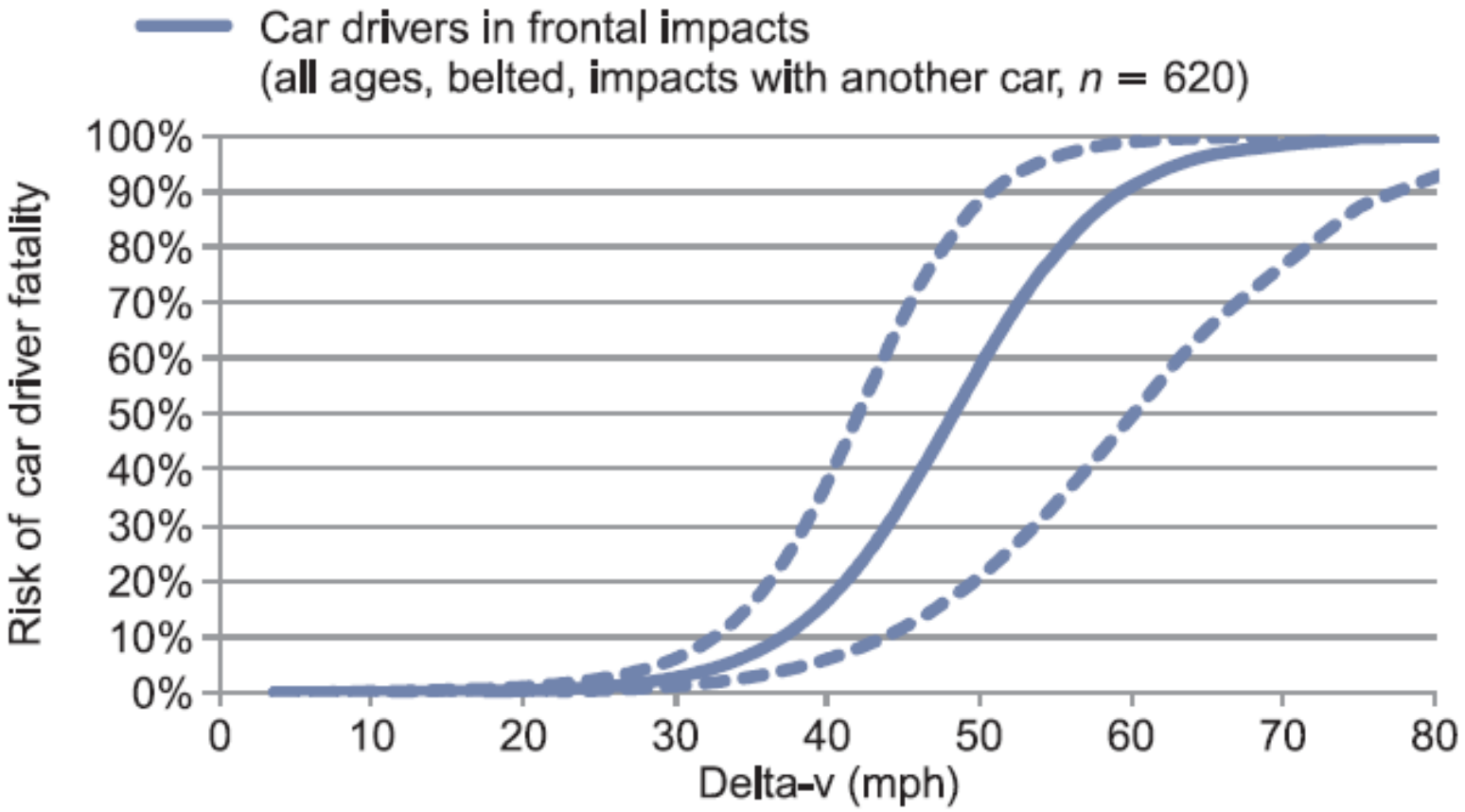

Source: DfT, 2010
(dashed lines show 95% confidence interval)

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Impact speed and the risk of pedestrian death

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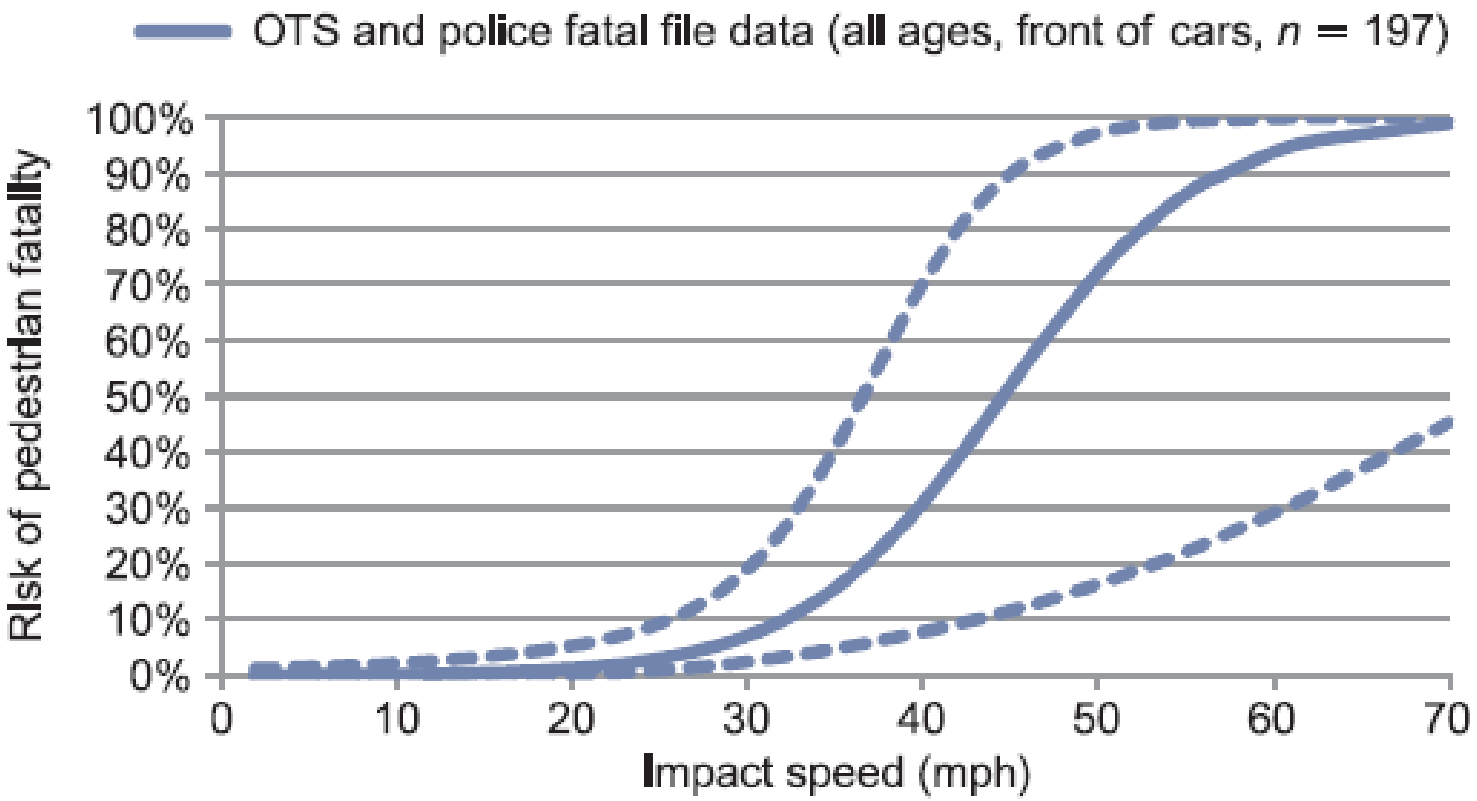

Source: DfT, 2010
(dashed lines show 95% confidence interval)

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Collision speed and the risk of car driver death in side collisions

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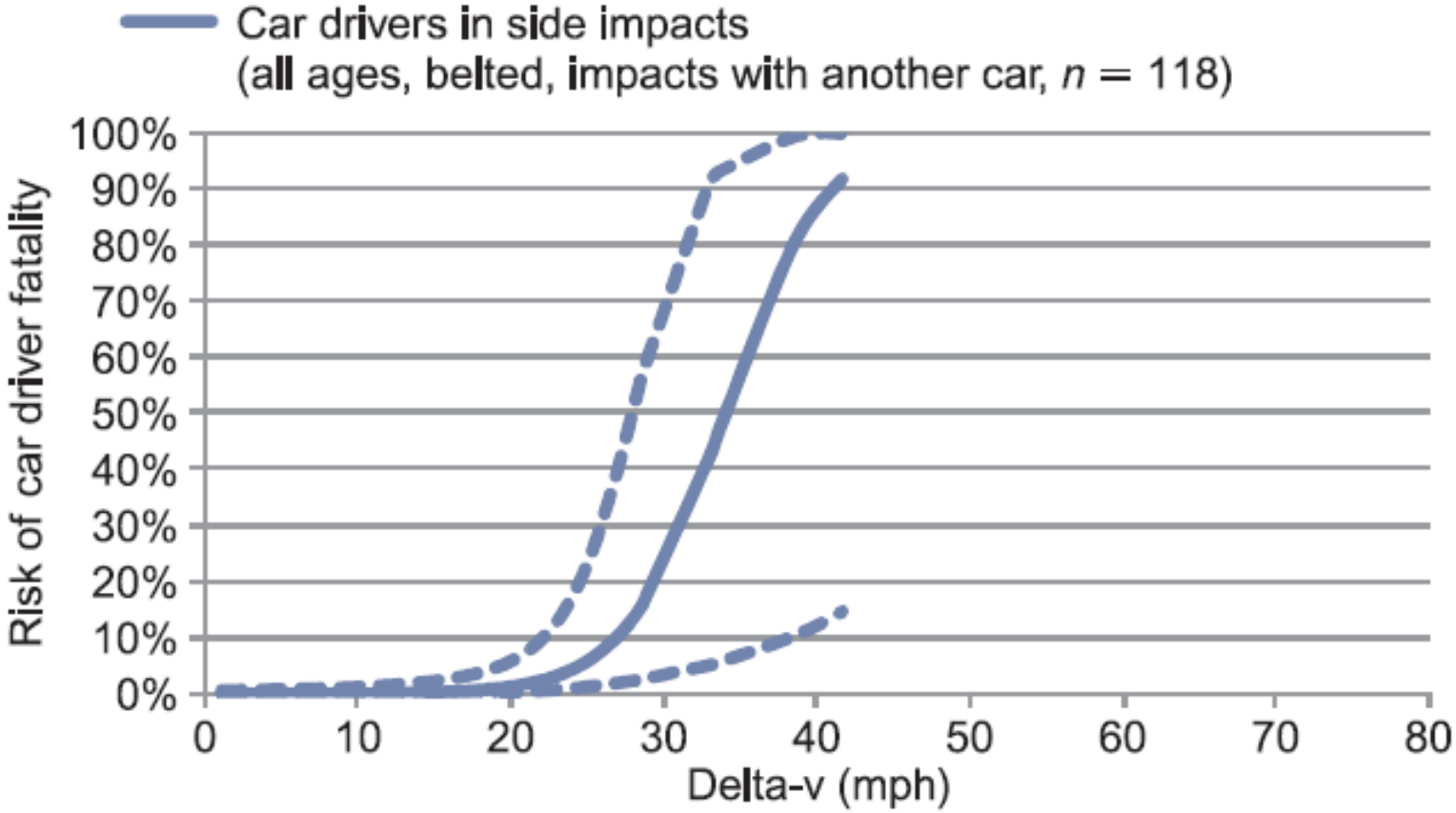

Source: DfT, 2010
(dashed lines show 95% confidence interval)

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Real-world trials

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Denmark (2000-2001 and 2005-2008)

Finland (2001-)

ISA-UK (2001-2006)

Two projects in Belgium (2001-2002)

LAVIA in France (2002-2006)

Austria (2003-2004)

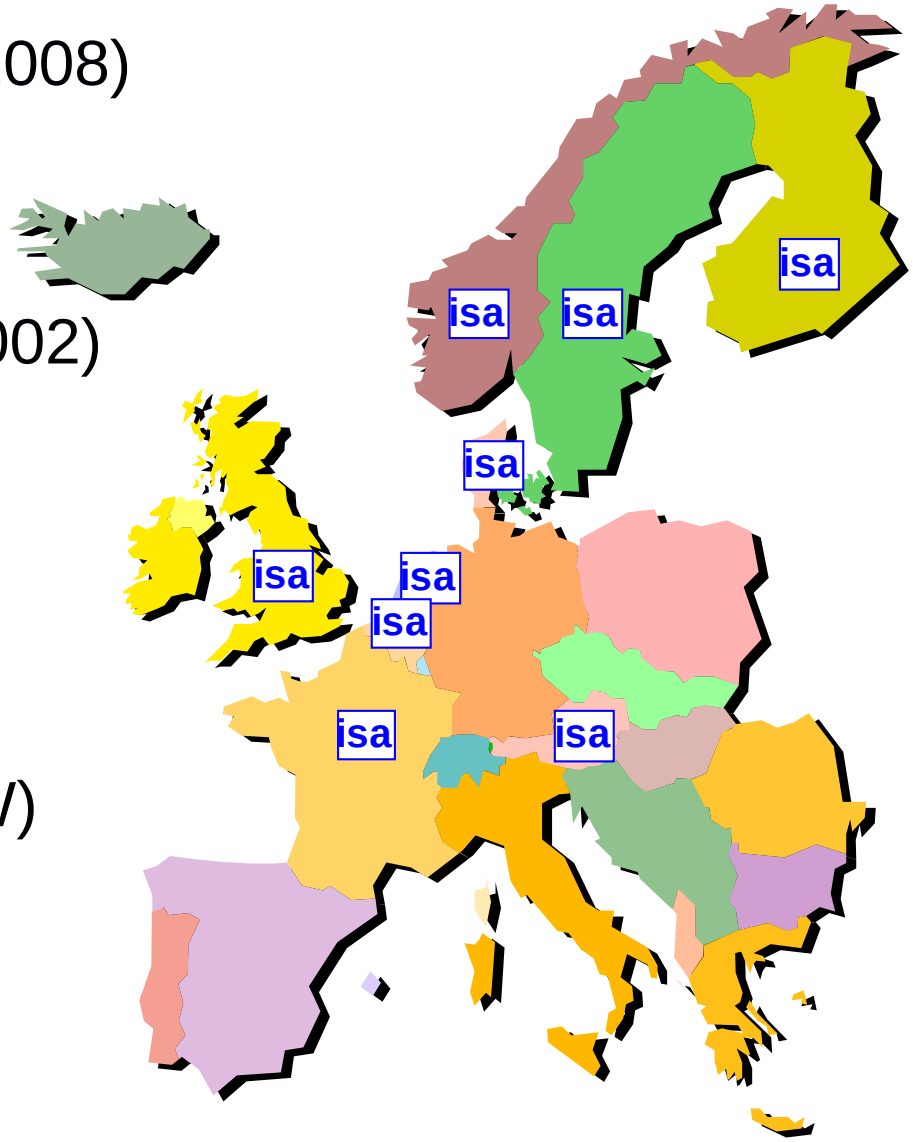
Norway (2005-?)

+

Australia (TAC SafeCar and NSW)

Canada

Japan (Soft Car)



Assisting ISA: effect on behaviour and attitudes

The ISA-UK trials

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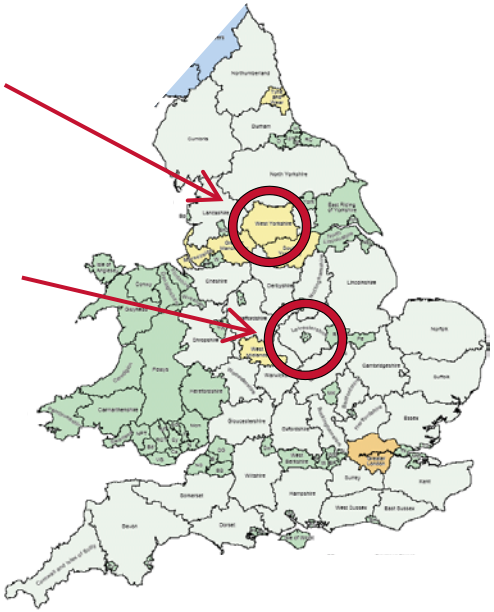
2 urban trials
(1 private motorists, 1 fleet)

2 rural trials
(1 private motorists, 1 fleet)



79 drivers with a mix of:

Younger / older
Male / female
Speeding intenders / non-intenders

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An overridable assisting system

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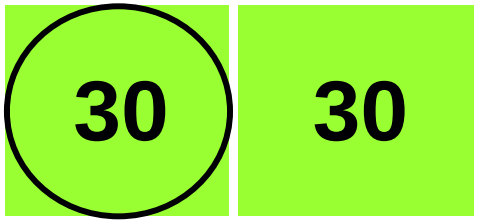
- System that limited speed to the prevailing limit (no acceleration beyond limit)
- Drivers could override at will
- Vibration on throttle pedal to prevent over-throttling



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Speed distribution on 30 mph (50 km/h) urban roads

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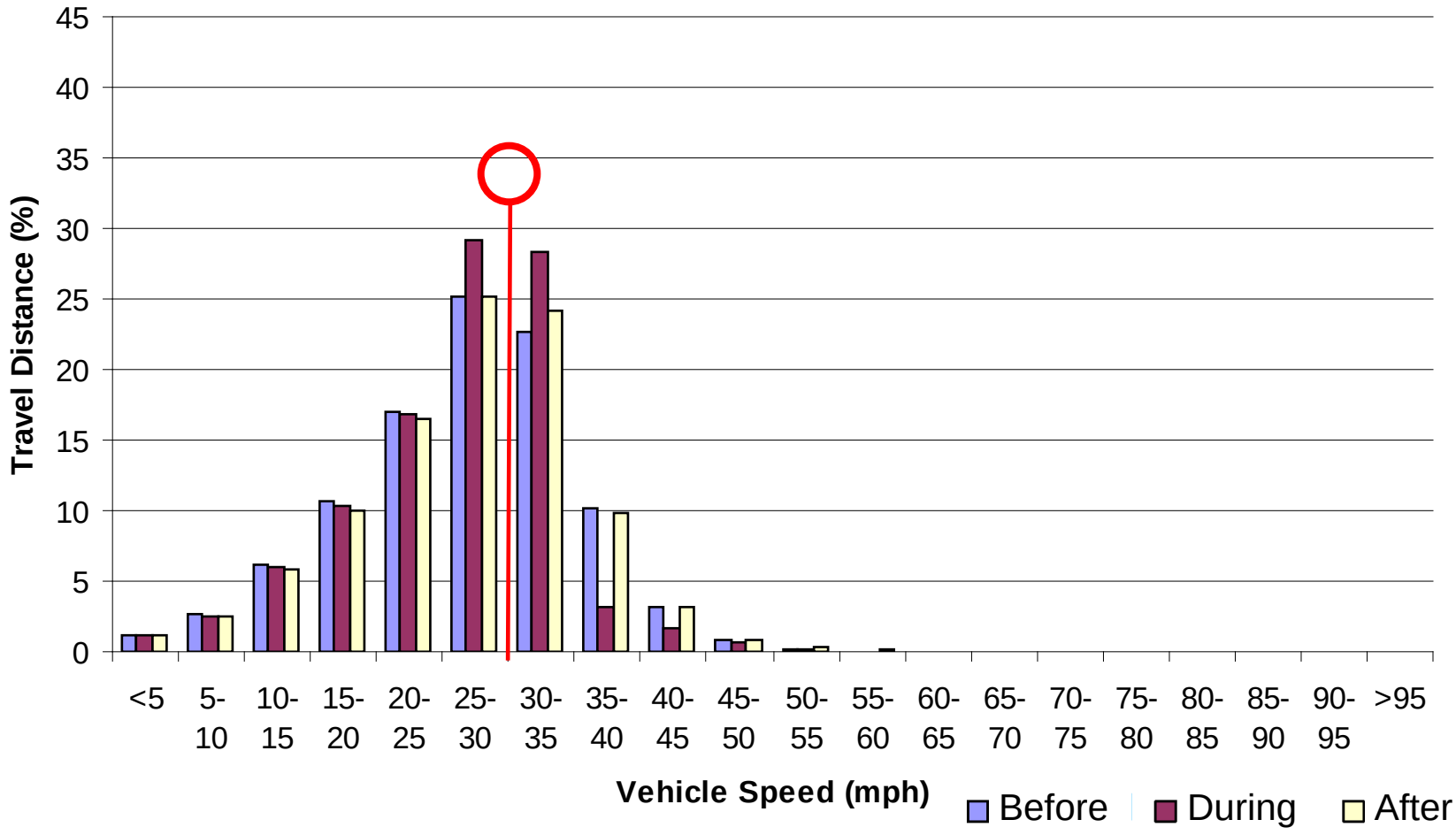

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Speed distribution on 70 mph (110 km/h) roads

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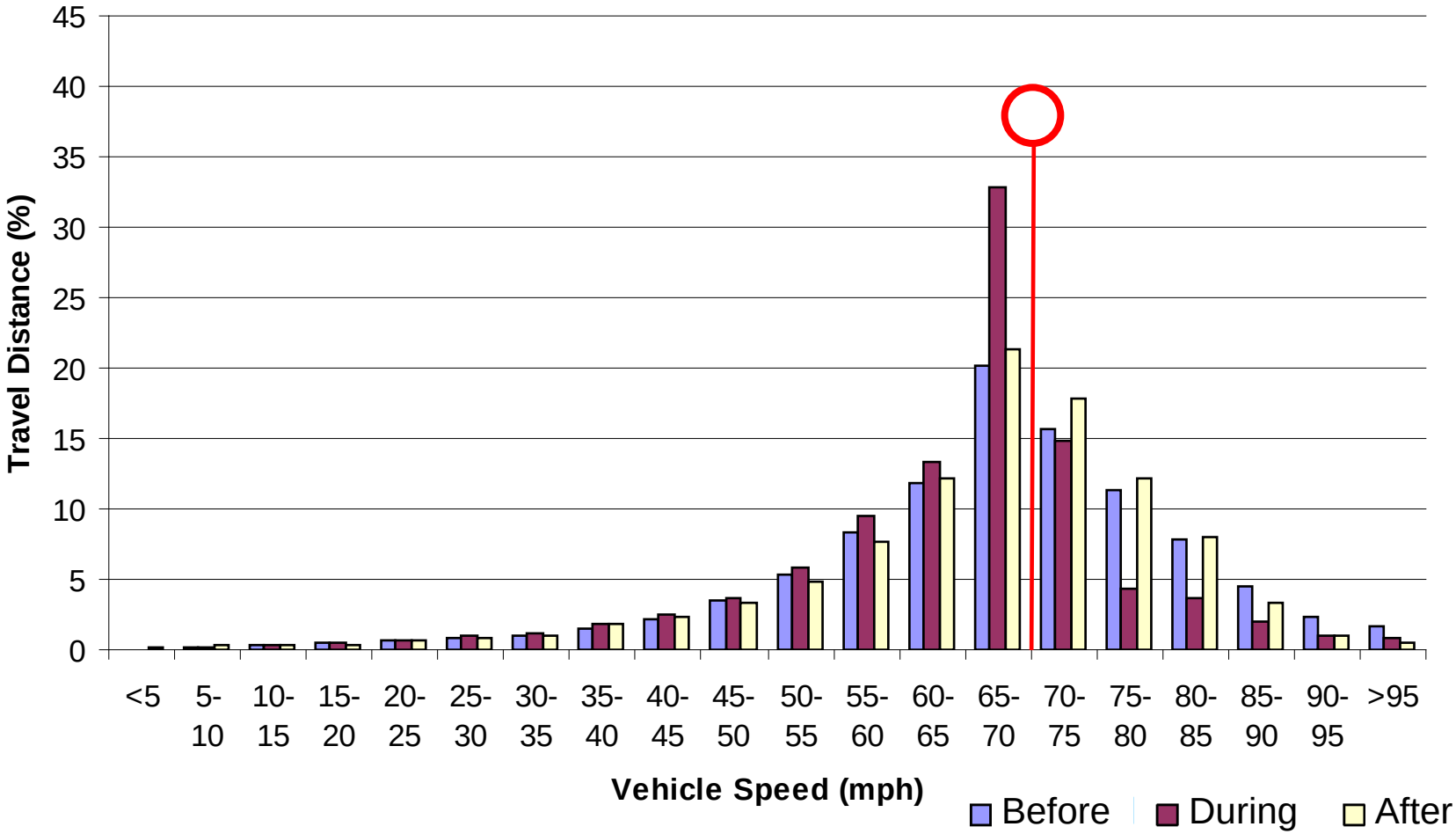

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Acceptability

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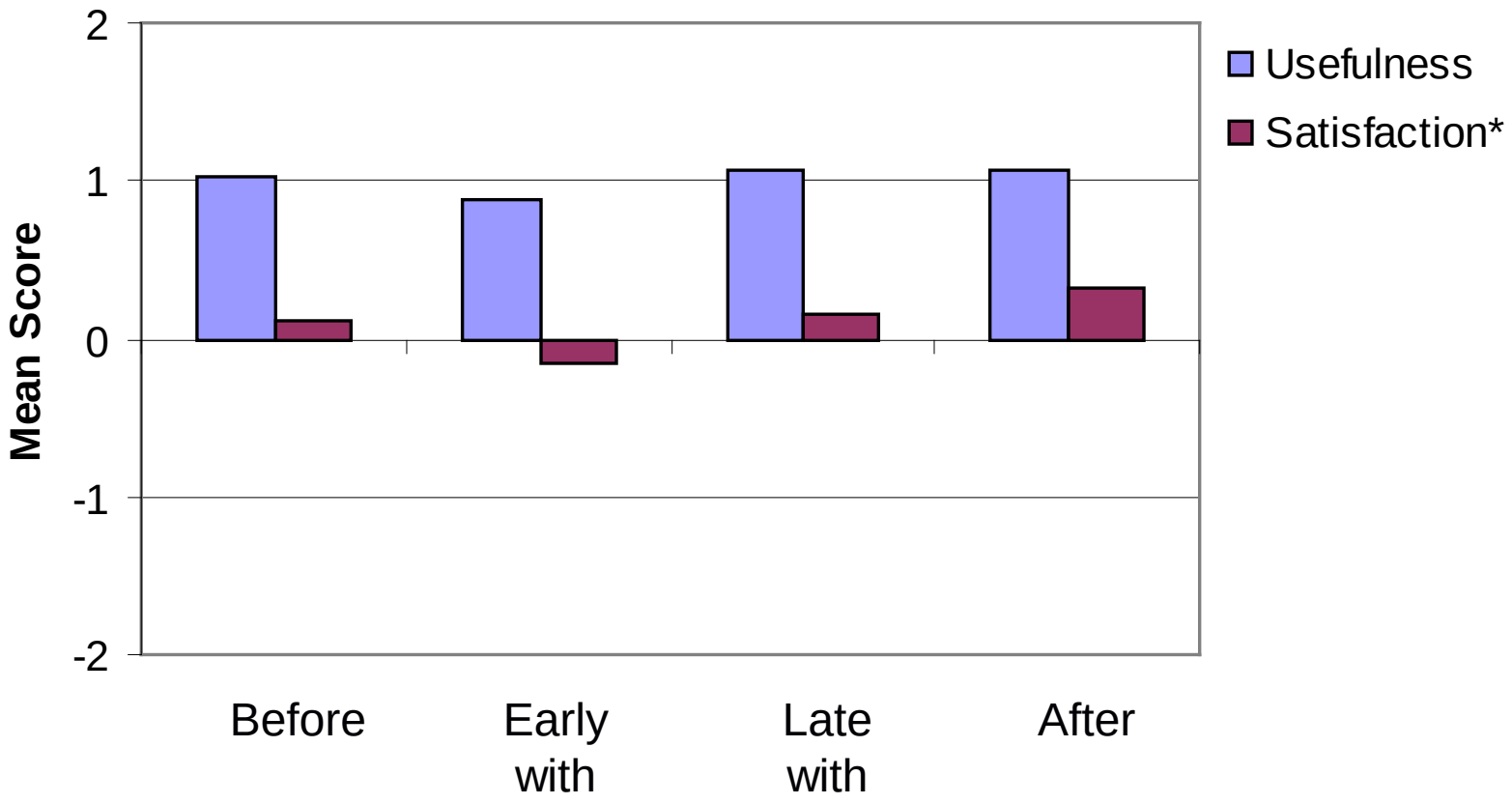

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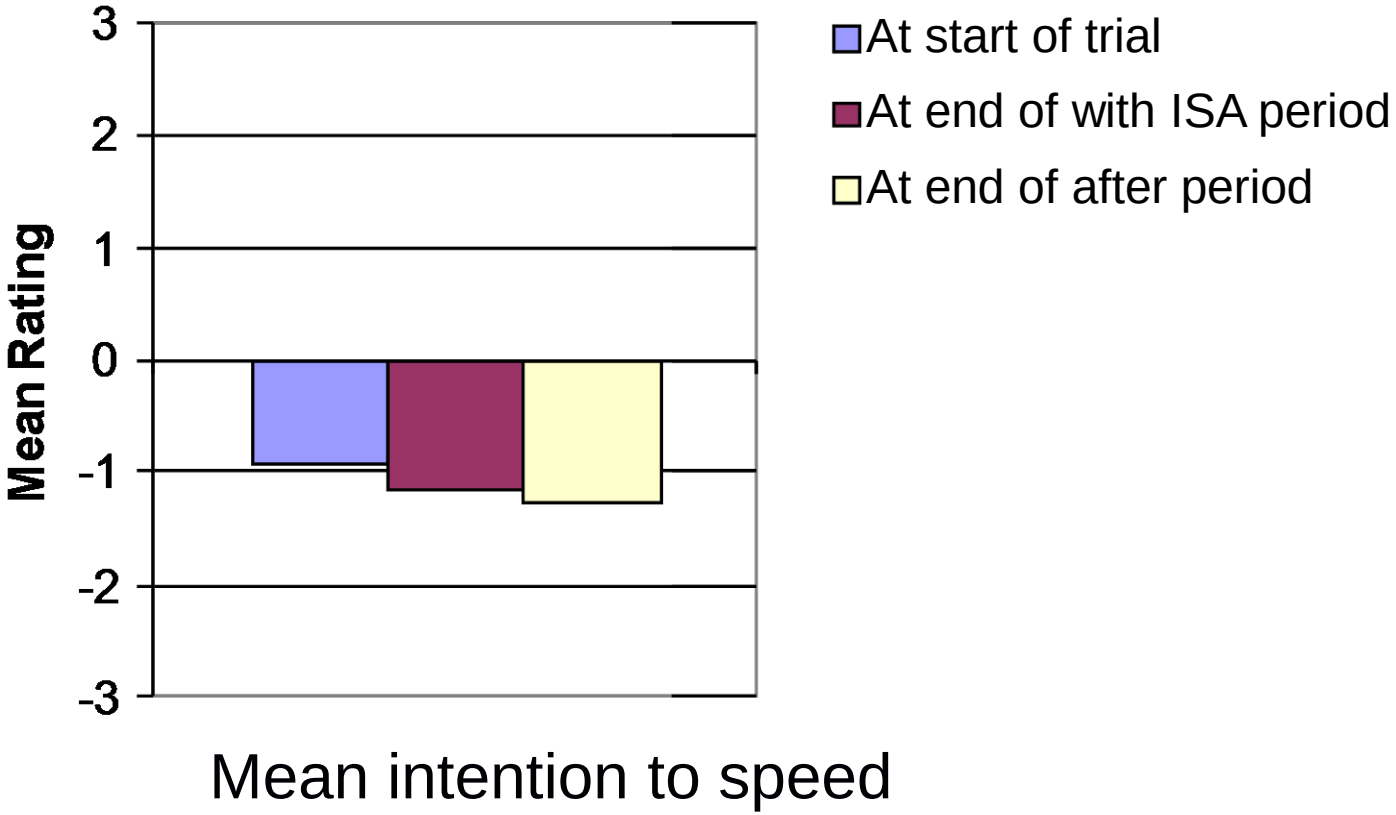
Intention


3
2
1
0
-1
-2
-3
Mean Rating
At start of trial
At end of with ISA period
At end of after period
Mean intention to speed

Impact Prediction

Method for estimating accident reductions with ISA

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- Based on models from the literature relating speed to crash risk (e.g. Kloeden et al., 2001, 2002)
- These models have been calculated from real-world data
- *They are not drawn from the police reported contributory factors for accidents*

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Estimated risk reduction by type of ISA

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Estimated Reduction in Injury Accidents for Vehicles with ISA

ISA Variant	Reduction
Advisory ISA	−2.7%
Assisting (Overridable) ISA	−12.0%
Assisting (Non-Overridable) ISA	−28.9%

= −50% for fatal crashes

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What is the importance of regulation?

GB accidents saved over time for under the Market Driven scenario

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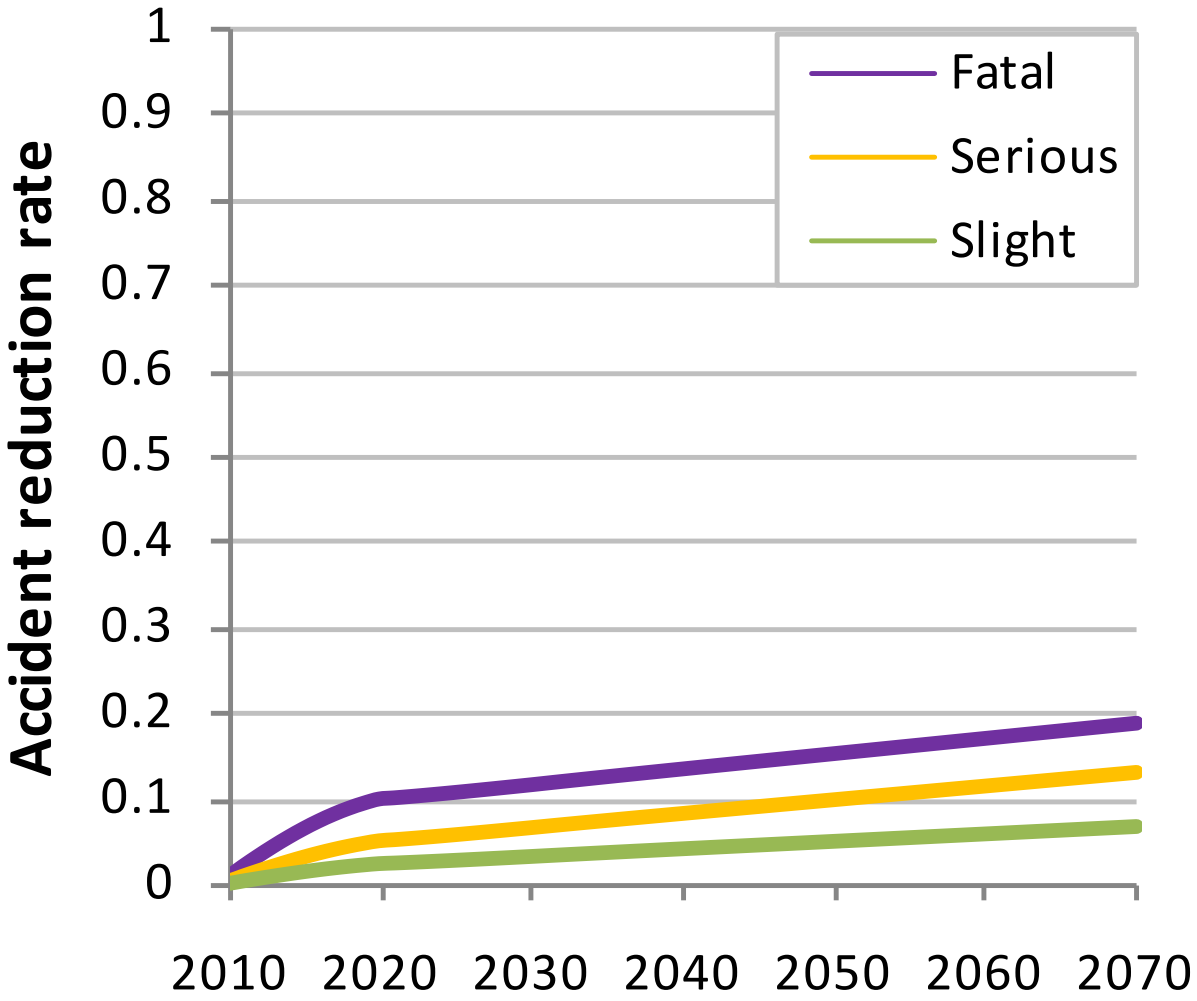

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GB accidents saved over time for the Authority Driven scenario

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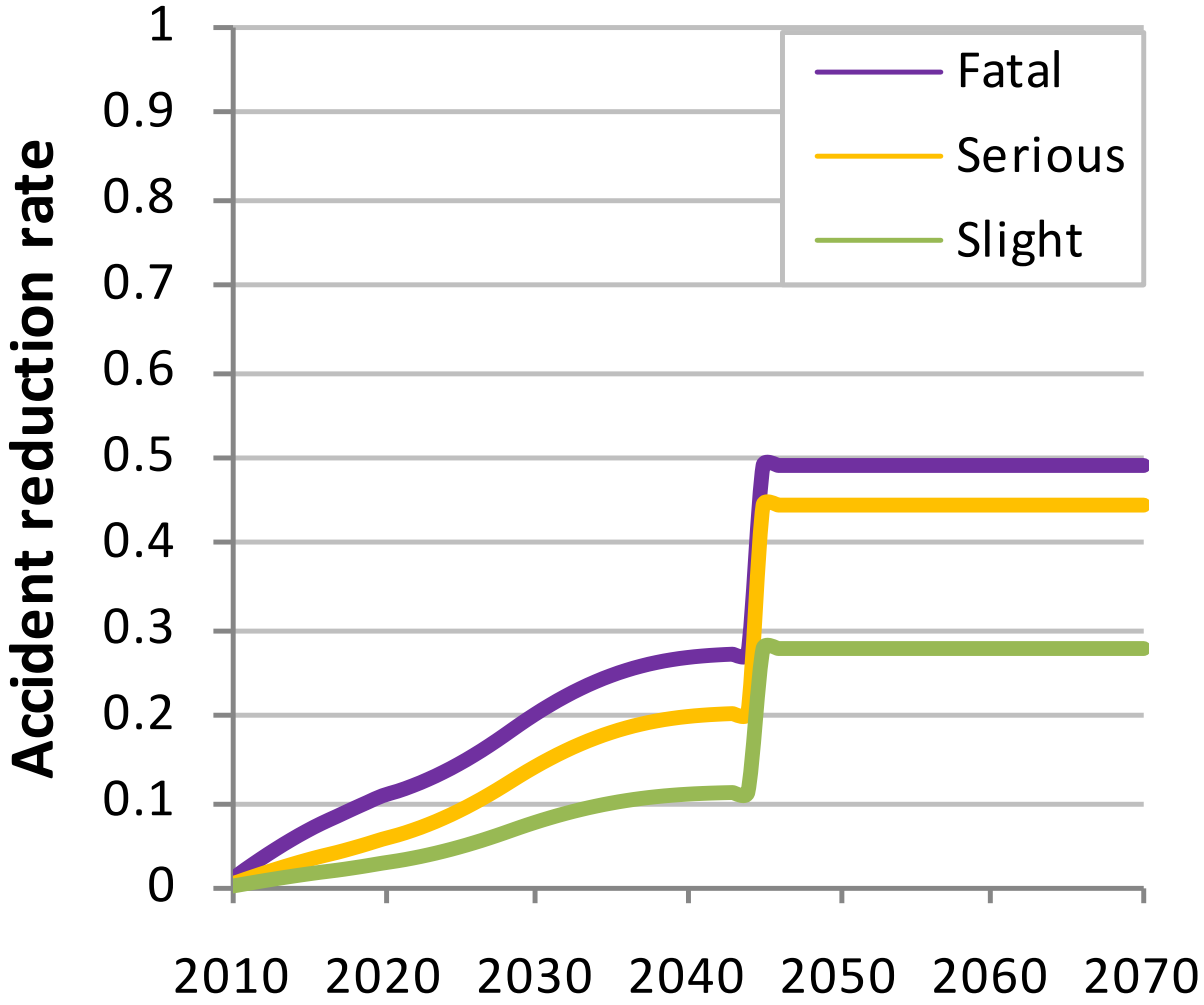

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Comparison of predicted outcomes

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GB Crashes Saved from, 2010 to 2070

	Slight Crashes	Serious Crashes	Fatal Crashes
Market Driven	4%	8%	13%
Authority Driven	15%	25%	30%

- Benefit to cost ratios (accidents + fuel + CO_2):
  - Market Driven scenario 3.4
  - Authority Driven scenario 7.4

Note that we used rather high numbers for costs

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Interpretation of scenario analysis

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- Both scenarios are winners
- The harder the push for ISA and the “stronger” the system, the greater the benefits
- Shows the importance of regulation
- Much of the potential of ISA, e.g. to replace traditional and costly traffic calming, was not counted

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Confirmation from Norway

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Vaa et al. (2014) examined the safety potential for Norway of a number of driver assistance systems, including Adaptive Cruise Control, alcolocks, seatbelt reminders, Electronic Stability Control and fatigue warning.

Their conclusion was:

"The most effective driver support system is ISA."

Similar conclusions are being reached by the current review of the General Safety Regulation of motor vehicles for the European Commission.

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Conclusions

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- ISA is a well-proven technology with very significant safety benefits
- Regulation is necessary to maximise the impact of ISA on traffic injuries and deaths
- Requirement of the overridable assisting system provides a sensible way forward

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Thank you for your attention!

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