



How road safety varies across Europe: as investigated by ETSC – the European Transport Safety Council

Richard E Allsop

**Centre for
Transport
Studies**



Board Member of ETSC

European Transport Safety Council

- A non-governmental organisation funded by its members, the EC and corporate sponsors bringing together practitioners, researchers and parliamentarians from across the whole of the EU to provide impartial advice at the European level on transport safety matters

See www.etsc.eu

ETSC and road safety

- ETSC is concerned with the safety of all forms of transport
- but about 97 per cent of deaths in transport in the EU occur on the roads
- so the safety of people using the roads in all the Member States is a prime concern of ETSC
- and the EU has a target to halve yearly road deaths to 25000 over 2001 to 2010

Performance indices

Previous work by ETSC has confirmed the importance of a range of performance indices

- in monitoring progress
- in guiding the evolution of policy
- in making the case for resources
- in motivating sustained effort
- in challenging complacency
- in keeping citizens informed

The ETSC programme PIN

- Performance indices can help decision-makers throughout the EU by
 - recognising achievement
 - identifying shortcomings
- ETSC is supported by **Toyota Motor Europe** and the **Swedish Road Administration** since 2006 in the programme PIN to establish road safety performance indices helped by the technical outcomes of the EU project **SafetyNet** – see www.erso.eu

PIN works through ...

- a well-placed expert Panel Member in each Member State
- ETSC's EU-wide network of over 200 experts
- a Steering Group with members from research organisations, the EU Commission, the PIN sponsors and the ETSC leadership
- a project team of 3 in the ETSC secretariat:– Graziella Jost, Marco Popolizio and Vojtech Eksler (Franziska Achterberg in 2006-2007)

PIN is delivering ...

- **Flashes** – profile-raising quarterly overviews of specific aspects of road safety performance
- **Annual Reports** – bringing together each year's Flashes
- **Annual Conferences** – to make an Award for performance and launch the annual report
- **PIN Talks** in Member States to encourage each country's road safety effort

Aspects of performance indexed so far

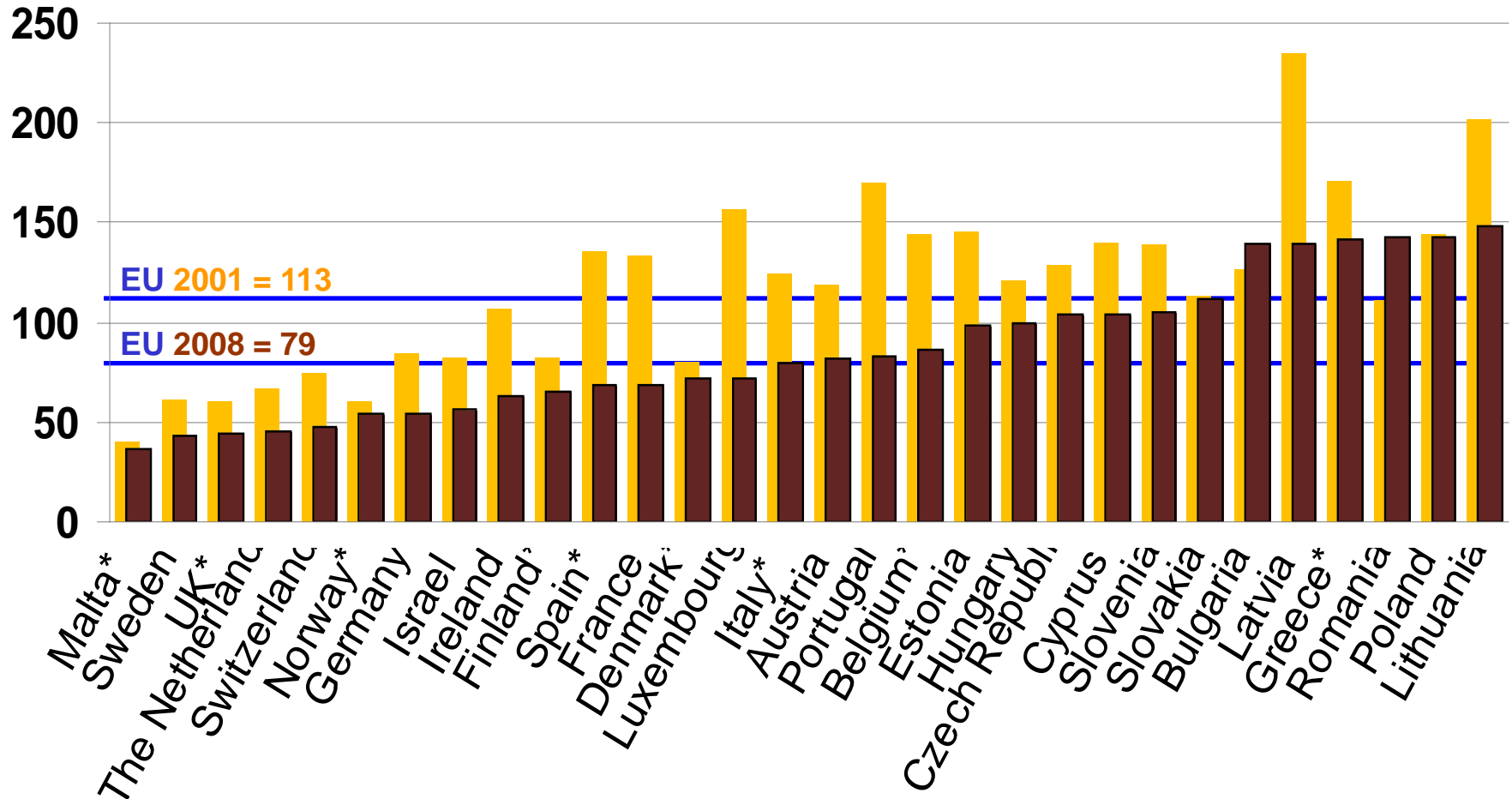
- Annual number of deaths *
- Seat belt use *
- Deaths from drink driving *
- Driving speeds *
- Deaths among older road users
- Deaths among children
- Motorcycling deaths *
- Deaths on motorways
- Deaths in capital cities
- Car safety *

Road deaths per million population

in 2008

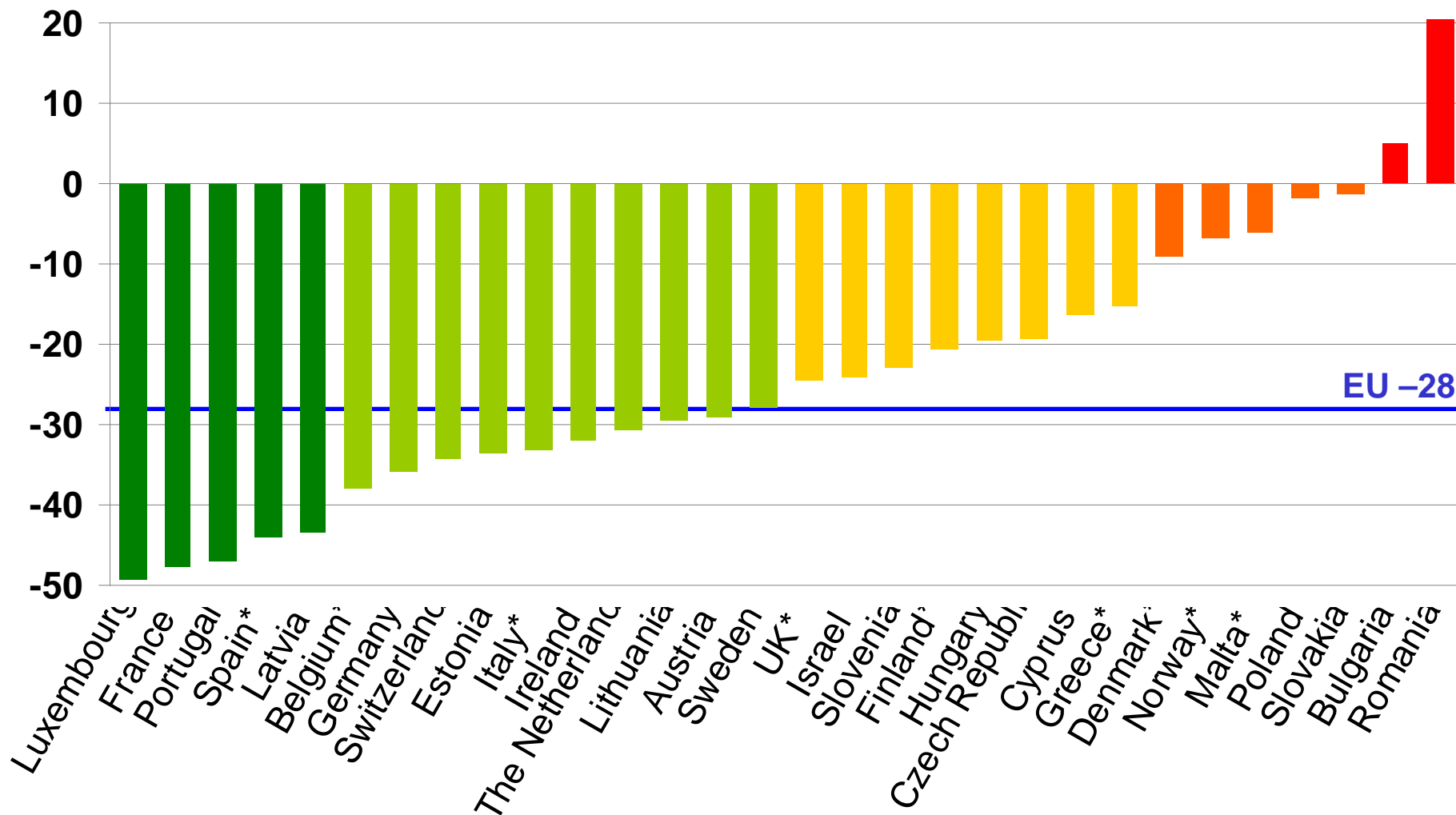


compared with 2001



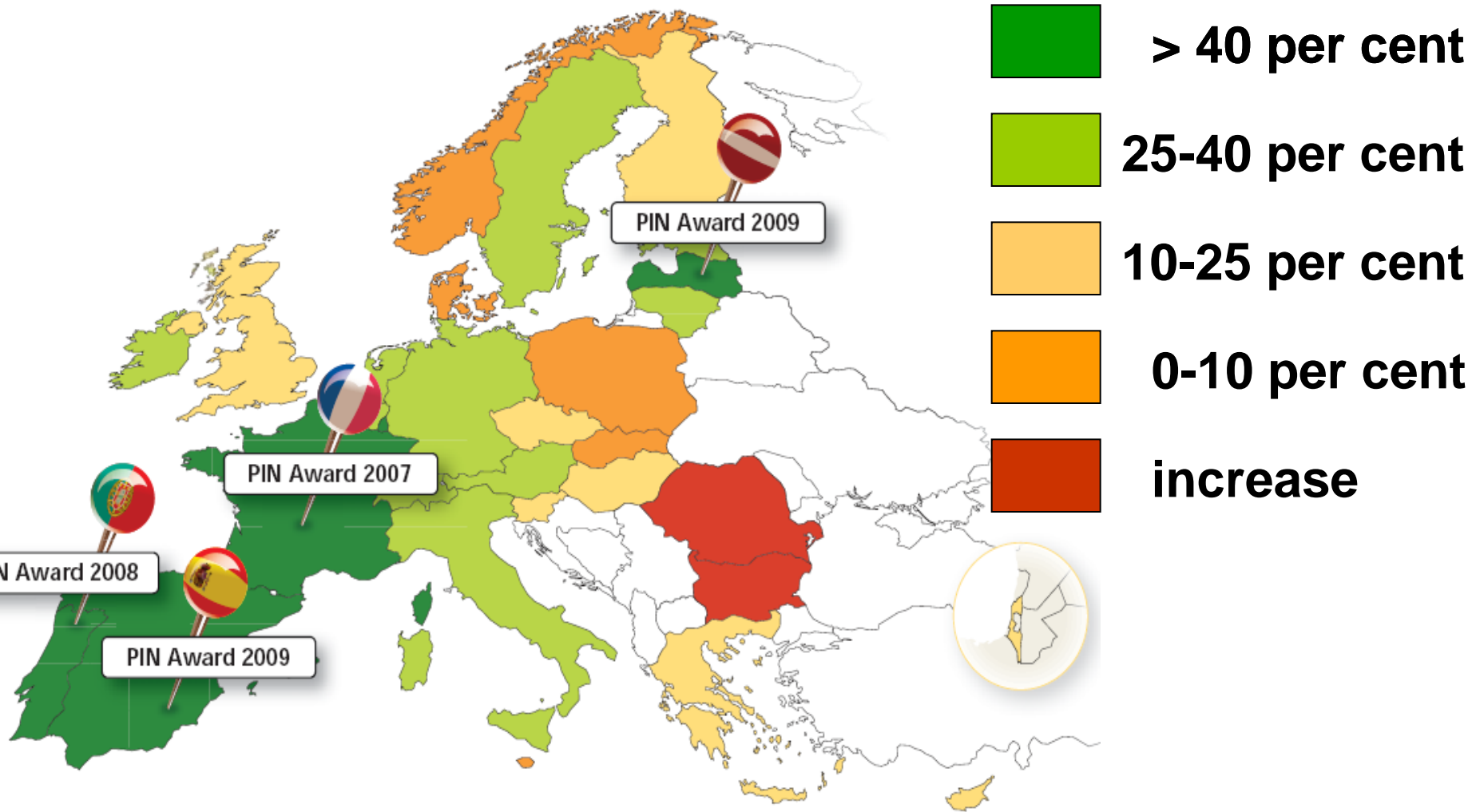
*2008 numbers provisional at June 2009

Percent change in deaths 2001-08



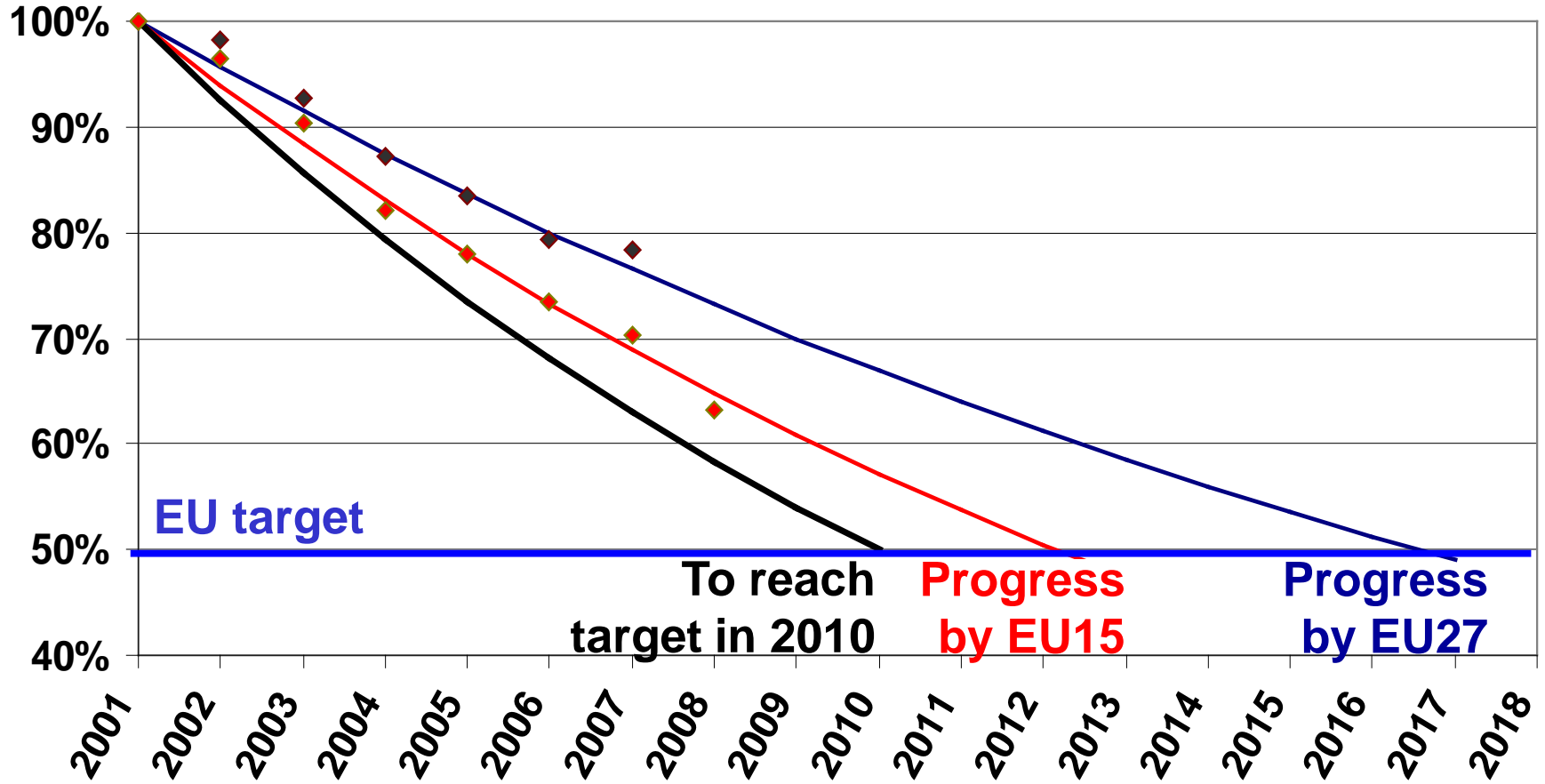
*2008 numbers provisional at June 2009

Reduction in road deaths 2001-2008



Progress relative to the EU target

Deaths as percentage of the number in 2001



Average annual percentage reduction

Let Y_n be the number of deaths in year n

Then with an annual percentage reduction of p per cent

$$Y_n = Y_0(1 - p/100)^n \dots\dots\dots (1)$$

E.g. $Y_9 = Y_0/2$ if $p/100 = 1 - 1/2^{1/9}$ i.e. if $p = 7.41$ per cent

To fit Equation (1) to a series of data for years 0 to N

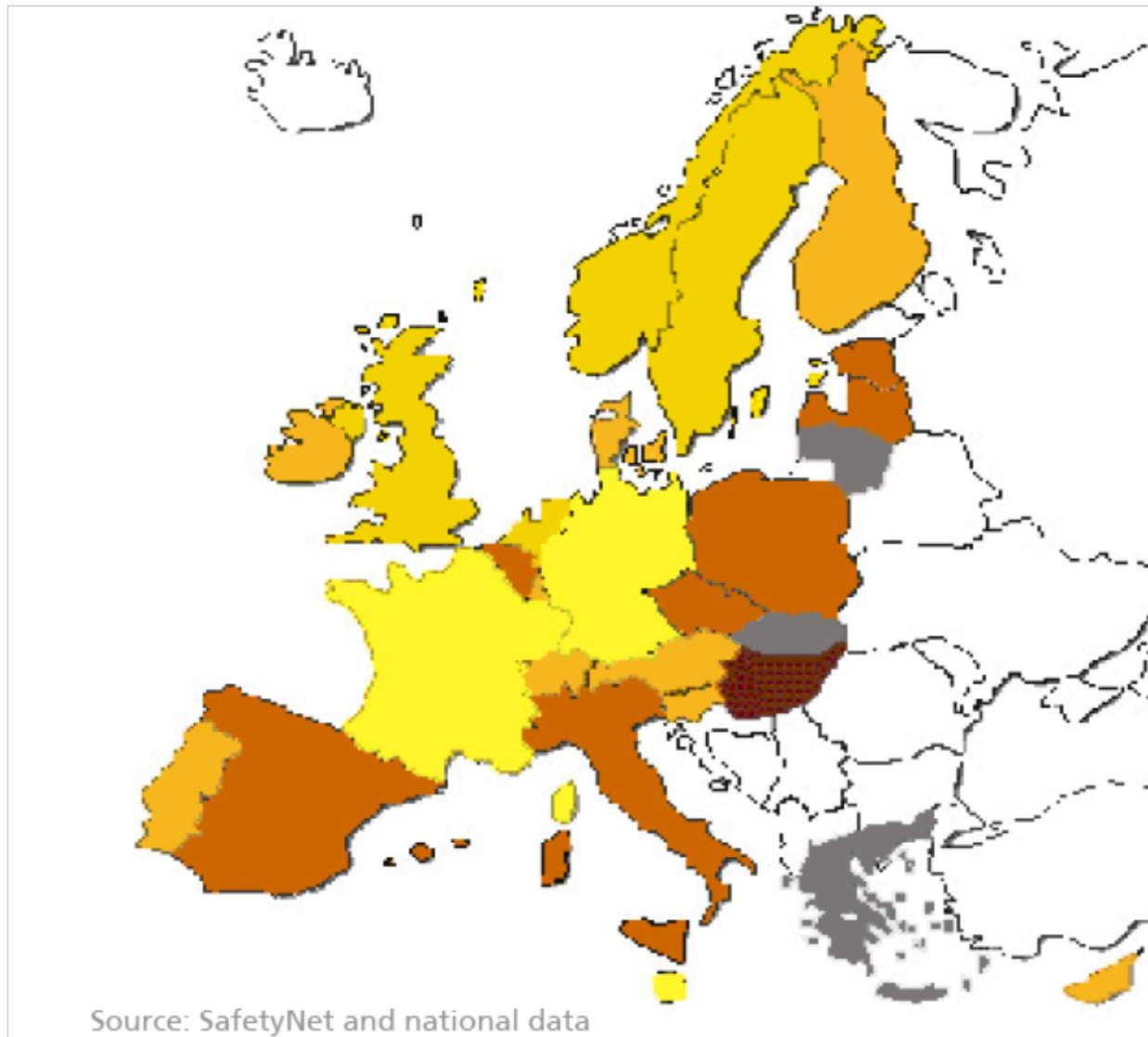
we can fit the line $\ln(Y_n/Y_0) = an$ by least squares

Then a is the estimate of $\ln(1 - p/100)$

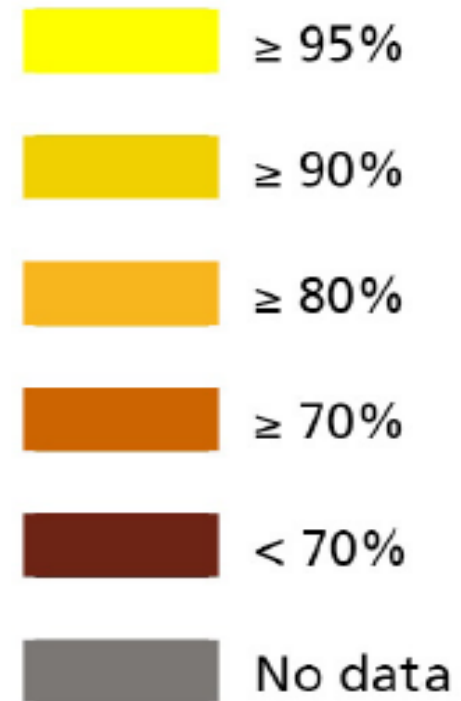
and p is estimated by $100(1 - e^a)$

Unless the annual numbers are very large, $(Y_0 + Y_1 + Y_2)/3$
can be used in place of Y_1 and the equation is then fitted
to the series beginning at year 1

Wearing of seat belts

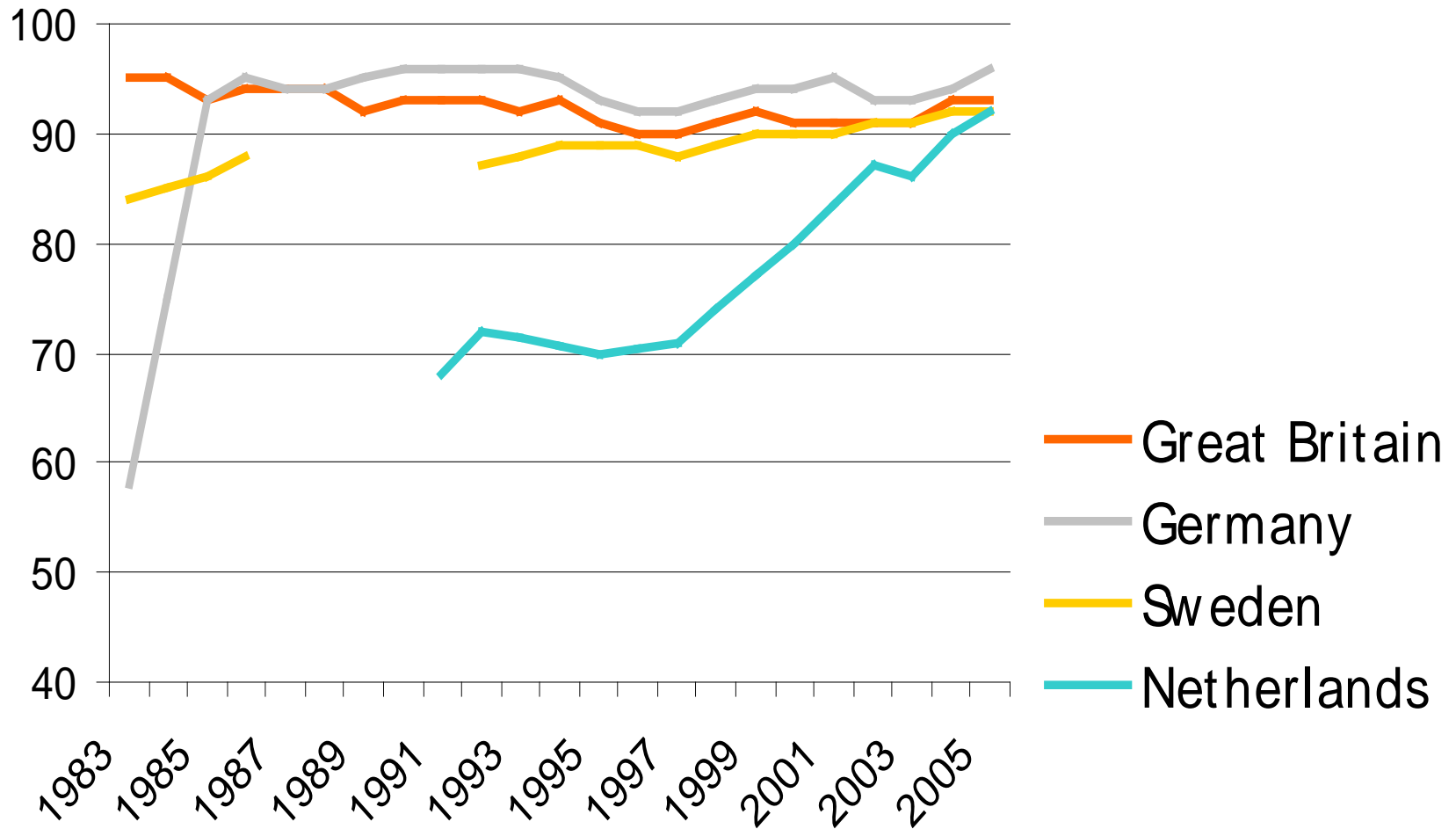


Seat belt wearing in front seats in 2005



Source: SafetyNet and national data

Seat belt use by car and van drivers



Deaths prevented by belt-wearing

Suppose N vehicle-users would be killed if none wore belts and that wearing reduces deaths by a factor E

If proportion W wear belts, there will be $N(1 - EW)$ deaths

So if W changes from W_1 to W_2 , deaths will change by $NE(W_1 - W_2)$, or $100E(W_1 - W_2)/(1 - EW_1)$ per cent

The deaths already prevented by proportion W_1 wearing is found as a percentage of existing deaths by putting $W_2 = 0$

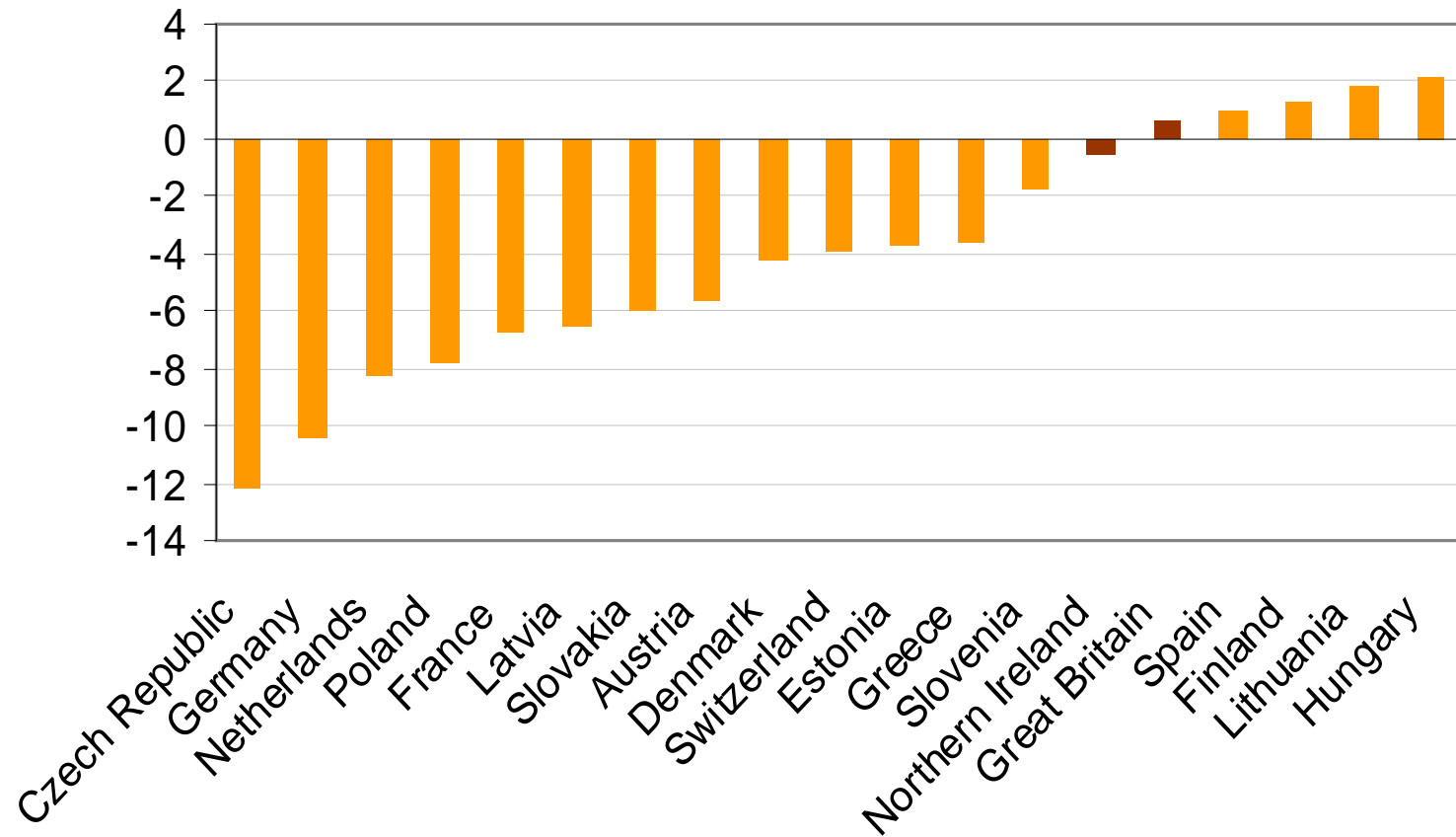
The deaths that would be prevented by increasing wearing from $W_1\%$ to, say, 99% is found similarly by putting $W_2 = 0.99$

If those now unbelted have X times the accident risk of those now belted, the decrease in deaths for $W_2 > W_1$ becomes $100E(W_1 - W_2)X/[(1 - W_1)X + EW_1]$ per cent

With $X = 1.5$ reaching $W = 0.99$ would prevent about 18% of EU driver deaths, about 3000 per year

Change in drink driving deaths

Average yearly percentage change in road deaths attributed to drink driving from 1996-98 to 2005



Effect of drink-driving countermeasures

Suppose that in a certain country there are a total of T road deaths per year, of which A are attributed to drink driving. Then $N = T - A$ are not so attributed.

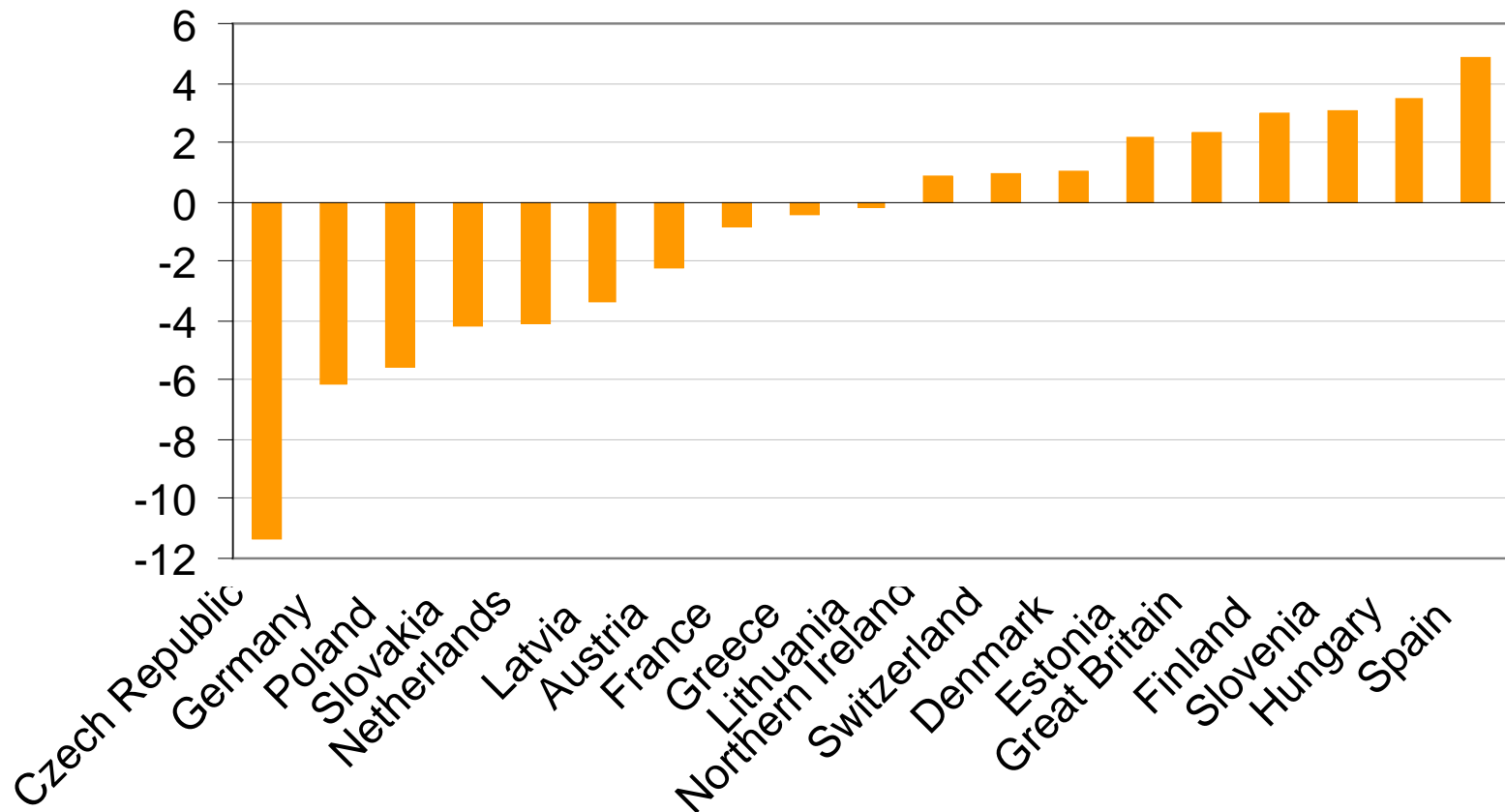
Let the average annual percentage reductions in A and N be $p(A)$ and $p(N)$ respectively.

Then if safety measures producing the reduction in N have a similar effect in reducing A , the average percentage reduction in A due to changes in drink driving, $p(D)$, say, is given by $100 - p(A) = [100 - p(D)][100 - p(N)]$

So $p(D) = 100\{1 - [100 - p(A)]/[100 - p(N)]\}$ is an indicator of effectiveness of drink driving countermeasures in that country

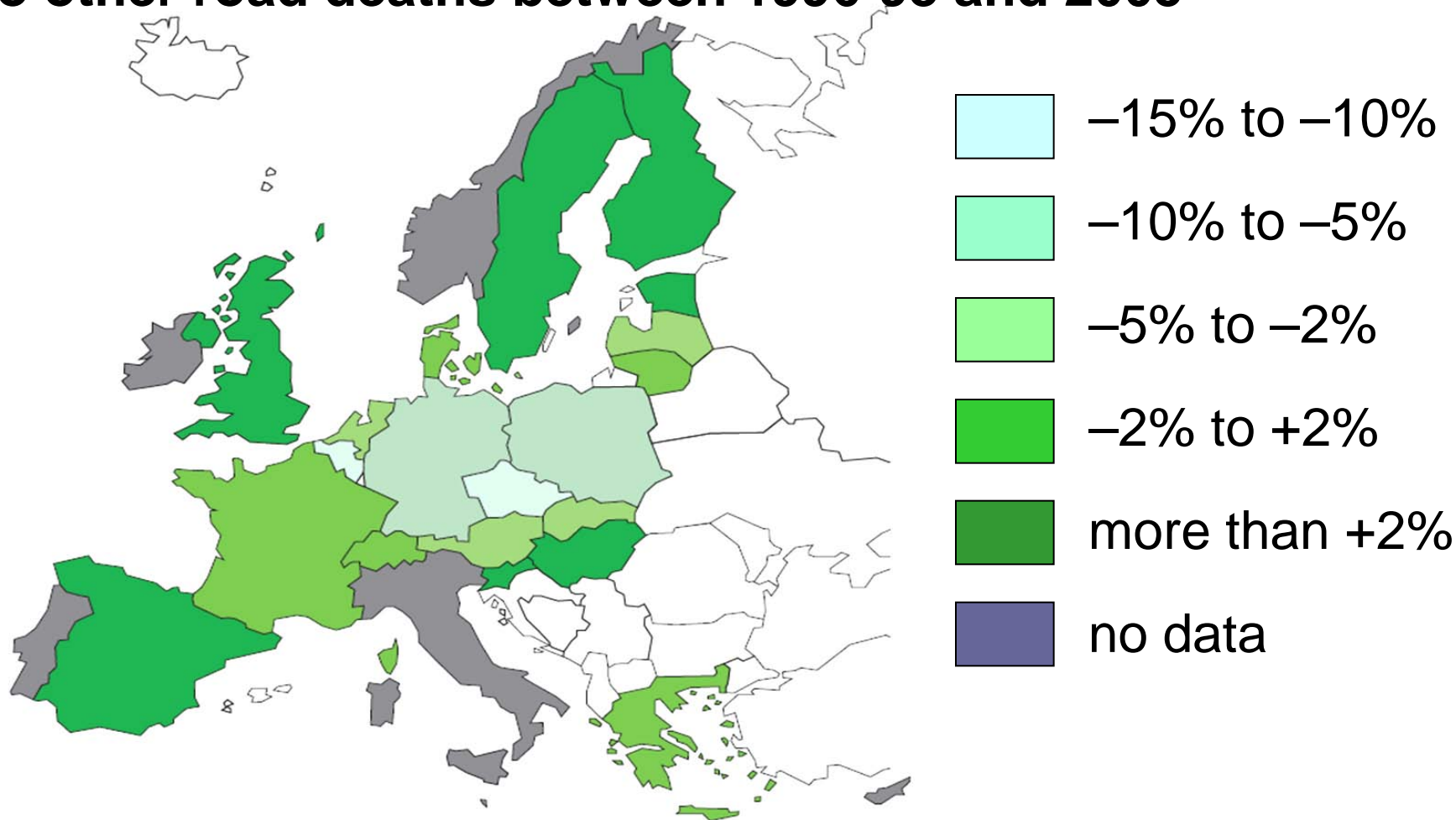
Tackling drink driving deaths

Yearly percentage change in deaths attributed to drink driving relative to other road deaths from 1996-98 to 2005

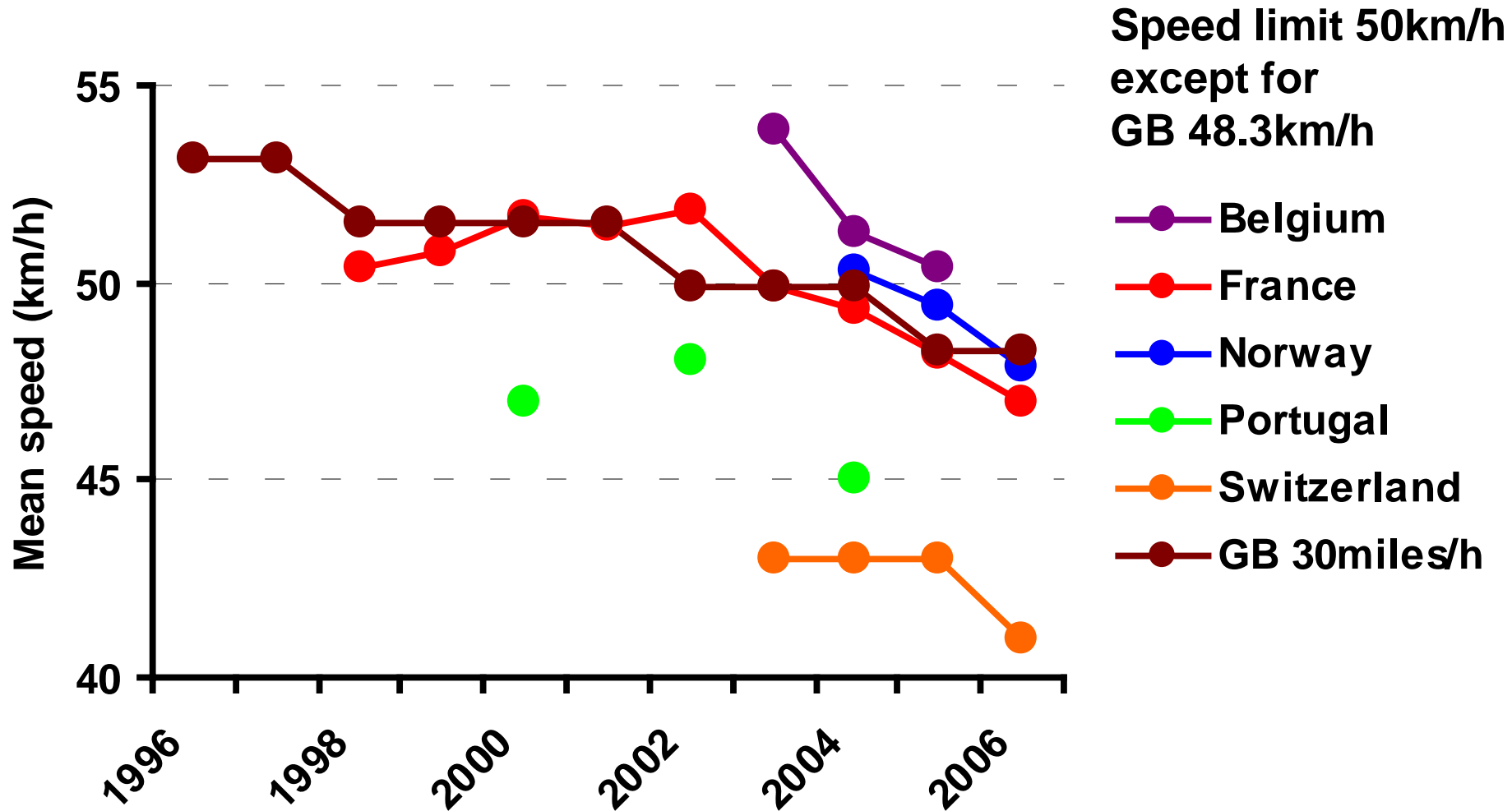


Tackling drink driving deaths

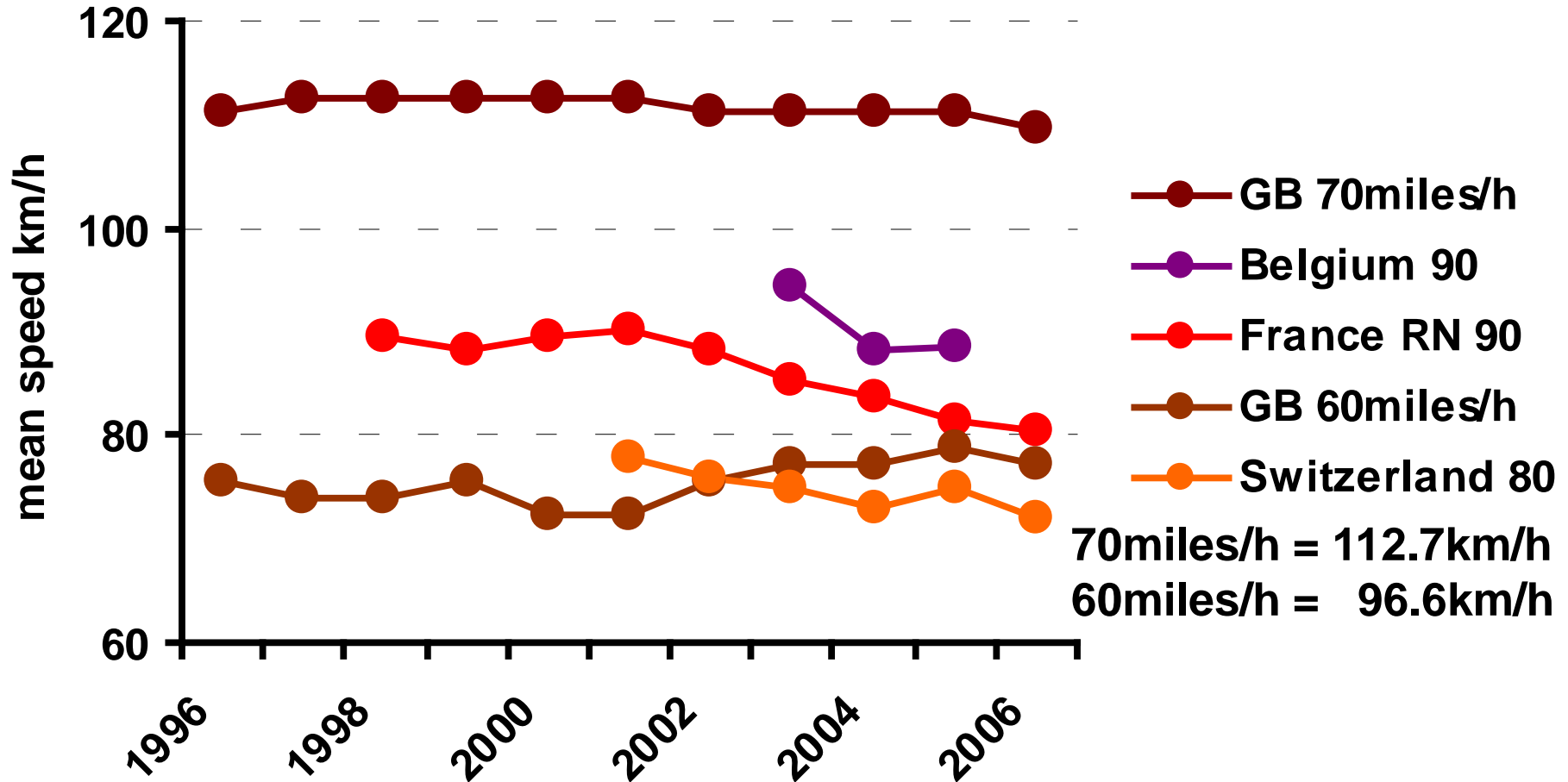
Yearly percentage change in drink driving deaths relative to other road deaths between 1996-98 and 2005



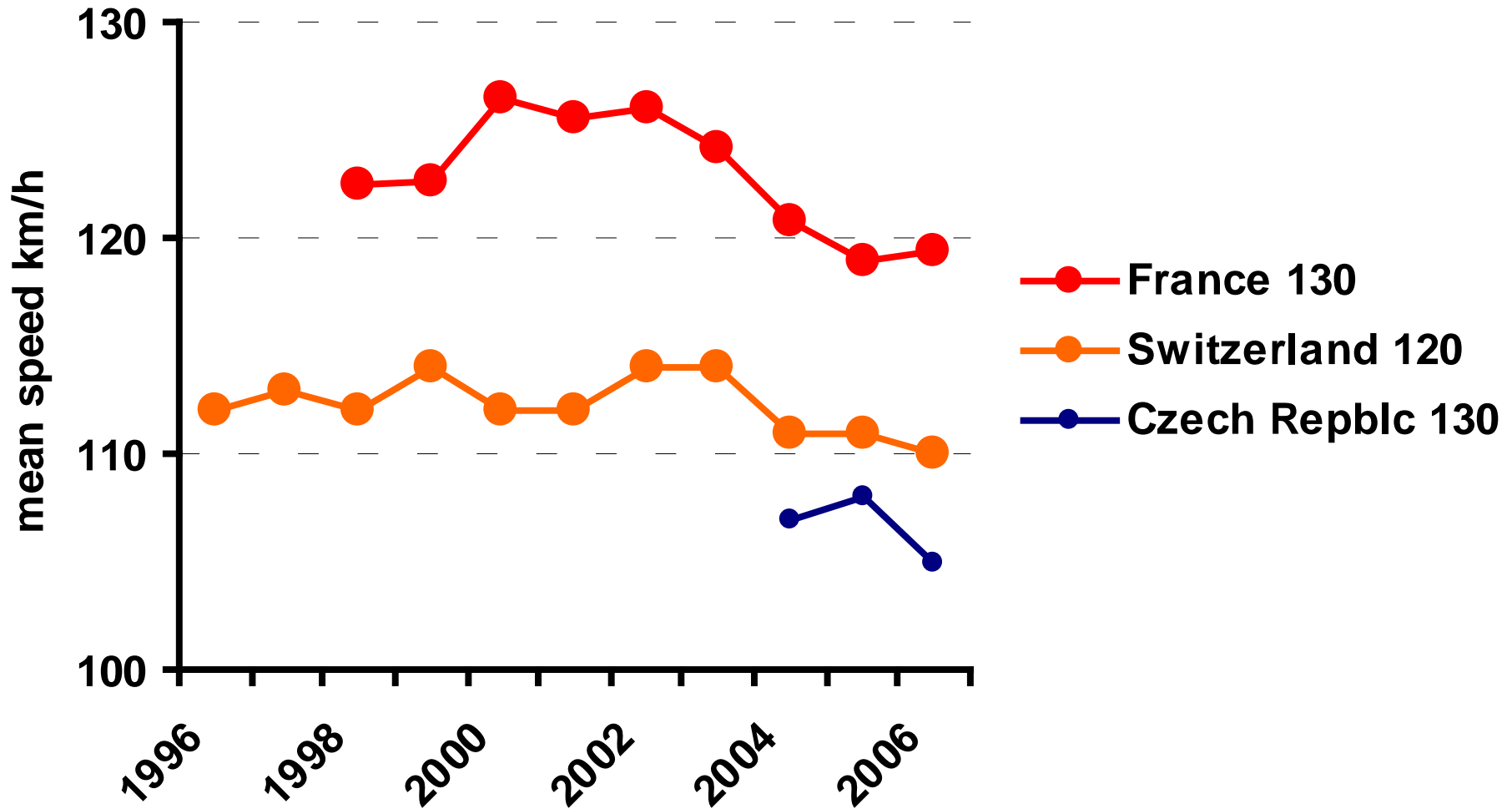
Reduced speeds – urban roads



Reduced speeds – rural roads

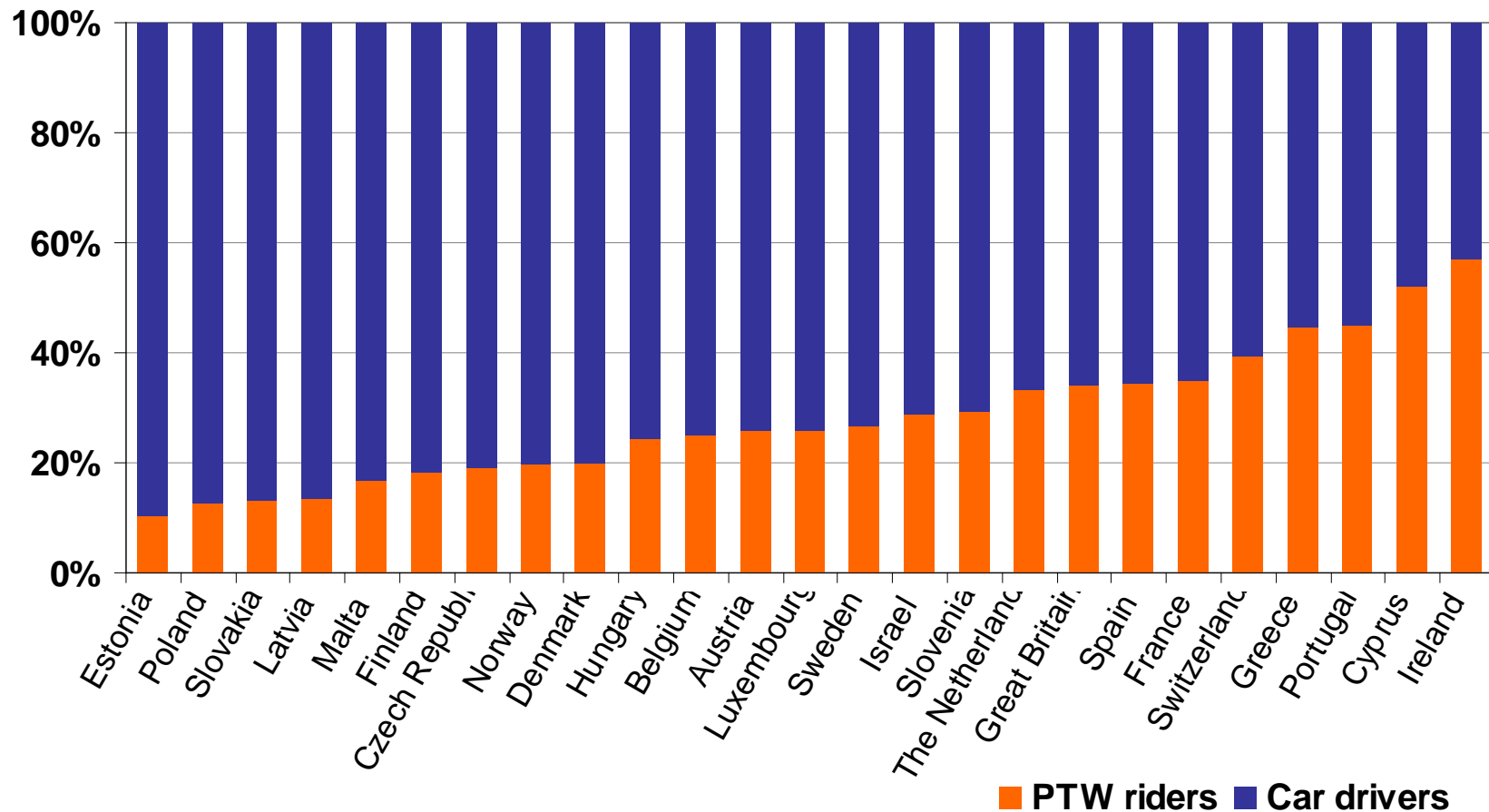


Reduced speeds - motorways



PTW rider and car driver deaths

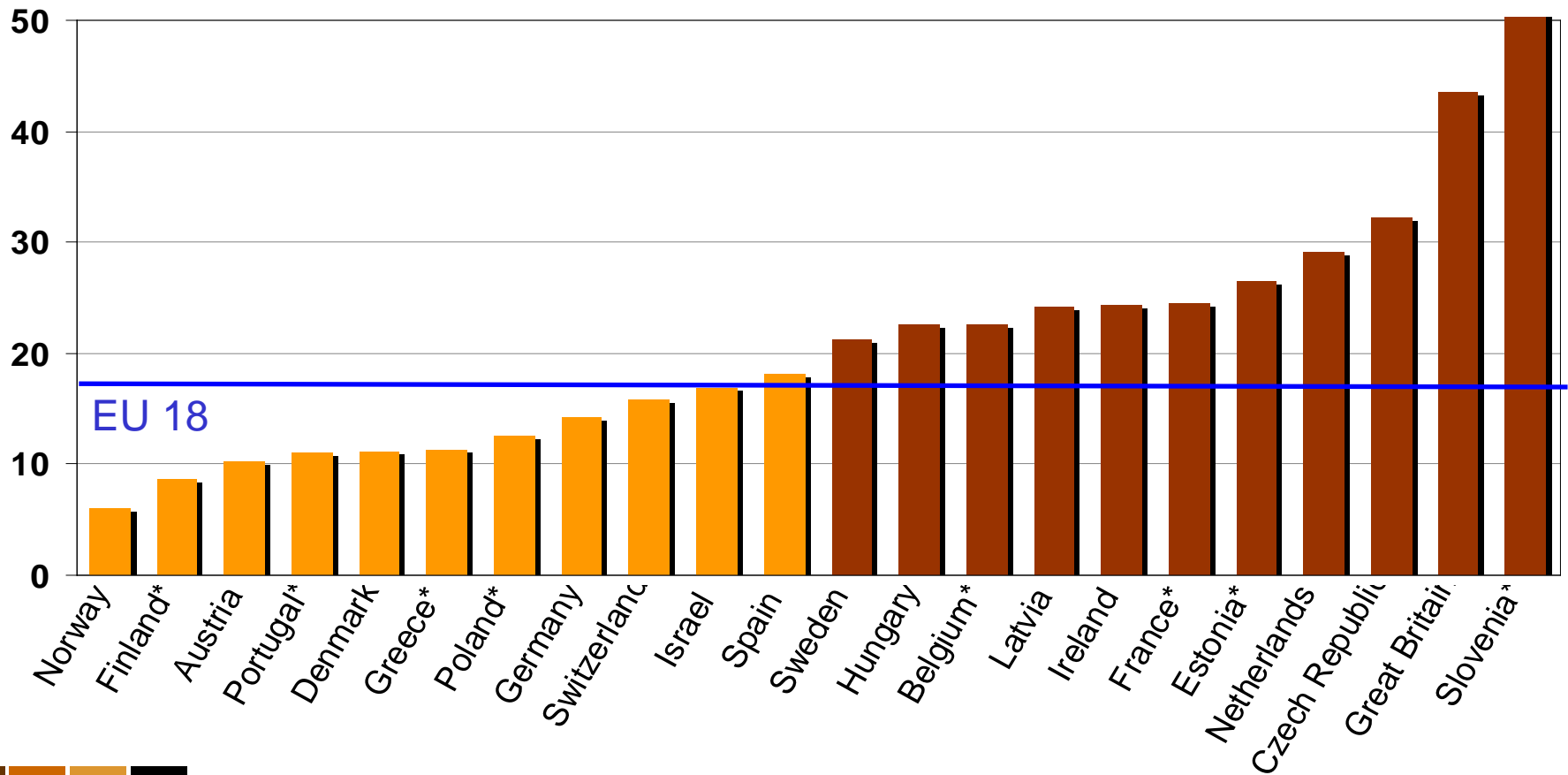
PTW rider deaths as a percentage of
PTW rider and car driver deaths in 2006



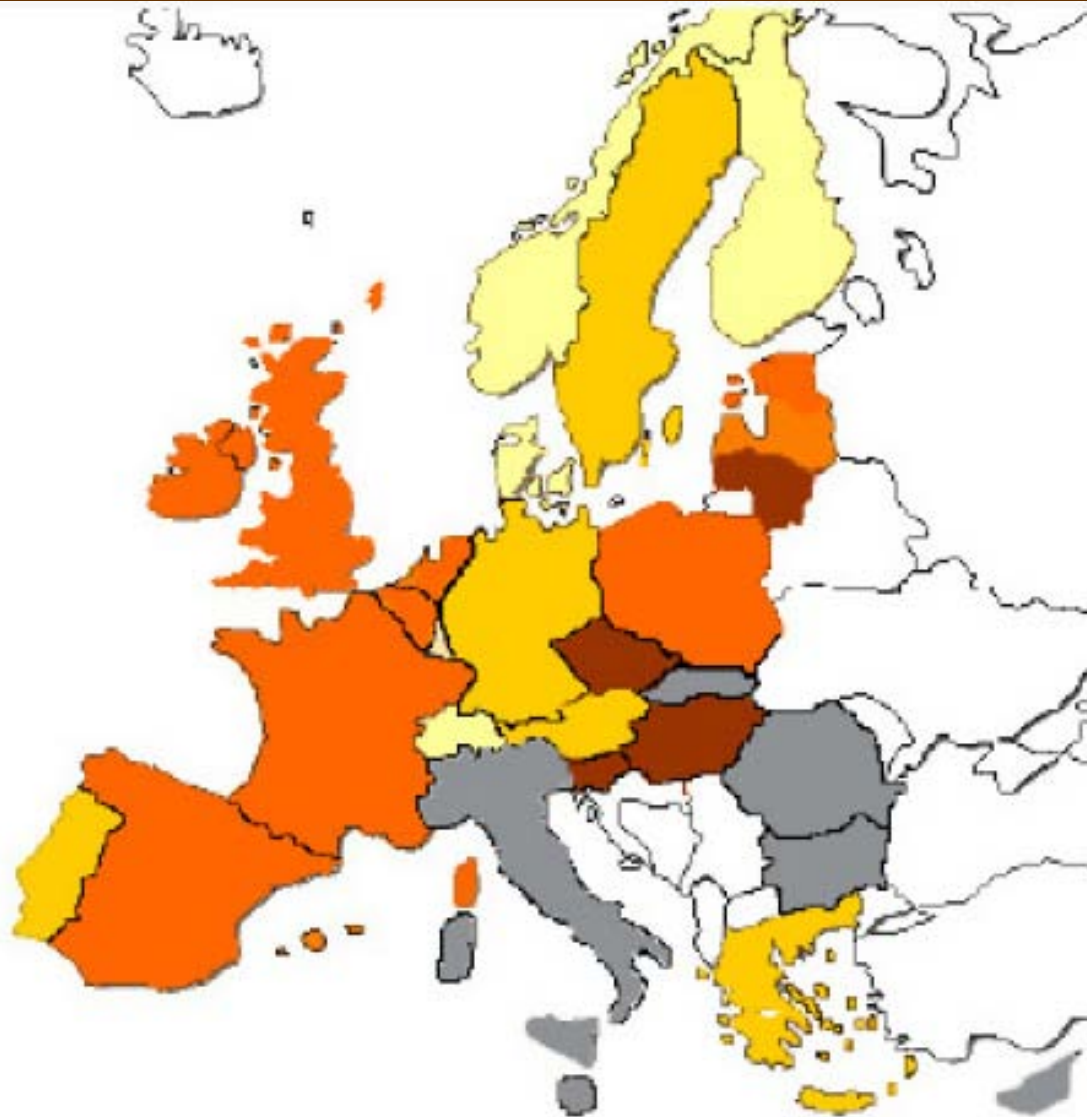


Risk to PTW riders and car drivers

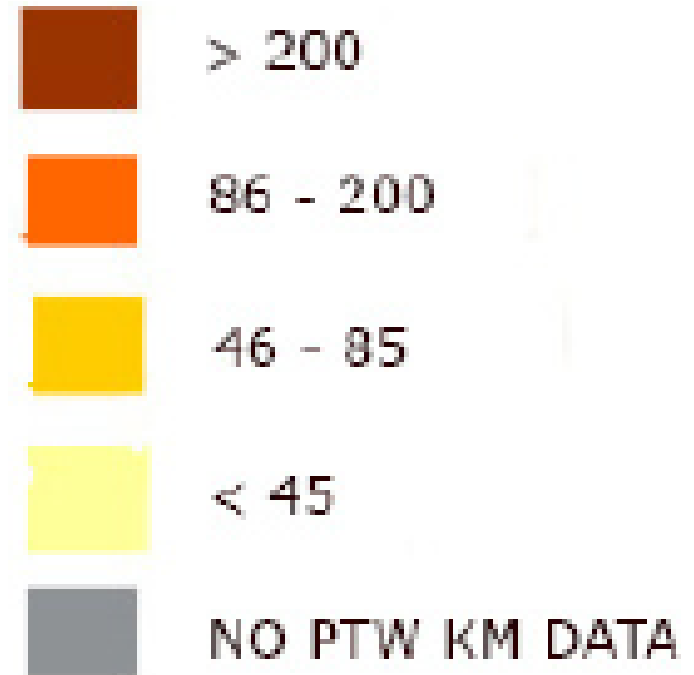
Ratio of death rate per billion km for PTW riders to corresponding rate for car drivers in a recent year



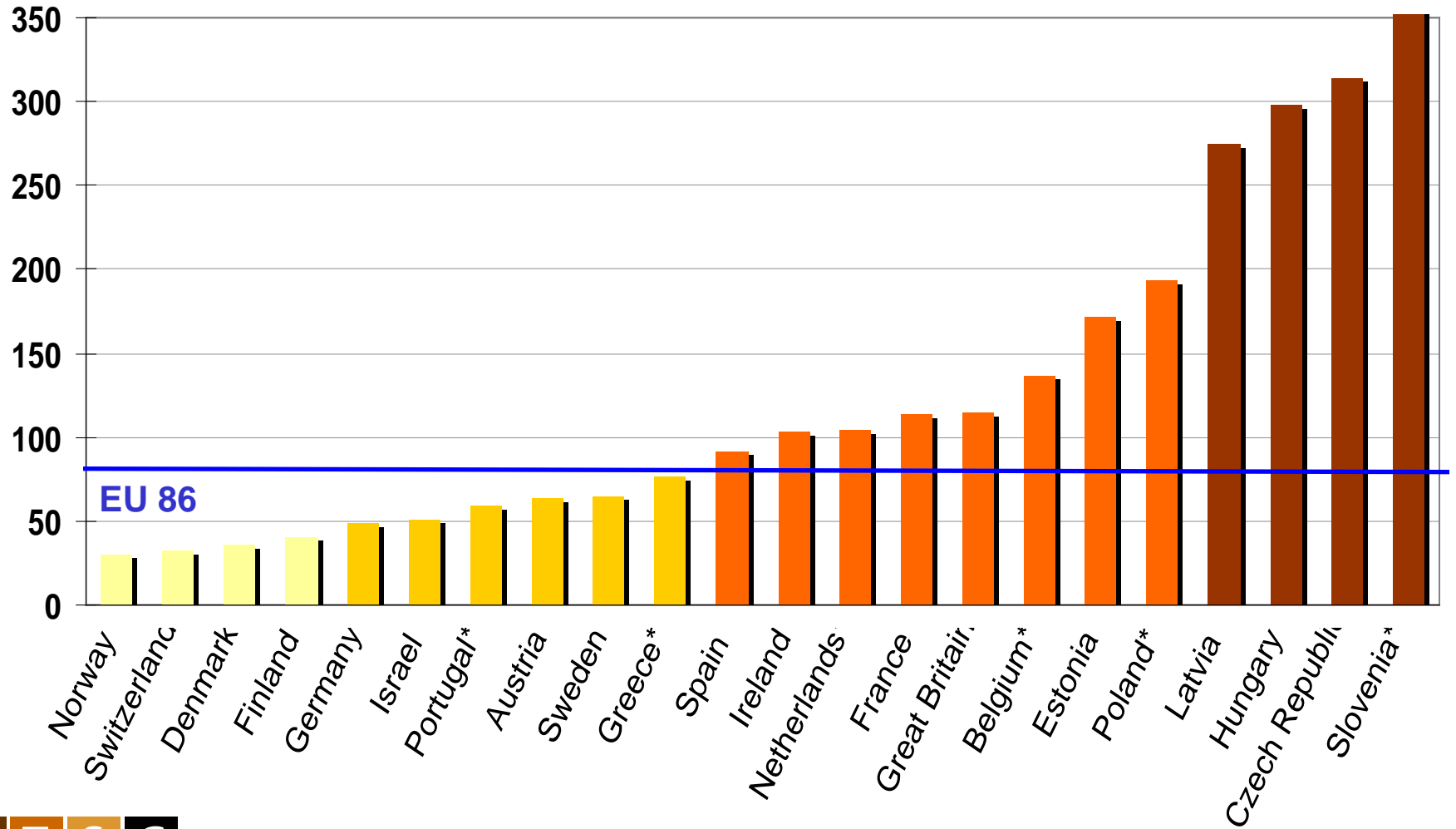
Risk to motorcycle riders



PTW rider deaths per billion km ridden - 2006

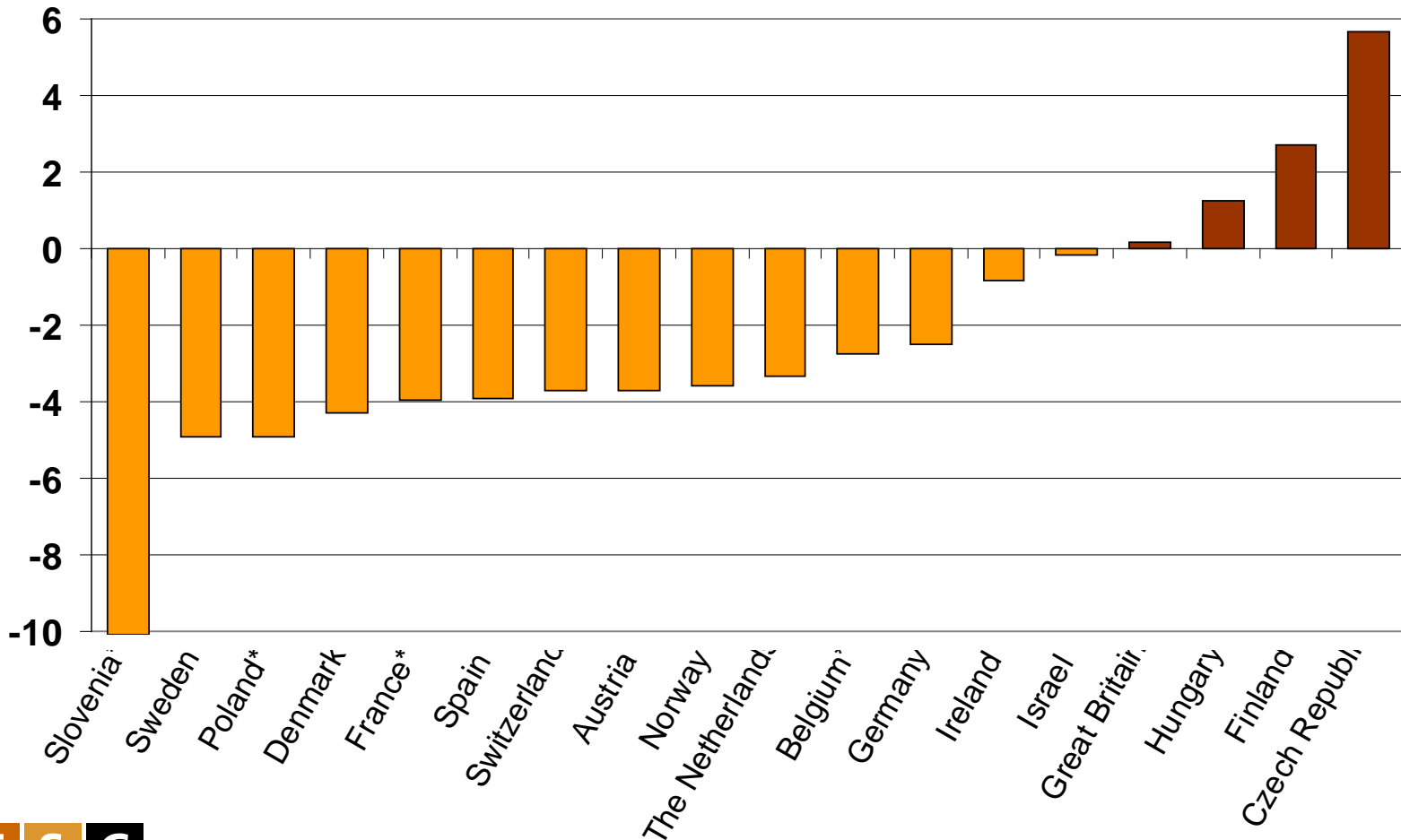


PTW rider deaths/billion km in 2006



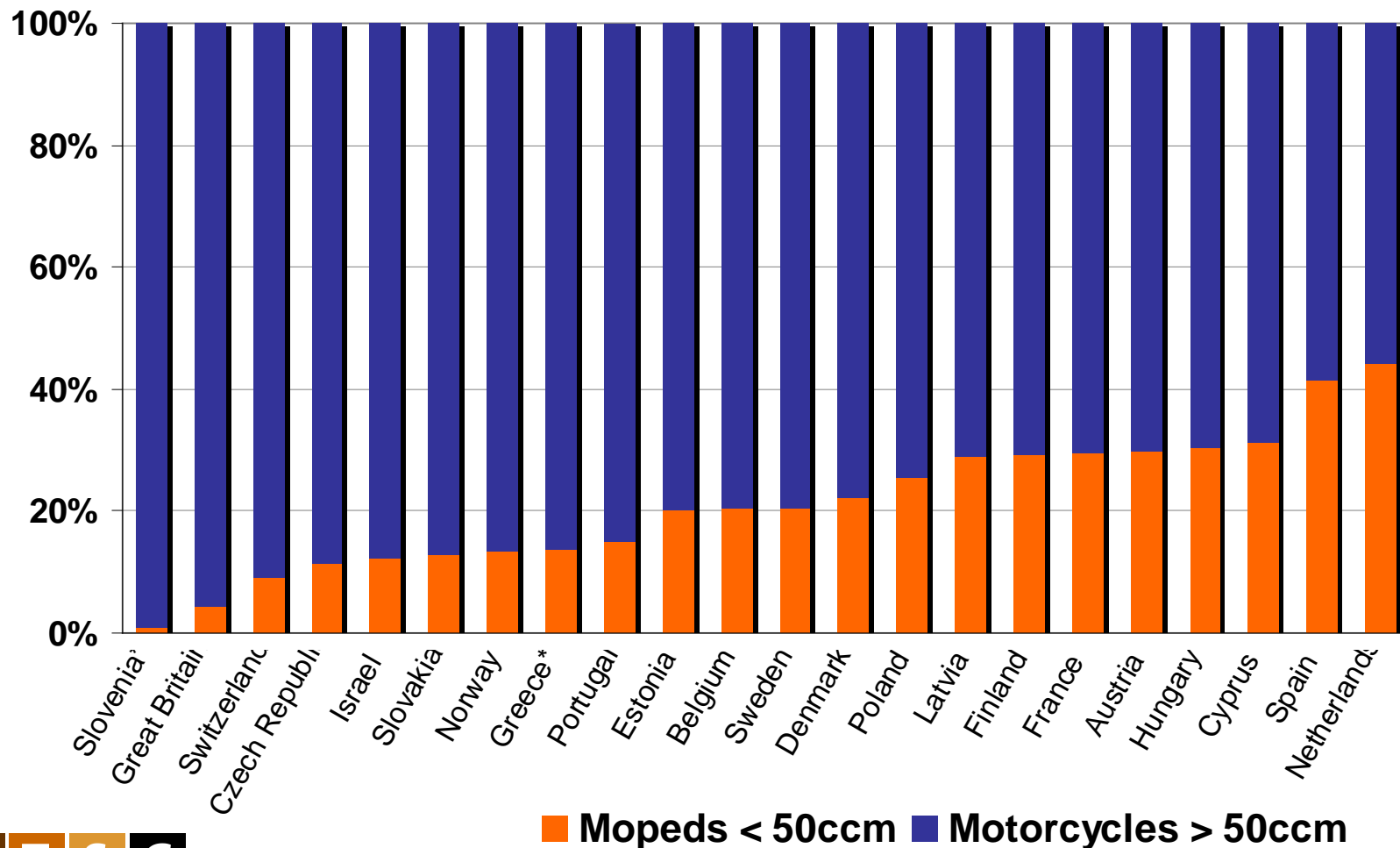
Progress over a recent decade

Average yearly percentage change between 1997 and 2006 in PTW rider deaths per billion km



Moped riders among PTW riders

Moped rider deaths as a percentage of PTW rider deaths in 2004-2006



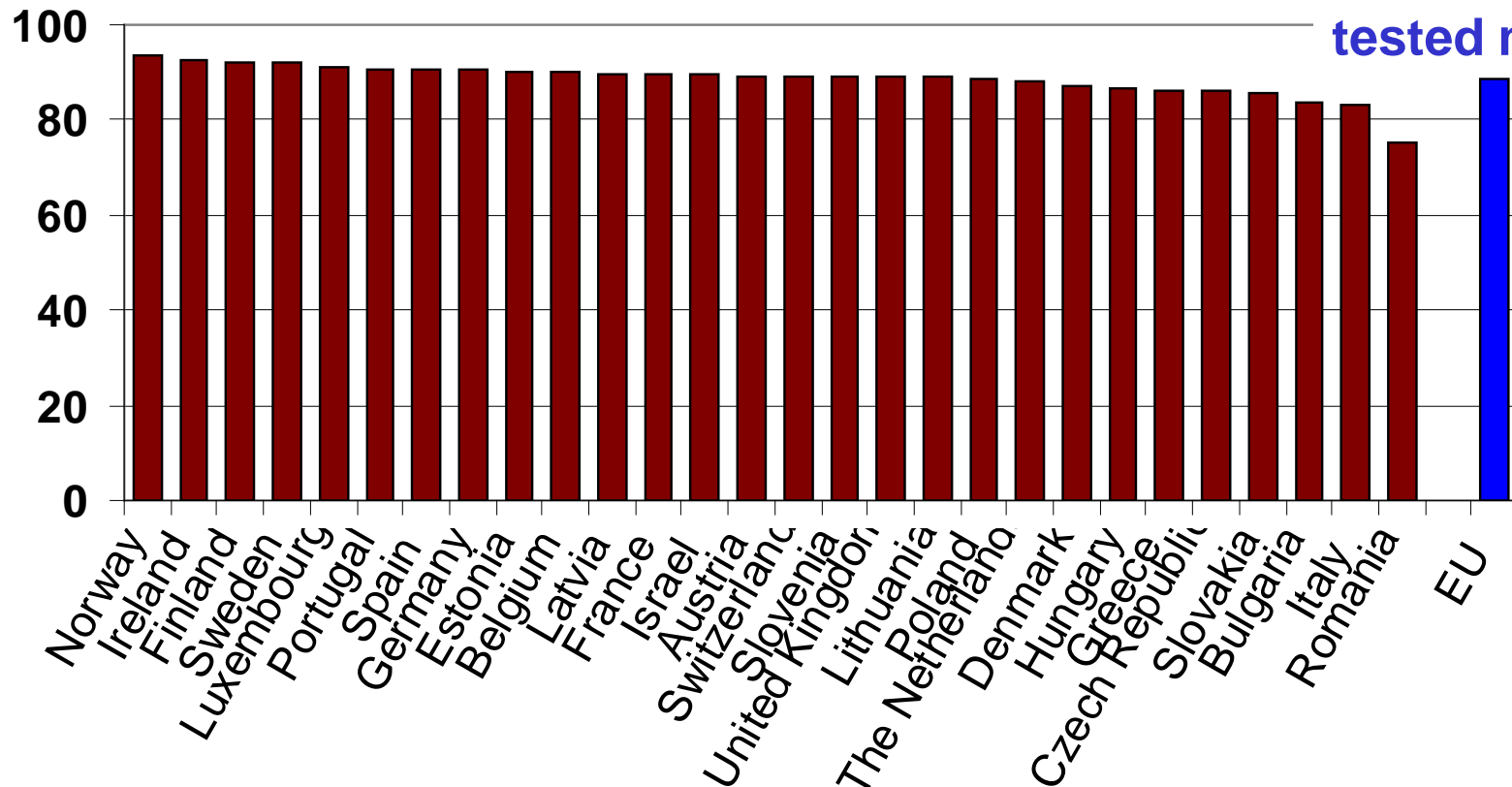
Car safety according to EuroNCAP

- EuroNCAP provides independent consumer information from its own testing
- Tested models receive points scores for *adult occupant*, *child occupant* and *pedestrian* protection
- Between 0 and 5 stars were awarded for each of these separately until 2008
- From 2009 there is a single star rating covering all these and active safety
- See www.euroncap.com

Occupant protection

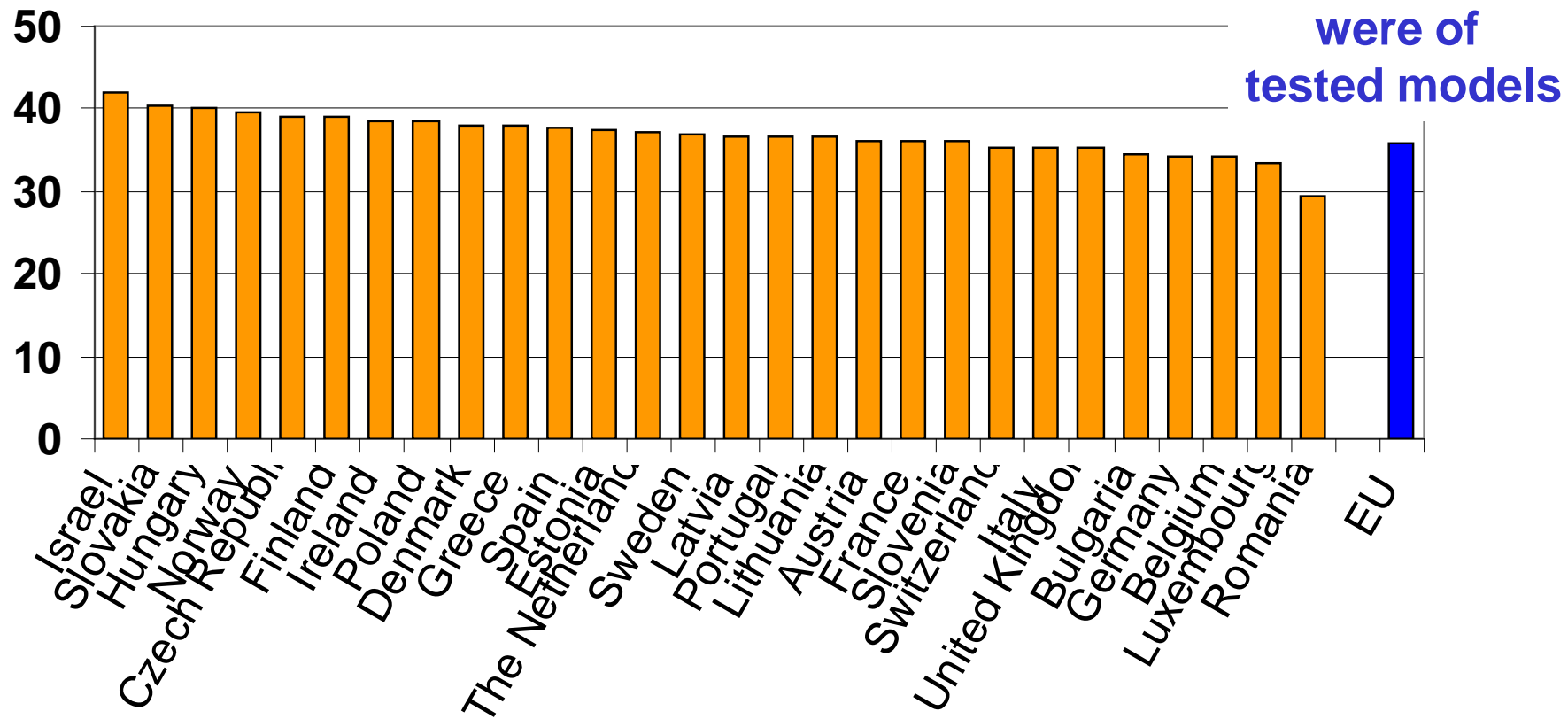
Average EuroNCAP score for new cars of tested models sold in 2008 – percentage of maximum points

92% of sales were of tested models



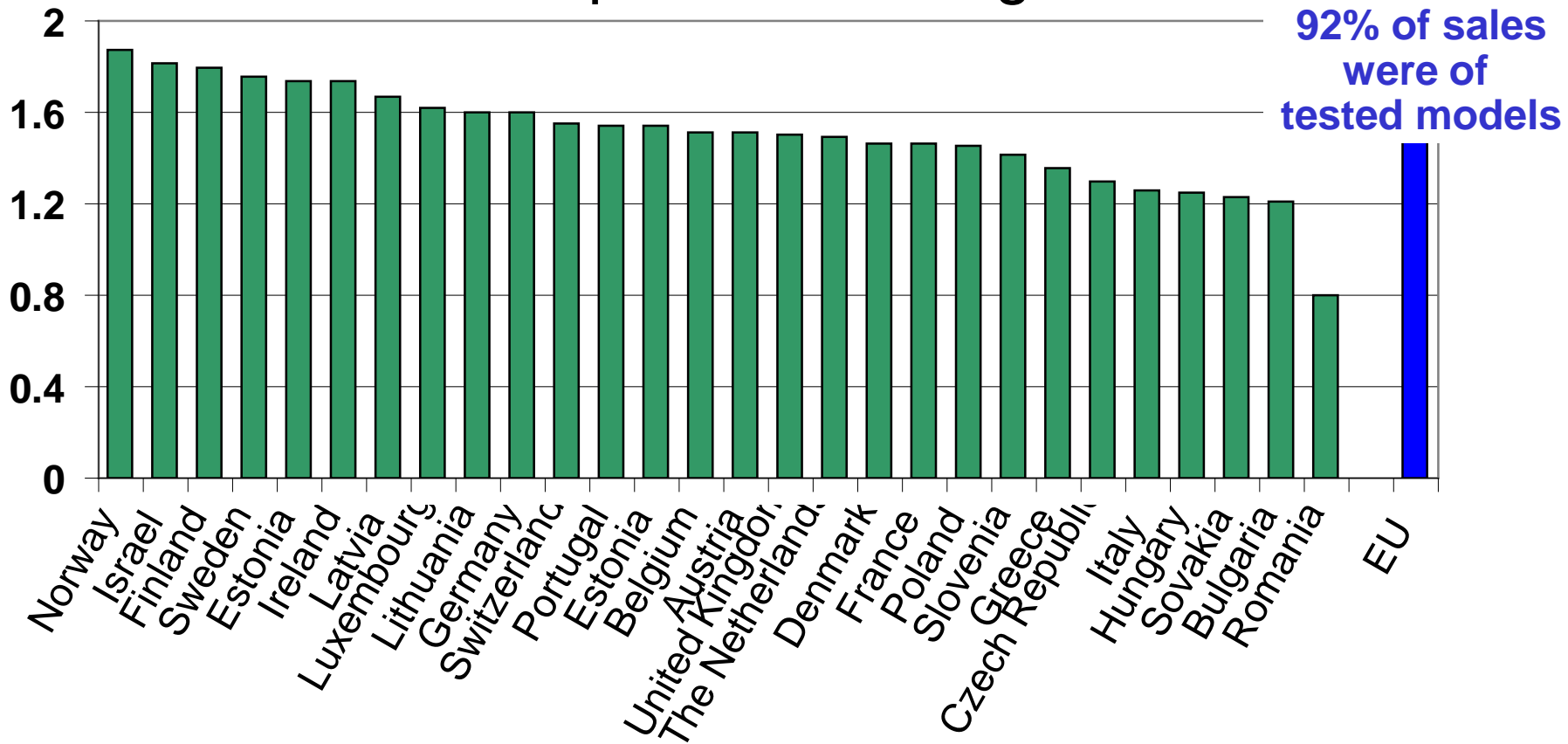
Pedestrian protection

Average EuroNCAP score for new cars of tested models sold in 2008 – percentage of maximum points



Fitting of seat belt reminders

Average number of EuroNCAP points for new cars of tested models sold in 2008 – out of maximum of 3 points for fitting to all seats



Impact of PIN – the PIN Talks

- **Italy:** extensive press coverage of Italy's performance relative to other countries
 - professional recognition of need for improved data collection
- **UK:** Minister extended scope of planned drink-driving consultation to include level of legal limit on breath alcohol
 - influential press coverage based on challenging press release and Minister's statement

UK falls behind on road safety

14 June 2007 – Comparison of the UK road safety performance with that of other European countries reveals that the UK has lost its leading role as a road safety driving force in Europe. Progress on reducing road deaths is slower than in other top performing countries, which means that the UK now comes after the Netherlands and Sweden in terms of road deaths per million population

Another challenging press release

Sweden top of the class – but not on driver behaviour

4 September 2007 – Comparison of Sweden's road safety performance with that of other European countries reveals that Sweden scores exceedingly well in terms of overall safety but neglects the role of the driver in road safety. Sweden has not made any progress on the key areas of drink driving and speeding whereas other top performing countries have, according to the first Road Safety PIN Report by the European Transport Safety Council (ETSC)

Impact of PIN Talk in Sweden

- Widespread discussion among road safety practitioners and politicians
 - recognition that more needed to be done about driver behaviour
 - contribution to fresh phase of thinking about implications of Vision Zero for safe use of the roads

Impact of Flash 7 – motorcycling

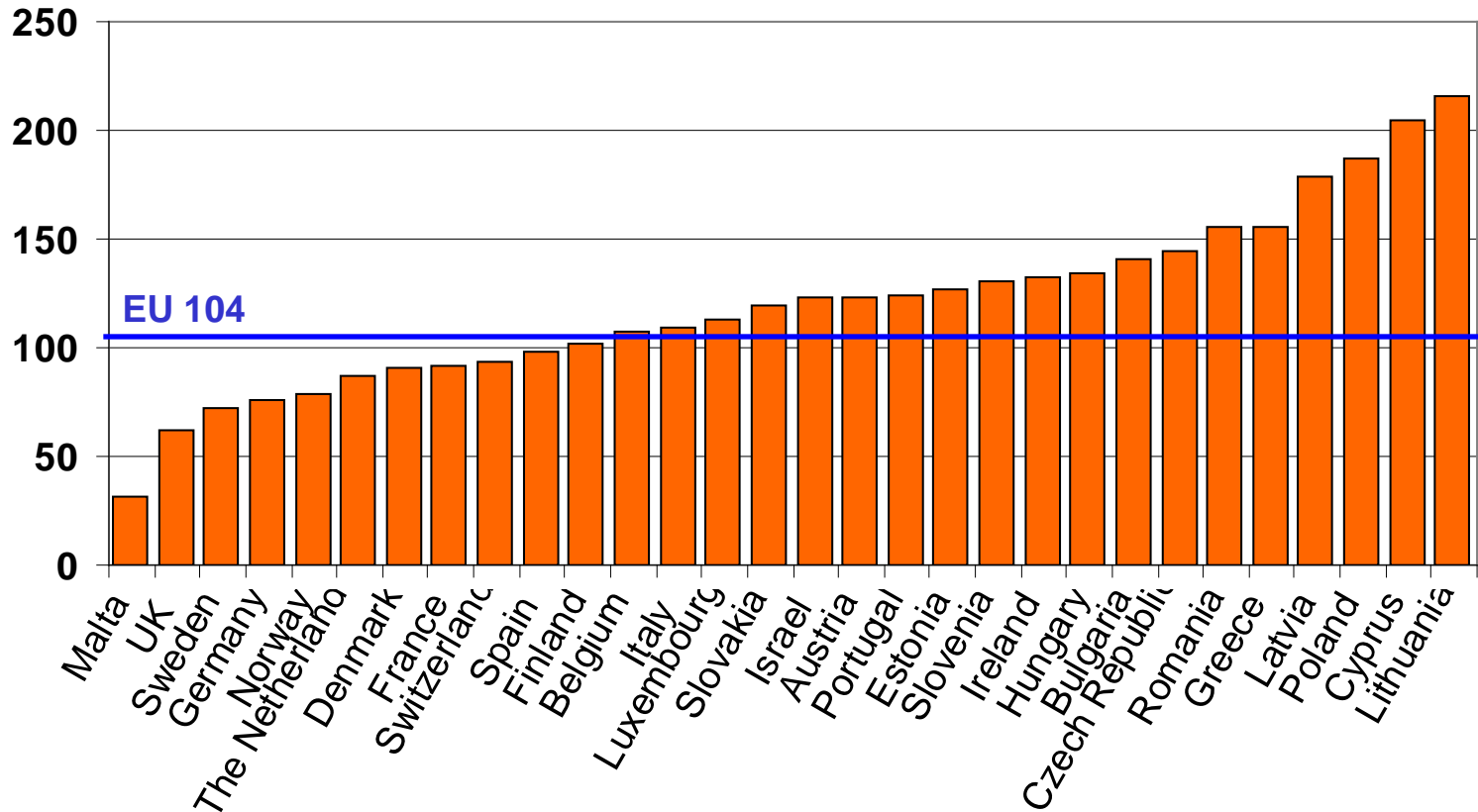
- Low rankings of the **Czech Republic** on risk to motorcyclists and on rate of change in motorcyclist deaths were noted by press and practitioners
- Ministry decided to place two-wheelers at the centre of road user education and awareness-raising in 2008

Impact of Flash 8 – motorways

- Publication timed for one week before European Parliament Committee vote on Infrastructure Directive concerning safety audit, treatment of high-risk sites and safety inspection on Trans-European roads
- Flash sent personally to each Committee Member and Substitute
- Rapporteur's proposal for directive adopted by Committee

Deaths among older road users ...

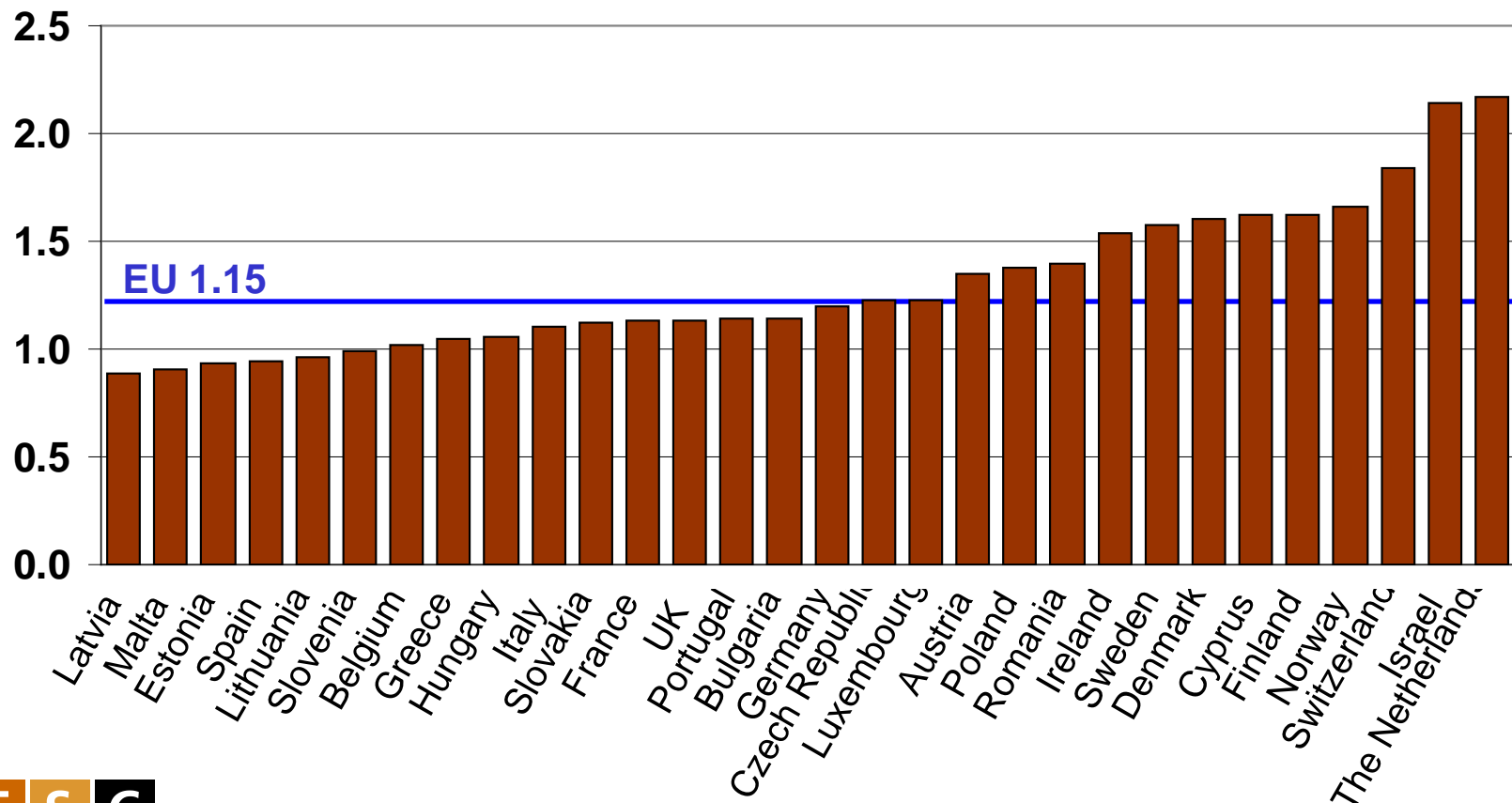
Road deaths per million population among people aged 65 or over – average for 2004-2006



... compared with younger people

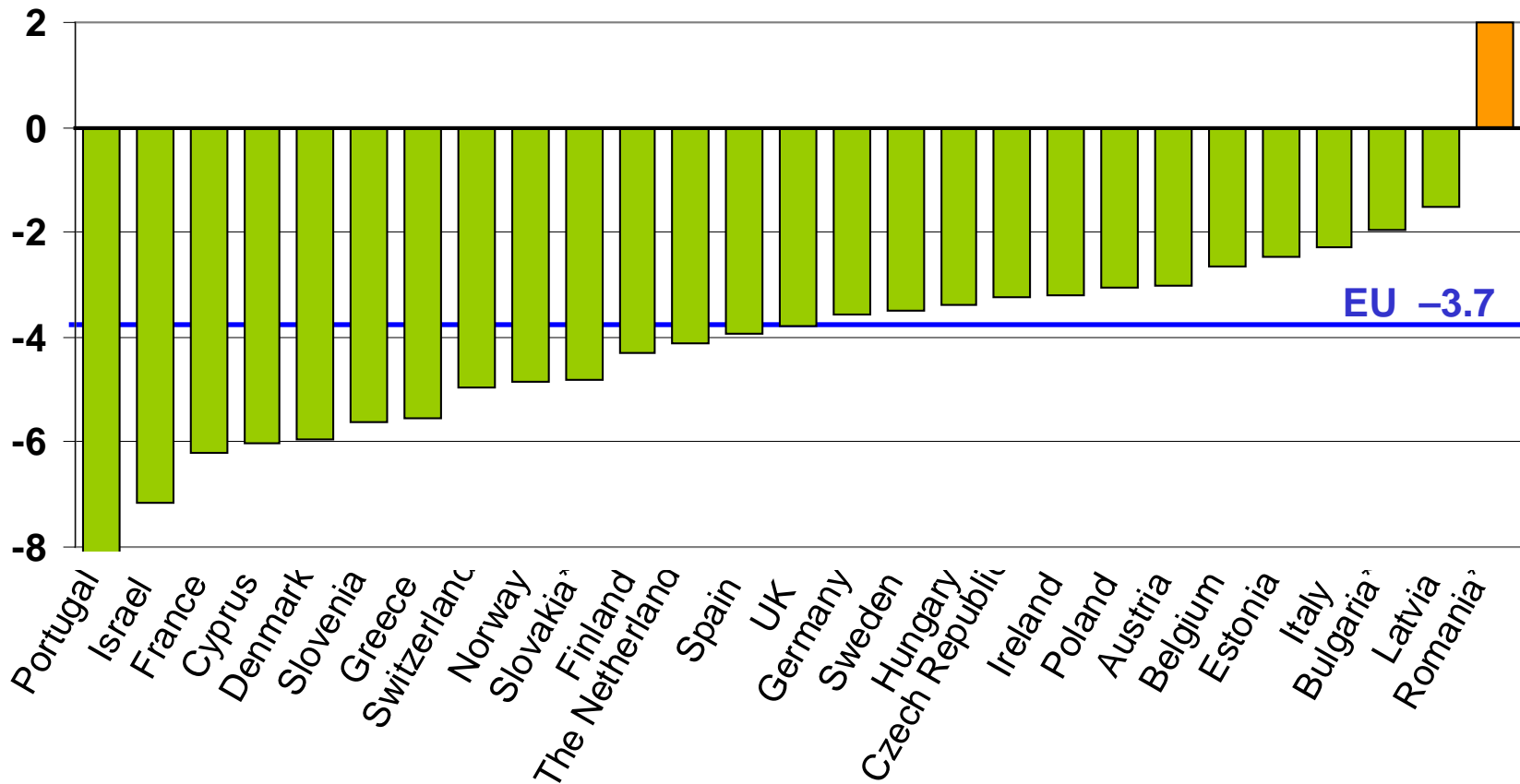
Ratio $\frac{\text{Deaths per million population 65 or over}}{\text{Deaths per million population under 65}}$

in 2004-2006

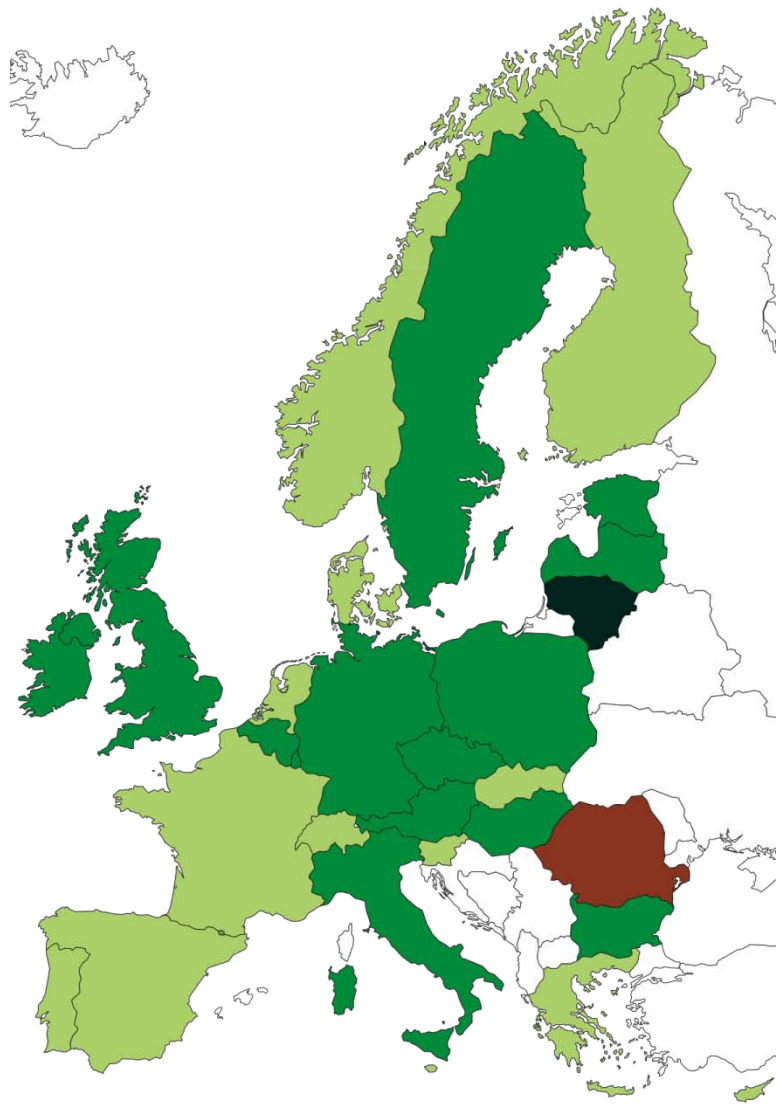






Progress over a recent decade

Average yearly percentage change in road deaths among people aged 65 and over between 1997 and 2006



Progress over a recent decade



-  Above EU Average
-  Below EU Average
-  Increasing
-  Not available

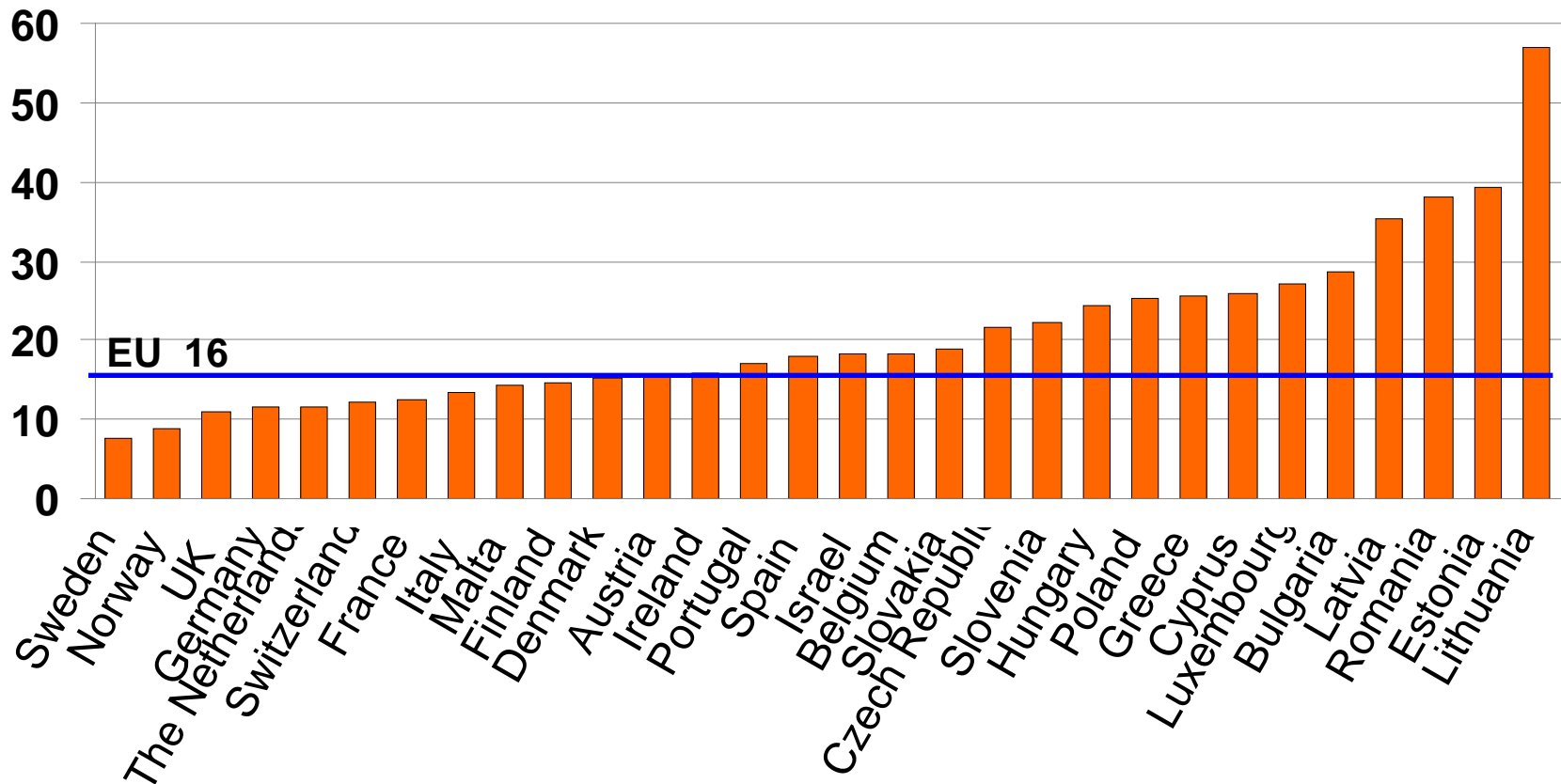
Average yearly percentage change in road deaths at ages 65+ from 1997 to 2006*
EU Average = -3.7%



* shorter periods ending 2006 in a few countries

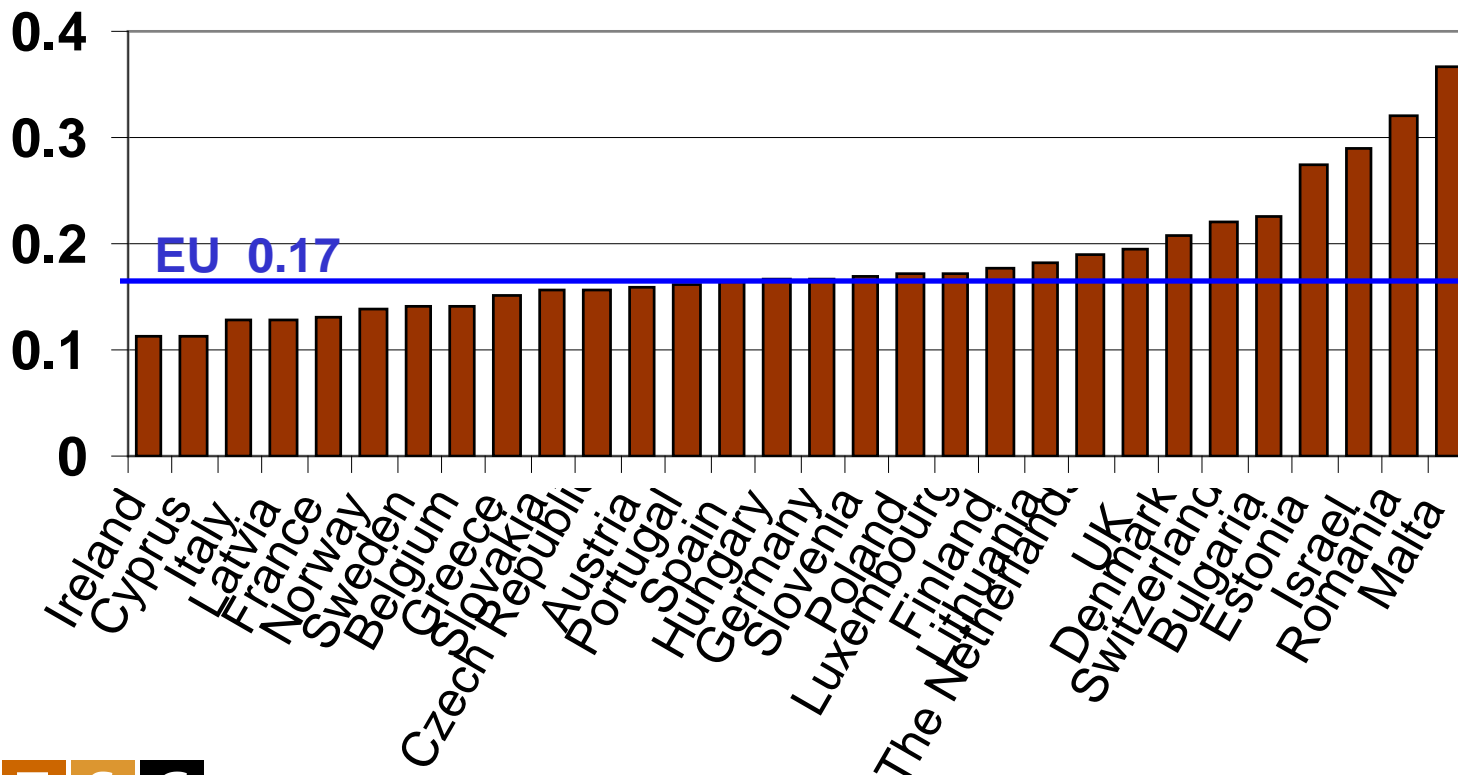
Deaths among children ...

Road deaths per million population among children aged 14 or under – average for 2005-2007



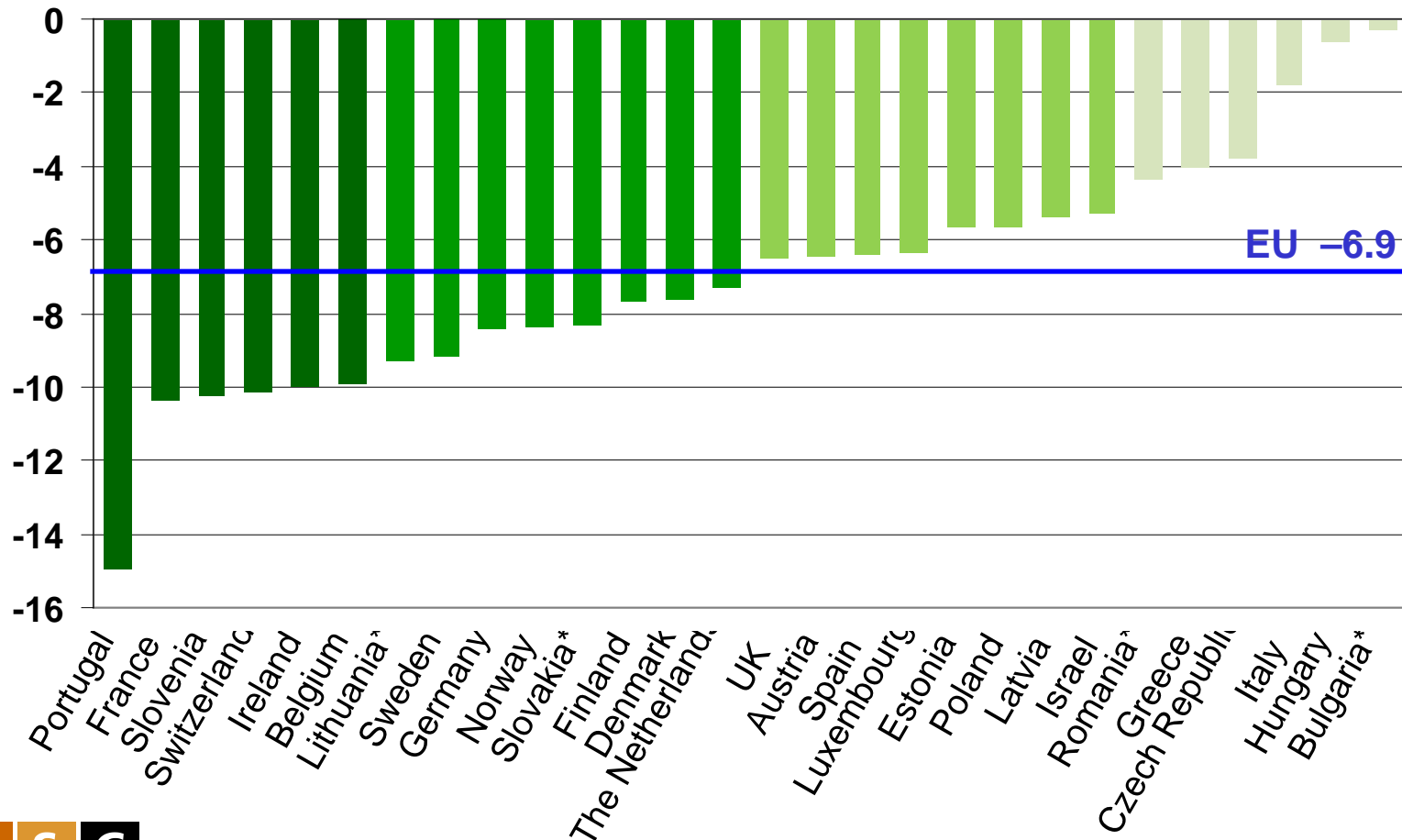
... compared with those over 14

Ratio $\frac{\text{Deaths per million population 14 or under}}{\text{Deaths per million population over 14}}$
in 2005-2007

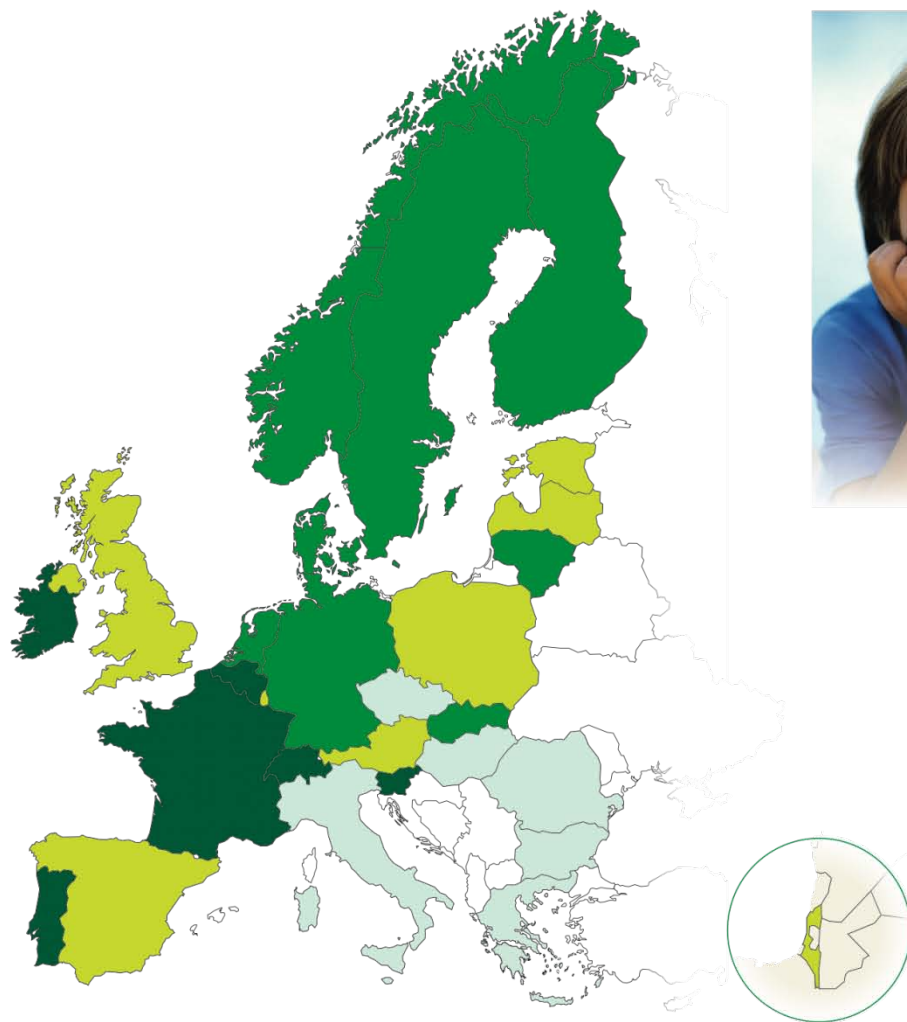


Progress over a recent decade

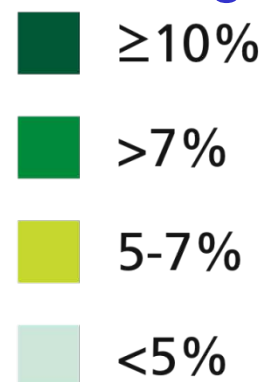
Average yearly percentage change in road deaths among children aged 14 or under between 1998 and 2007



Child road deaths over a decade



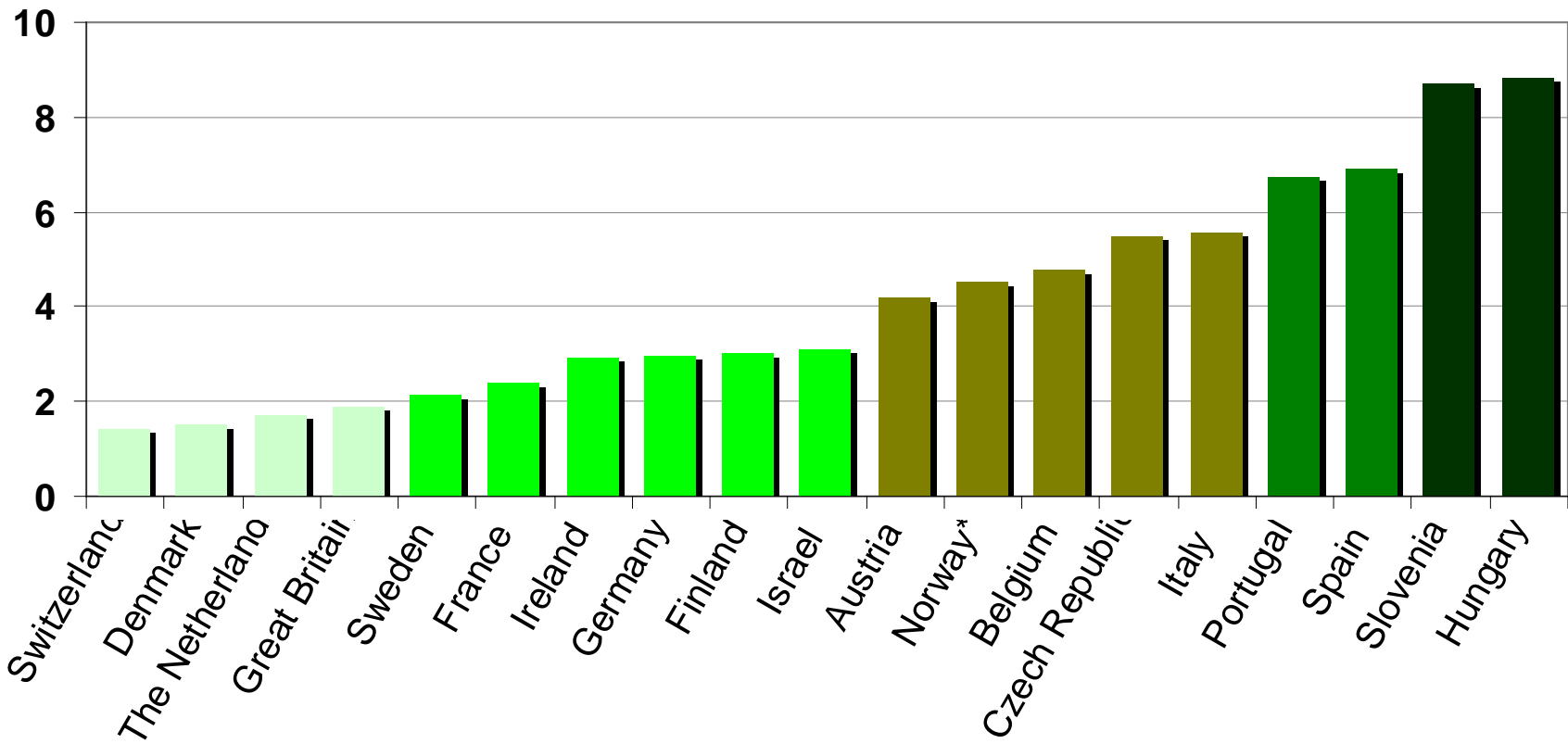
Annual average percentage reduction over the decade 1998 to 2007*
EU Average = -6.9%



* shorter periods ending 2007 in a few countries

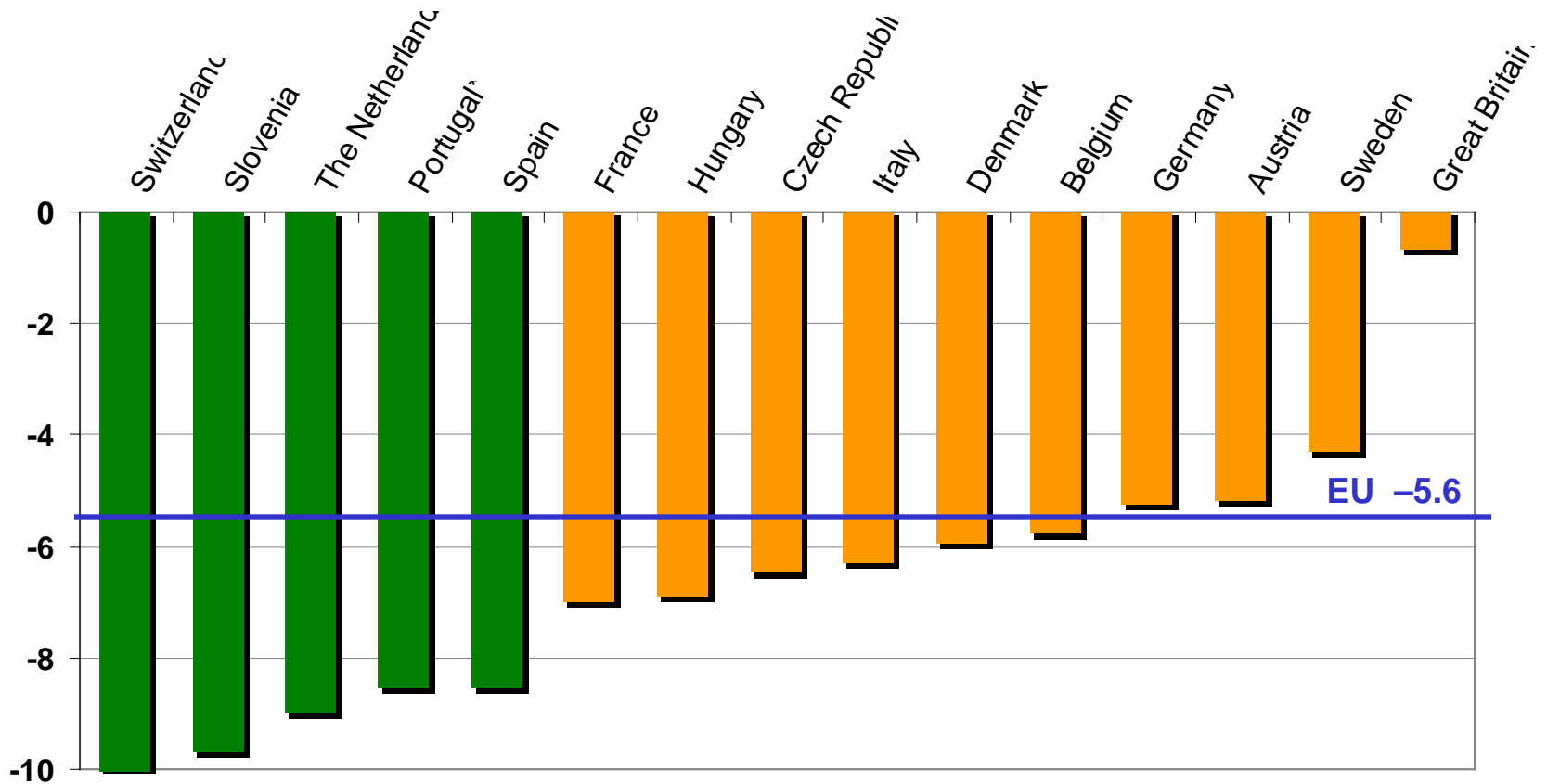
Deaths on motorways

Deaths on motorways per billion vehicle-km in 2006



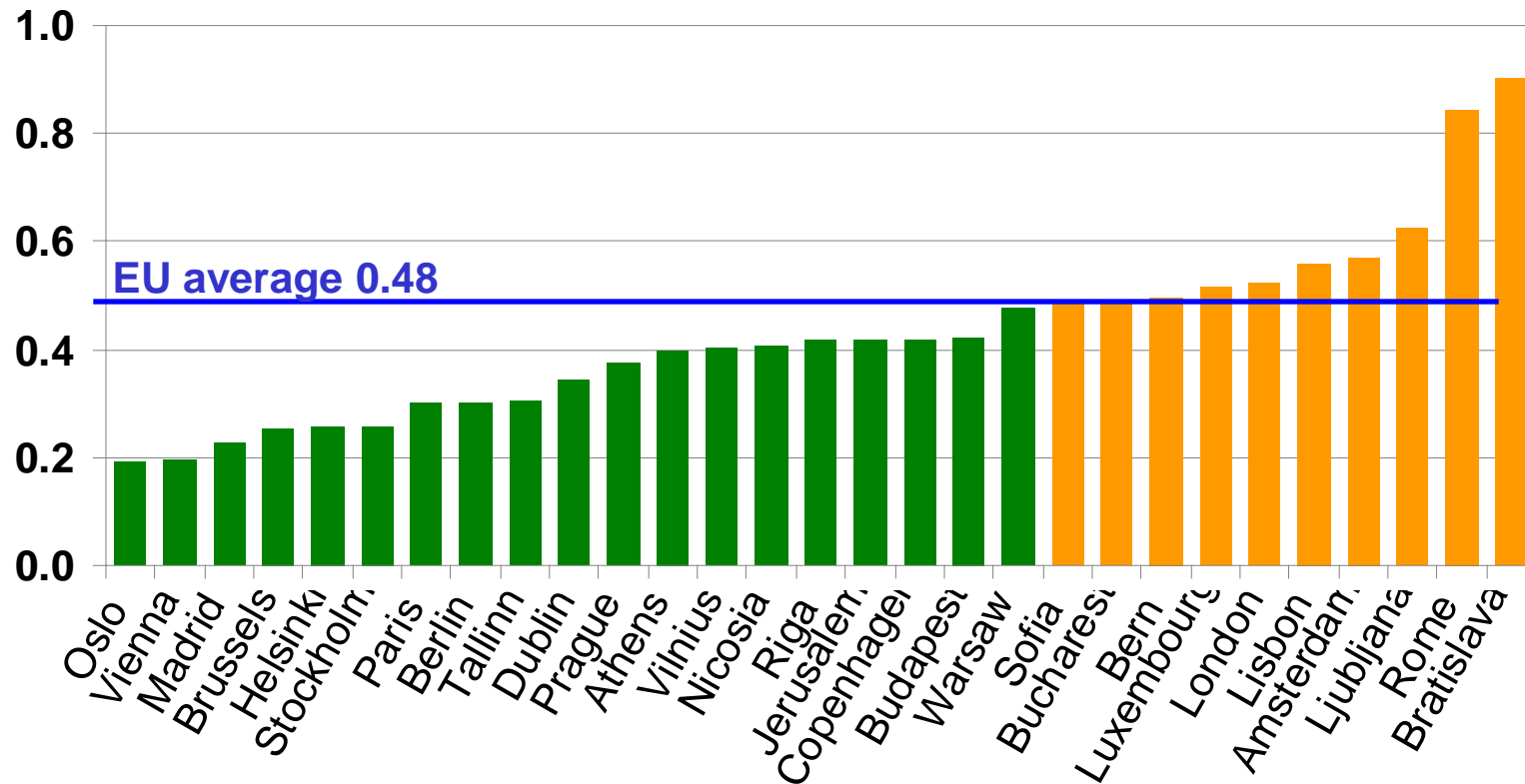
Reducing deaths on motorways

Average yearly percentage change between 1997 and 2006 in deaths on motorways per billion vehicle-km



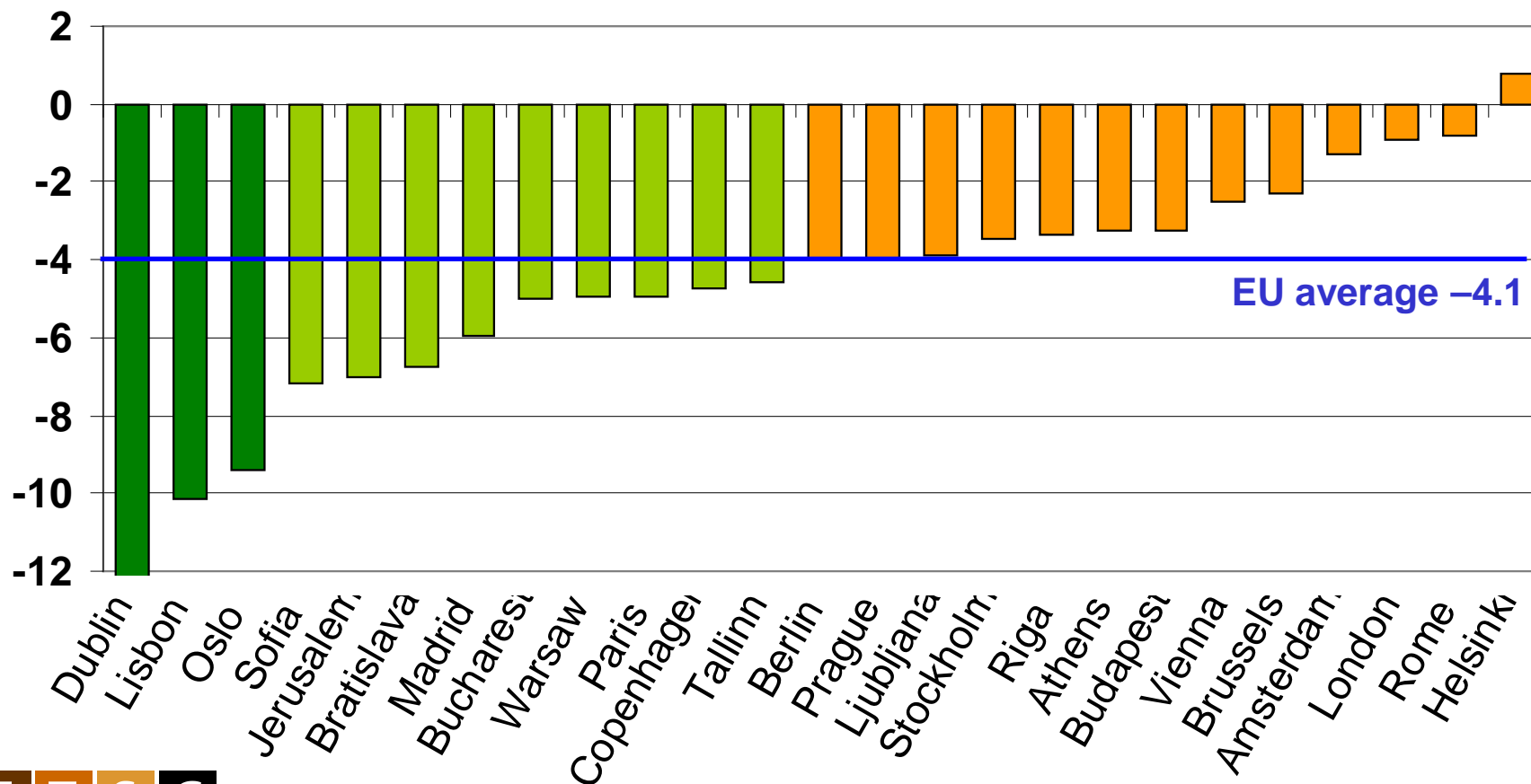
Risk of road death lower in capitals –

Ratio $\frac{\text{road deaths/million population in capital city}}{\text{road deaths/million population elsewhere}}$
in 2005-2007



– and has decreased over a decade ..

Average annual percentage change in road deaths/million population between 1997 and 2007



.. on average faster than elsewhere

Annual average reduction in deaths/million population:
excess in the capital city over the rest of the country

Percentage
points

