

Crash modification factors versus functions

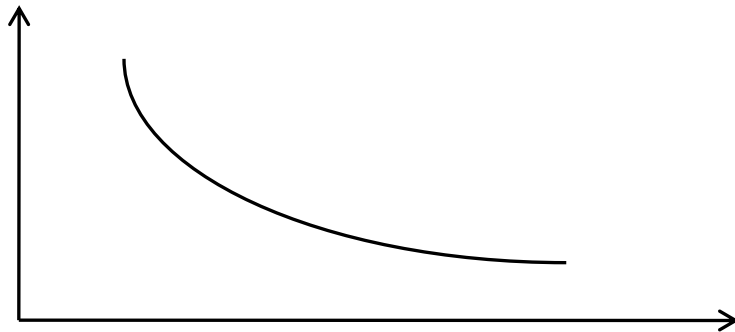
International Workshop on Transferability of Crash
Modification Factors

TRB Annual Meeting 2011, January 23

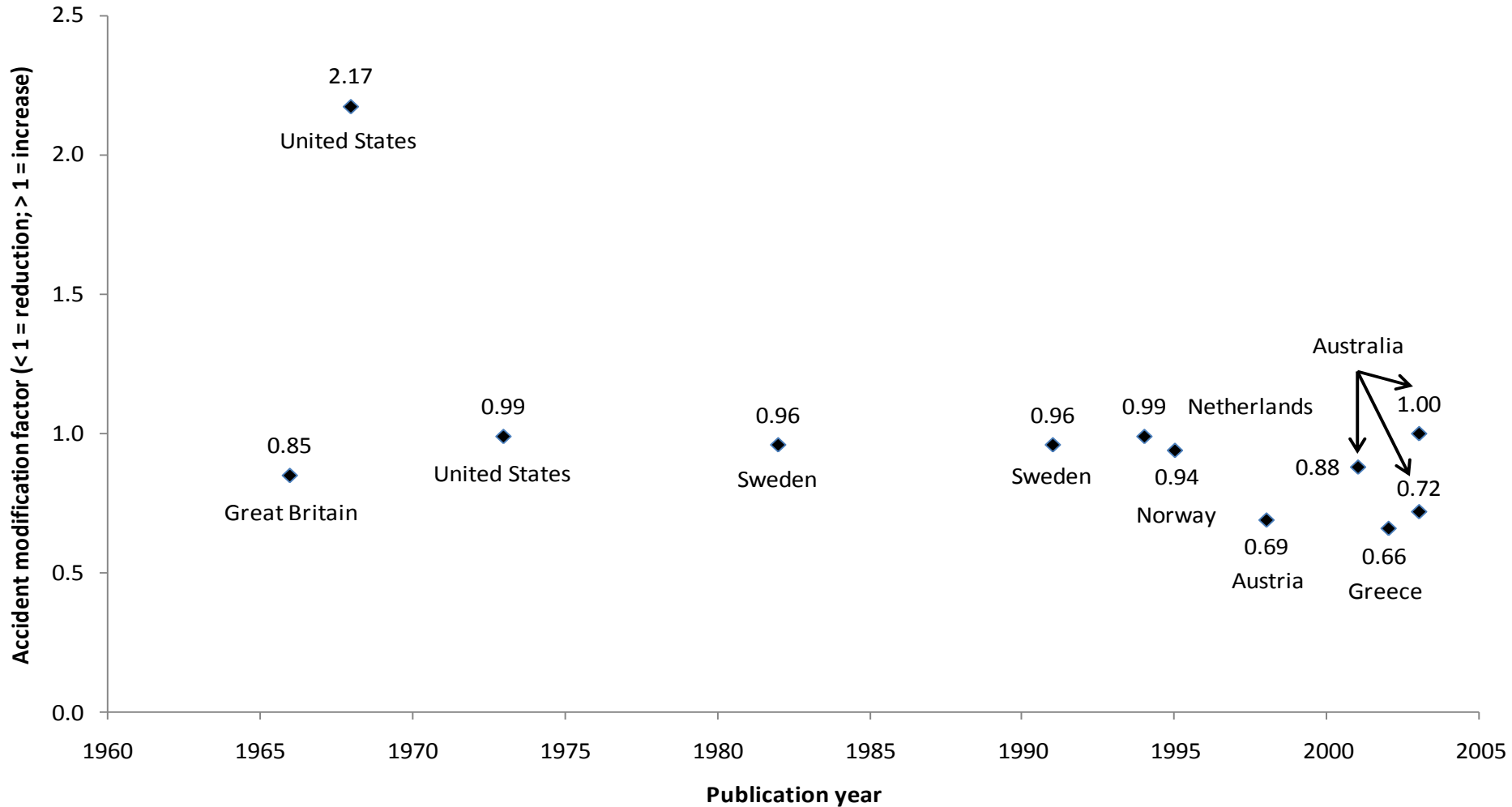
Rune Elvik, Institute of Transport Economics, Norway
(re@toi.no)

Two ways of representing the effects of a safety measure

- By stating the effect as a single point estimate, for example:
 - Speed enforcement reduces accidents by 10 %
- By showing how the effect varies as a function of one or more characteristics that influence the size of the effect:



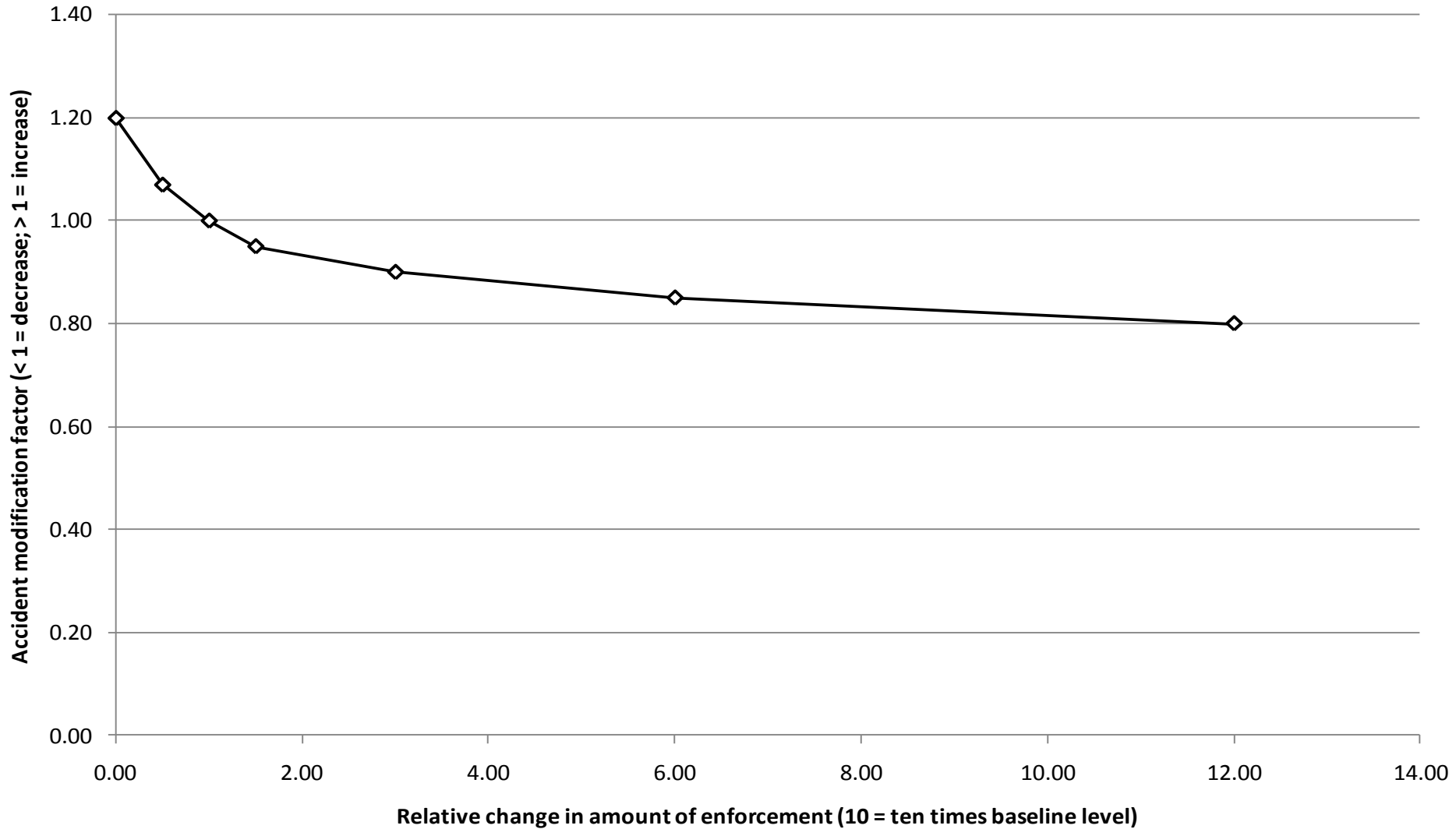
Accident modification factors for speed enforcement in twelve studies reported from 1966 to 2003



Results vary – we want to know why

- The twelve studies were published in eight countries between 1966 and 2003
- Results vary considerably, both within and between countries
- It is important to find out why, and to examine if results obtained in one country can be applied in another country
- Can we think of a function that shows the effects of speed enforcement and that can be generalized across countries?

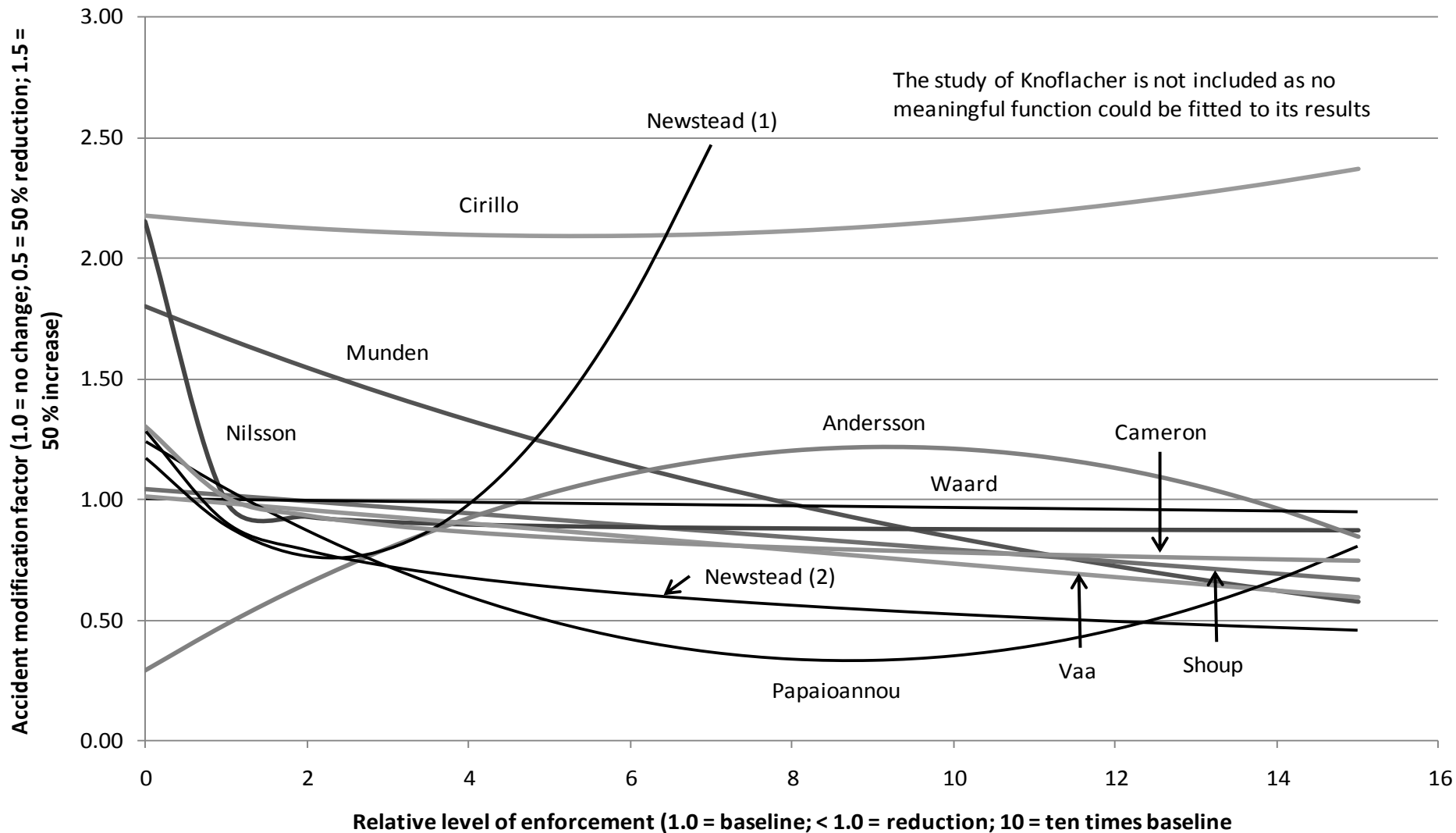
Hypothetical accident modification function for speed enforcement



An approach for developing an accident modification function

- All results based on cross-sectional studies were omitted
- Data points were weighted according to their precision
- Functions were fitted to each study by means of weighted regression analysis
- An attempt was then made to fit a summary function to the data points of all studies
- Data points were aggregated to reduce random variation in estimates of effect referring to identical levels of enforcement

Accident modification functions for eleven studies of speed enforcement



The necessity of grouping data

| Level of enforcement | Accident modification factor | Statistical weight |
|-----------------------------|-------------------------------------|---------------------------|
| 1.0 | 1.01 | 30.81 |
| 1.0 | 0.87 | 30.48 |
| 1.0 | 1.06 | 28.60 |
| 1.0 | 1.00 | 2.63 |
| 1.0 | 0.97 | 18.18 |
| 1.0 | 0.84 | 91.09 |
| 1.0 | 1.07 | 566.01 |
| 1.0 | 0.94 | 1824.63 |

Accident modification functions for police enforcement based on weighted and non-weighted data points

