

Evaluating road safety and safety effects using Empirical Bayesian method

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4th IRTAD CONFERENCE

Road safety data: collection and analysis

for target setting and monitoring performances and progress

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Alvar Aalto

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Forests

FINLAND

5,3 million inhabitants

16 persons/km²



In road traffic in 2008:

65 killed/million inhabitants

0,6 killed/100 million automobile kilometres

Nokia

Father Christmas

Karita Mattila

Santa Claus

Linus Torvalds

Tarja Halonen

Sauna

Republic



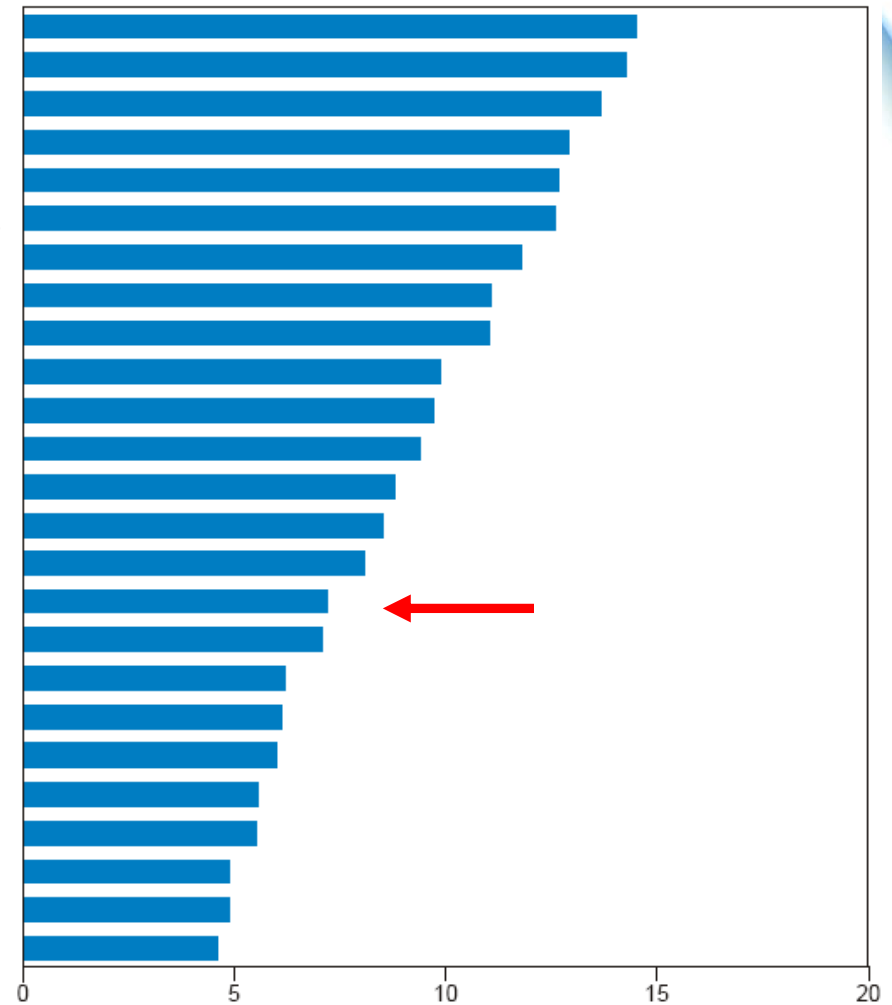
Relative numbers of road fatalities

Per billion vehicle kilometres in 2006

Per 100 000 population in 2005



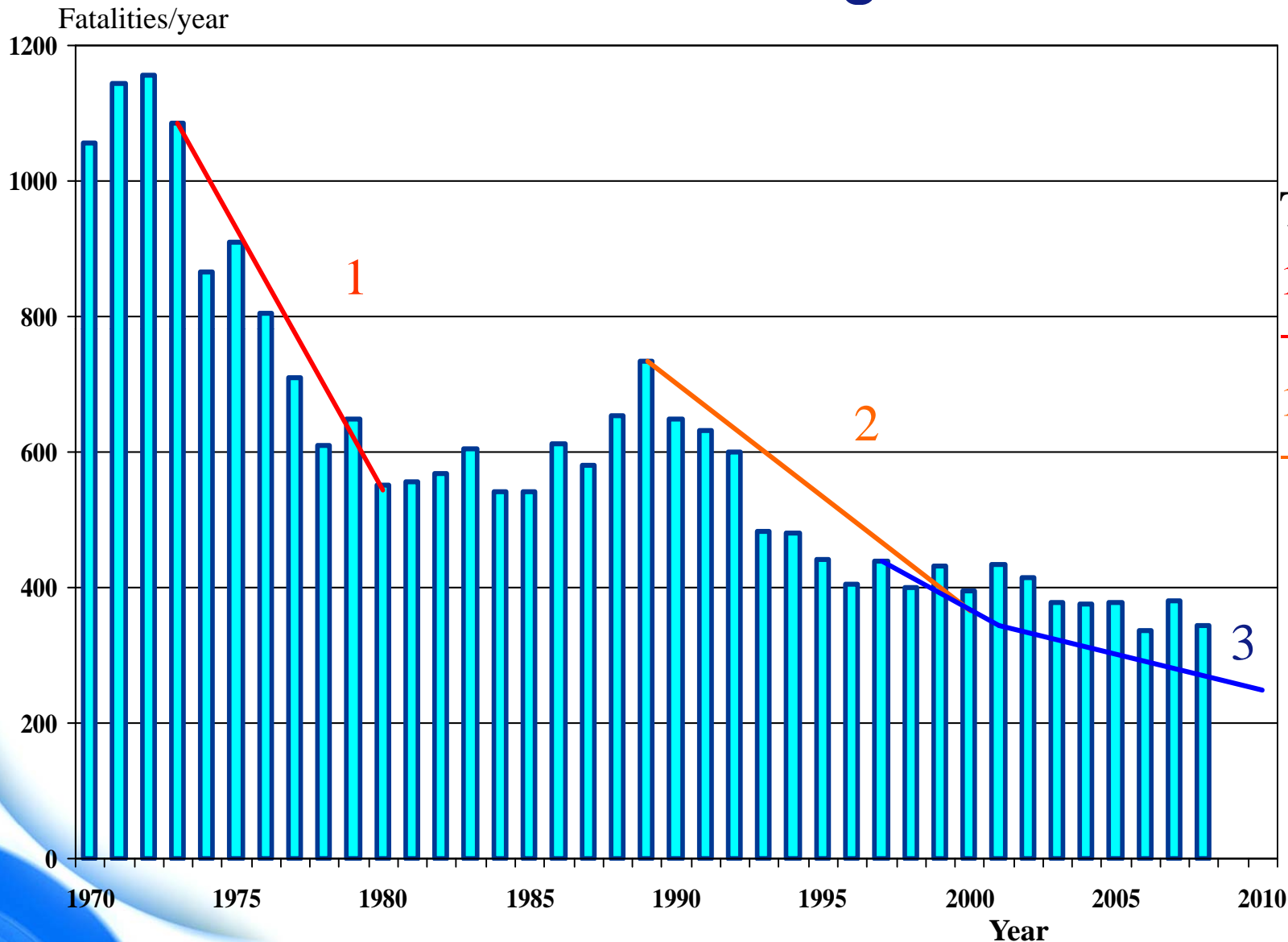
- USA*
 - PL Poland
 - KOR* South Korea
 - SLO Slovenia
 - H Hungary
 - CZ Czech Republic
 - P Portugal
 - L* Luxemburg
 - E* Spain
 - NZ New Zealand
 - I* Italy
 - A Austria
 - F France
 - CDN* Canada
 - AUS Australia
 - FIN* Finland
 - D Germany
 - J Japan
 - DK Denmark
 - IS Iceland
 - GB* Great Britain
 - CH Switzerland
 - S Sweden
 - N Norway
 - NL Netherlands
- * 2004



Source: IRTAD



Road traffic fatalities and targets in Finland



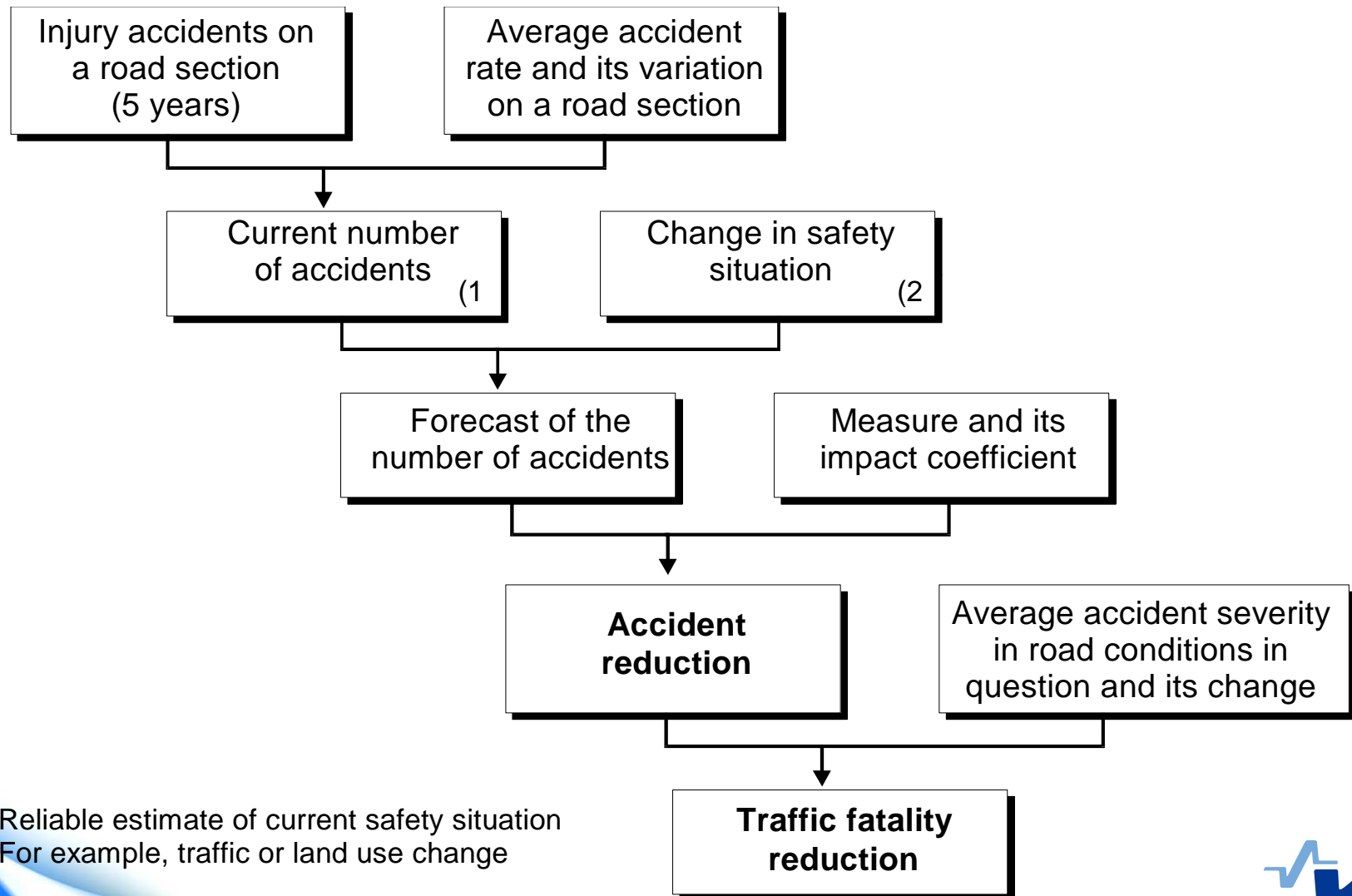
Targets:

1973:
-50% in 8 years

1989:
-50% in 10 years

1997:
-43% in 13 years

Evaluation of safety effects of road improvements



- 1) Reliable estimate of current safety situation
- 2) For example, traffic or land use change

Evaluating safety effects

Principles

- History and model combined using Empirical Bayesian method
- Injury accident coefficients + change in accident severity
- Overlapping measures taken into consideration

Details

- Road sections and crossings modelled separately
- Accident models for vehicle, animal and light traffic accidents
- Accident history from five years used
- Average implementation costs for measures allow easy effectiveness estimates

Using the safety evaluation programme, TARVA

The screenshot displays the TARVA software interface. At the top, there is a menu bar with 'File', 'Add', 'Settings', and 'Apua'. Below the menu bar, there are tabs for 'Worksheet' and 'Inc. file'. A 'Calculate file' button is present, along with a 'Report' checkbox. The 'Inc. file modification' section includes a dropdown menu set to 'Measure' and buttons for 'Add', 'Delete', 'Modify', 'Move up', and 'Move down'. Below this, there are tabs for 'Measure', 'Impact coefficients', 'Reports', and 'Own Measures', with a 'Road address order' checkbox. The main data table is as follows:

Road	BegSection	BegDistance	End Section	EndDistance	Measure	Costs	Project	Description
25	7	0	11	0	101	1908	0	Pedestrian/bicycle way
25	11	660	12	0	101	771	0	Pedestrian/bicycle way
▶ 25	8	0	15	0	172	5557	0	Improving delineation, country side
25	8	0	12	0	501	595	0	Flattening road side slopes

Below the table, there are red arrows pointing left and right, with the text 'Where', 'What', 'Cost', and 'Description' in red. The 'Where' text is positioned between the left and right arrows. The 'What', 'Cost', and 'Description' text are positioned to the right of the right arrow.

At the bottom, there is a section for 'Roads and selected section' with buttons for 'Add', 'Delete', 'Modify', and 'Mod.sections'. Below this is a small table:

Road	BegSection	EndSection	Changed
▶ 25	6	15	✓

To the right of this table is a 'View' button and an 'Inc. file description:' label with a text input field.

Results from the safety evaluation programme

Current safety situation: injury accidents, fatalities

Safety situation after the measures

Safety effects of each measure and measures all together

Costs of the road improvements

Effectiveness of each measure and measures all together

Yearly avoided injury accidents by measures implemented in 2005 - evaluated by TARVA

Measure	Reduced injury accidents /year	Proportion (%)
Automatic speed camera enforcement	13,7	38,5
Renovation of road lightning	4,6	12,8
Rumbling road markings	3,1	8,6
New lightning with breakable poles	2,5	7,0
Building new road side railings	1,8	5,1
More effective crossing markings	1,2	3,4
Improvement of winter maintenance	1,1	2,9
Reflective road side poles	0,9	2,5
Intensified attention to speed limits	0,9	2,5
Speed reducing humps etc.	0,4	1,2
Other measures	4,8	13,6
All measures in total	34,9	100,0



The screenshot shows a software window titled "English_1.txt" with a menu bar (File, Add, Settings, Aqua) and a toolbar. Below the toolbar is a "Calculate file" button and a "Report" checkbox. The "Inc. file modification" section includes a dropdown menu set to "Measure" and buttons for "Add", "Delete", "Modify", "Move up", and "Move down". There are tabs for "Measure", "Impact coefficients", "Reports", and "Own Measures", along with a "Road address order" checkbox. The main data table has the following columns: Road, BegSection, BegDistance, EndSection, EndDistance, Measure, Costs, Project, and Description. The data rows are:

Road	BegSection	BegDistance	EndSection	EndDistance	Measure	Costs	Project	Description
25	7	0	11	0	101	1908	0	Pedestrian/bicycle way
25	11	660	12	0	101	771	0	Pedestrian/bicycle way
▶ 25	8	0	15	0	172	5557	0	Improving delineation, country side
25	8	0	12	0	501	595	0	Flattening road side slopes

Below the table, a diagram shows a red double-headed arrow labeled "Where" pointing to the "BegSection" and "EndSection" columns, and another red double-headed arrow labeled "What Cost Description" pointing to the "Costs" and "Description" columns. At the bottom, there is a "Roads and selected sectio" section with buttons for "Add", "Delete", "Modify", and "Mod.sections". A small table below it shows:

Road	BegSection	EndSection	Changed
▶ 25	6	15	✓

Next to this table is a "View" button and an "Inc. file description:" label with a text input field.

Thank you!

More information...

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*The development of
 TARVA has been
 commissioned by the
 Finnish Road
 Administration.*

Thanks to FINRA!

