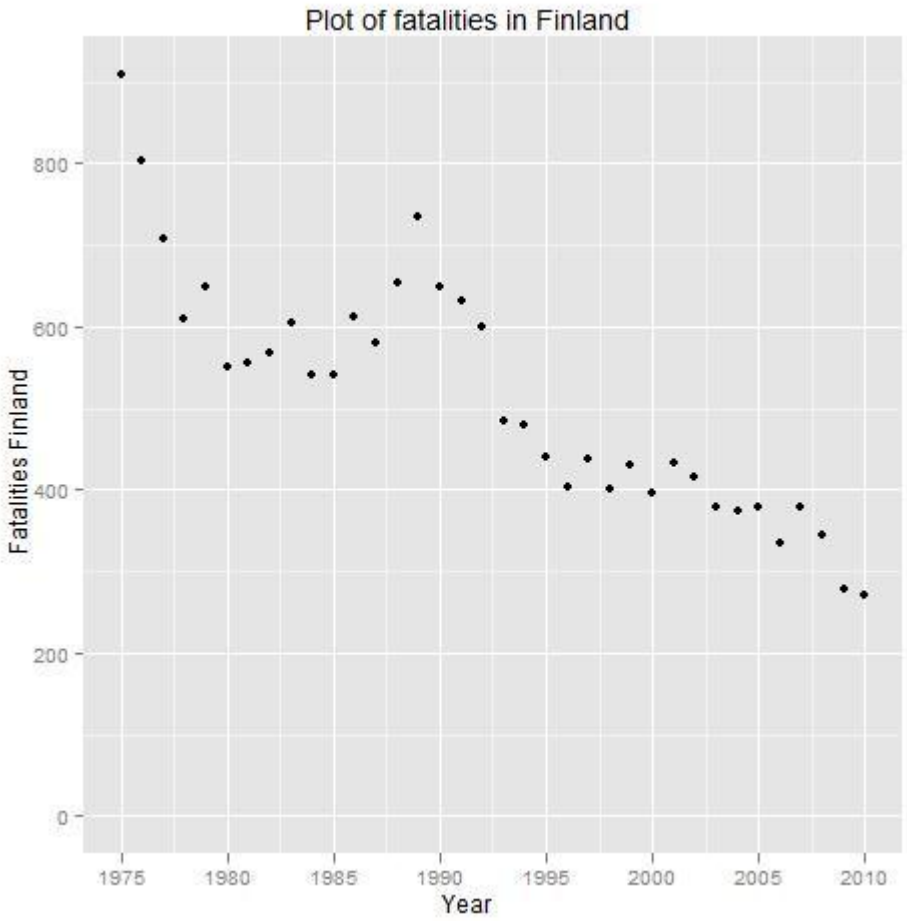
# Finland

## Fatalities




- The plot shows the number of fatalities in Finland from 1975 to 2010.
- In general, there is a decrease in the number of fatalities over the years, especially from the 90s onwards. Before, there was much more variation in the number of fatalities.

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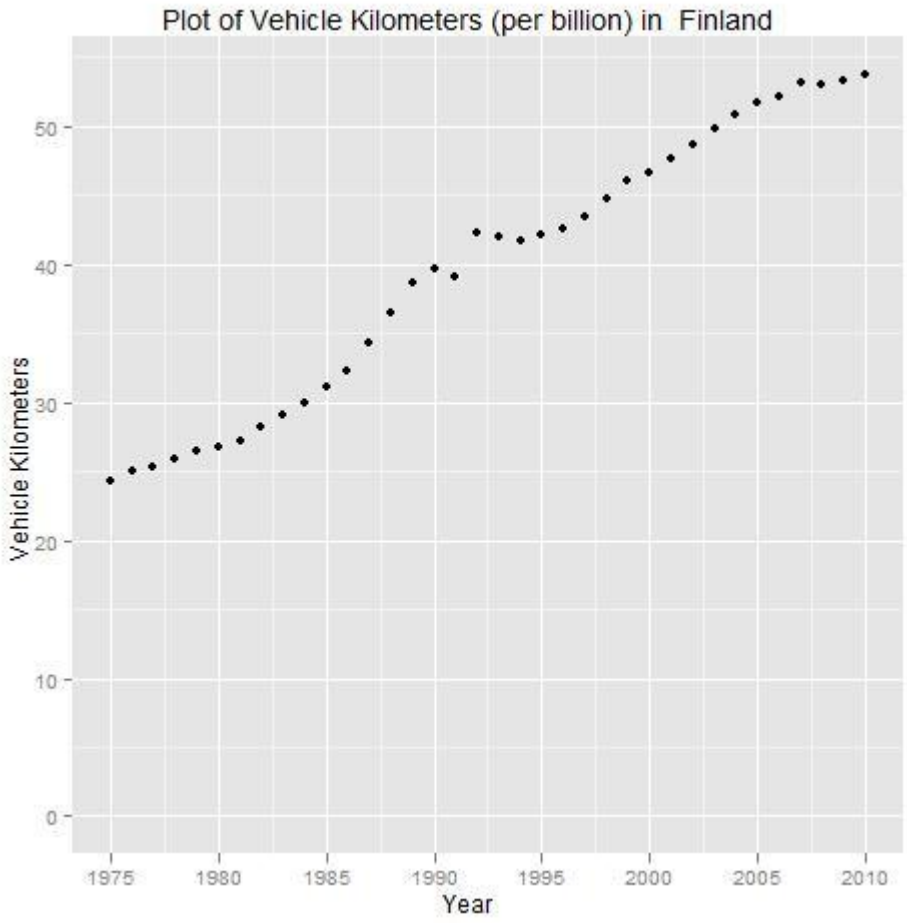
## Traffic volume

The number of vehicle kilometres in Finland has increased over time.




- The number of fatalities normally depends strongly on a measure reflecting the amount of traffic. For Finland, the number of vehicle kilometres is considered.
- Yearly data of the number of motor vehicle kilometres are shown for the period 1975 to 2010.
- The plot shows a gradual increase over the years. The period 1990-1995 shows a somewhat different evolution.
- There is a significant relation between the development in vehicle kilometres and the annual fatality numbers in Finland.

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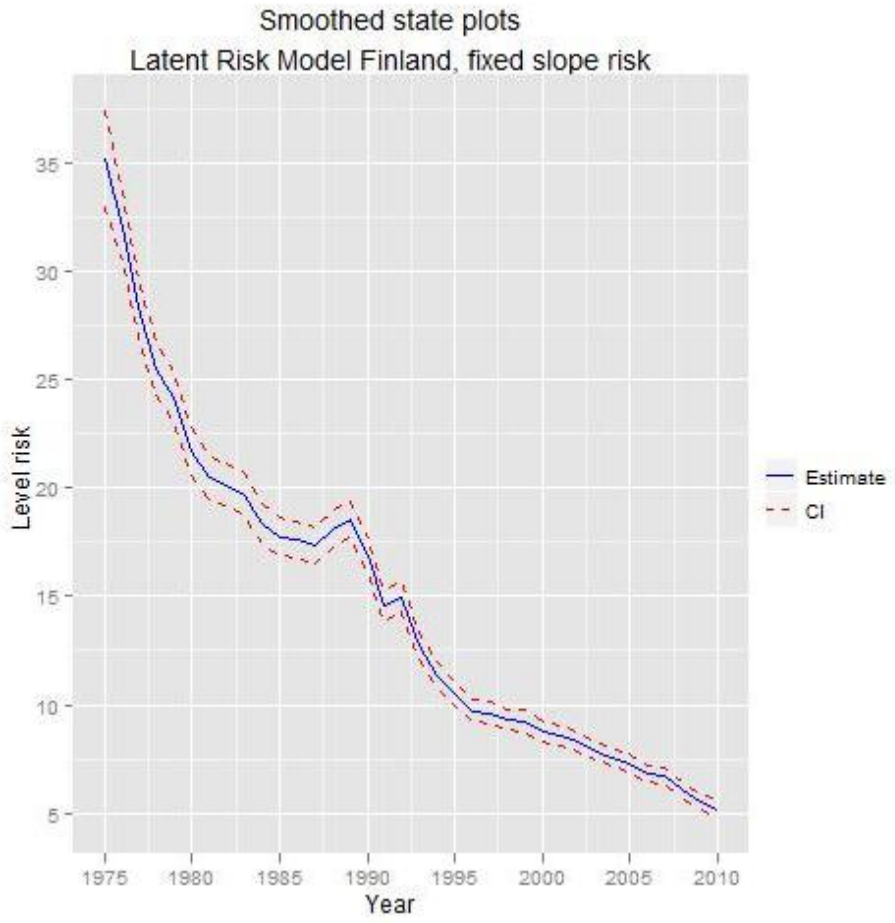
## Fatality Risk

- The fatality risk is defined as the number of fatalities per billion ($10^9$) vehicle kilometres.
- Estimation model – technical definition:
  - Latent Risk Model [1,2].
  - Fixed slope risk.
- CI: 68% confidence interval.




- The fatality risk in Finland has reduced from 35 per billion vehicle kilometres in 1975 to 5 in 2010.

- This amounts to a mean decrease of 5.3% per year.

On average, the fatality risk has been decreasing by more than 5% yearly

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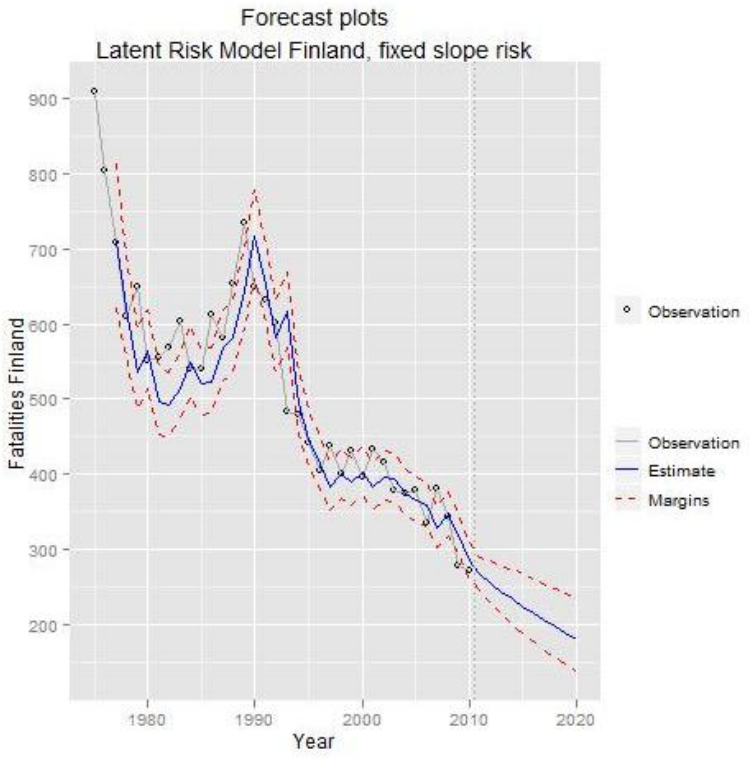
## Forecasts to 2020

– If road safety is improved at the same rate as previously and the past development of mobility continues, the following is to be expected for the number of fatalities in 2020:




If RS efforts continue at the same level, the expected number of fatalities in 2020 is 180.

**Forecast of road traffic fatalities in Finland up to 2020**

| Year | **Prediction** | Lower CI | Upper CI |
|---|---|---|---|
| 2011 | **267** | 226 | 315 |
| 2012 | **255** | 205 | 317 |
| 2013 | **244** | 188 | 318 |
| 2014 | **234** | 173 | 317 |
| 2015 | **224** | 159 | 316 |
| 2016 | **215** | 147 | 314 |
| 2017 | **205** | 135 | 312 |
| 2018 | **197** | 125 | 311 |
| 2019 | **188** | 115 | 309 |
| 2020 | **180** | 106 | 307 |

### Disclaimer

– Statistical forecasting does not offer a definite prediction of what is *actually* going to happen in the future.
– The estimates are based on the “business as usual” assumption: no *principal* changes between past and future development.
– Even in these conditions future outcomes are uncertain. This uncertainty is represented in the confidence intervals (plotted in the red margins: 68%; printed in table: 95%).

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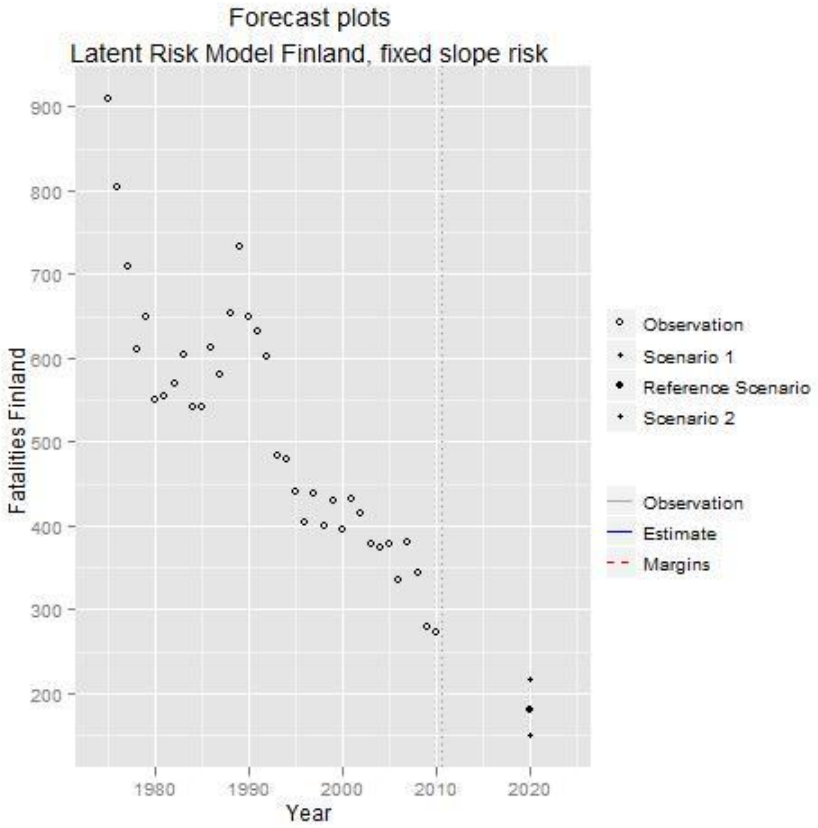
# Scenarios

- The uncertainty about the development of the fatalities observed in Finland is partly due to the development in vehicle kilometres.
- To illustrate that, three point-estimates for fatalities in Finland in 2020 are plotted assuming three different scenarios concerning the evolution in vehicle kilometres.
  - Reference: continuation of development, i.e.: increase in the number of vehicle kilometres (forecasted value)
  - Scenario 1: stronger increase (forecasted value + 1 stand. dev.)
  - Scenario 2: stagnation (forecasted value - 1 stand. deviation)




## Mobility scenarios

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| | *Vehicle kilometers (billions)* | *Road traffic fatalities* |
|---|---|---|
| | | |
| ***Situation 2010:*** | 53.82 | 272 |
| | | |
| ***Prediction 2020 according to mobility scenarios:*** | | |
| - Continuation of development (increase) | 60.19 | 180 |
| - Stronger increase than predicted | 68.20 | 217 |
| - Stagnation | 53.12 | 150 |

# References

[1] EC National Expert for road accident statistics and road safety performance indicators.

|2] Dupont & Martensen (Eds.) 2012. Forecasting road traffic fatalities in European countries. Deliverable 4.4 of the EC FP7 project DaCoTA.

[3] Bijleveld F., Commandeur J., Gould P., Koopman S. J. (2008),. Model-based measurement of latent risk in time series with applications. Journal of the Royal Statistical Society, Series A, 2008.

[4] Martensen & Dupont (Eds.) 2010. Forecasting road traffic fatalities in European countries: model and first results. Deliverable 4.2 of the EC FP7 project DaCoTA.

[5] Commandeur, J. & Koopman, S.J. (2007) An Introduction to State Space Time Series Analysis. Oxford University Press.