The effect of an ageing population on road safety

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- Why?
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Why?

- Changes in society will affect road safety?
- Prognosis helpful to anticipate
- Policy tool

But:

- most prognoses are based on trends of accident figures
- which learn nothing about causes or influencing factors
Why?

- Differences between age groups
  - Travel behaviour
  - Accident risk
- Differences between generations
  - Elderly past ≠ elderly present ≠ elderly future
- Changes
  - Population numbers and composition
  - Socio-economics
  - Drivers’ license possession
  - Risk
How?

- Decomposition
  - KSI = Exposure * (injury) Risk
Decomposition

- $\text{KSI} = \text{Exposure} \times \text{(injury) Risk}$

- $\sum (\text{person}_i \times \text{travel distance}_i)$
How?

- Decomposition

  - $KSI = \text{Exposure} \times \text{(injury) Risk}$

  - $\sum (\text{person}_i \times \text{travel distance}_i)$

  - synthetic population
How?

- Synthetic population
  - population numbers
    - existing population forecasts for Flanders 2009-2030
    - by age, gender and municipality
Population numbers

![Graph showing population numbers from 1997 to 2030. The x-axis represents the years 1997 to 2030, and the y-axis represents the population numbers ranging from 0 to 80,000. The graph includes lines for 1997, 2001, 2010, 2020, and 2030, with each line indicating the population trend for that year.](image-url)
How?

- Synthetic population
  - population numbers
    - existing population forecasts for Flanders 2009-2030
    - by age, gender and municipality
  - work status
    - based on prognosis (1995-2050) of activity rate
    - by age, gender
Activity rate

Activity rate men

Activity rate women

[Graph showing activity rates for men and women across different age groups and years from 1997 to 2030.]
How?

- Synthetic population
  - population numbers
    - existing population forecasts for Flanders 2009-2030
    - by age, gender and municipality
  - work status
    - based on prognosis (1995-2050) of activity rate
    - by age, gender
  - drivers’ license possession
    - modeled based on travel surveys
    - by age, birthyear, gender, work status, education, municipality
How?

- Decomposition
  - $\text{KSI} = \text{Exposure} \times (\text{injury}) \text{ Risk}$
  - $\sum (\text{person}_i \times \text{travel distance}_i)$
  - synthetic population
How?

- **Travel distance**
  - modeled based on travel surveys
    - by age, birthyear, gender, work status, education, municipality and travel mode
    - on the individual level

- **Exposure**
  - summed by age group, gender and travel mode
  - \( \Sigma (\text{population}_i * \text{travel distance}_i) \)
Exposure

Relative increase exposure (compared to 2001)

- Driver
- Passenger
- Cyclist
- Pedestrian
- TOT
Exposure

Distance traveled by men

Distance traveled by women

bio kms per year

Year 1997 1999 2001 2003 2005 2007 2009 2011 2013 2015 2017 2019

Bio kms per year

06-12 13-15 16-24 25-34 35-44 45-54 55-64 65-74 75+

bio kms per year
How?

- Risk
  - past
    - disaggregated by age group, gender and travel mode
    - victims/exposure
  - future
    - extrapolating existing trends

**Risk of women aged 65-74 as a driver**

\[ y = 0.1141e^{-0.0747x} \]

\[ R^2 = 0.6101 \]
Results

- Victims
  - calculated exposure * extrapolated risk
    - only demographic changes: +5.7%
    - + socio-demographic changes: +6.4%
    - + changes drivers’ license: +8.0%
    - + trends in risk: -57%
    (2020 compared to 2001)
Results

Share of age categories (men)

Share of age categories (women)
Questions?