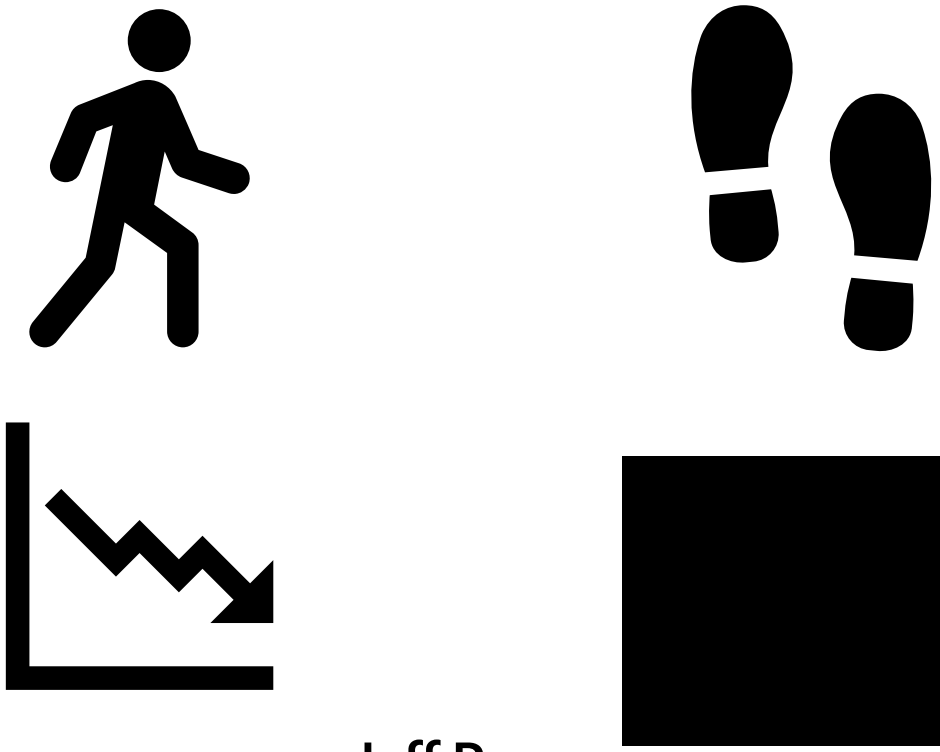

Jeff Pascua
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Pedestrian Fatality Forecasting:

A Model-Based Approach

A presentation prepared for the 4th Ontario Road Safety Forum

Lakehead University

Northern Ontario School of Medicine / École de médecine du Nord de l'Ontario

Centre for Research on Safe Driving

CAHR Centre for Applied Health Research

CARSP ACPSER

Research Background

As the first part of a two-part thesis, the objectives of this half are:

- to quantitatively examine long-term pedestrian safety on a national scale; and
- to contribute to existing literature by identifying at-risk pedestrian cohorts that are at elevated risk.

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Methodology

Disaggregation → Forecast Models → Selection Criteria

Data Disaggregation

- fatality data - **NHTSA FARS**
- exposure data - **FHWA NHTS**

- 12 age-sex cohorts defined
  - 6 age groups, 2 sexes

	Sex		
	Male		Female
Age Group	5 - 15	★	5 - 15
	16 – 19		16 – 19
	20 - 34		20 - 34
	35 - 54		35 - 54
	55 - 64		55 - 64
	65+	★	65+

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Methodology

Disaggregation → Forecast Models → Selection Criteria

Forecast Models

- SPSS v25 CURVEFIT
- 11 regression models:
  - 2nd & 3rd order polynomials
  - Compound
  - Growth
  - Exponential
  - Logistic
  - Power

CGEL models

Selection Criteria

- Akaike's Information Criterion (AIC)
- Visual Inspection
- Adjusted r^2 values
- Model significance (p-values)
- Abrupt changes in fatality rate per year

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Age-Stratified Fatality Forecasts

i. Children (5-15)
ii. Elderly (65+)

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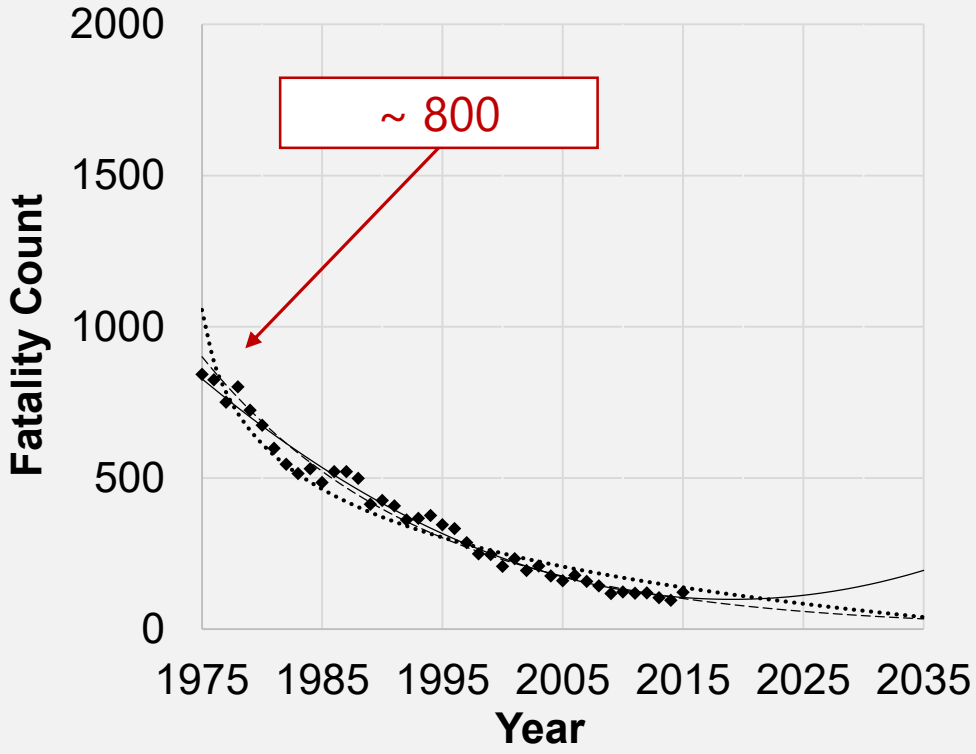
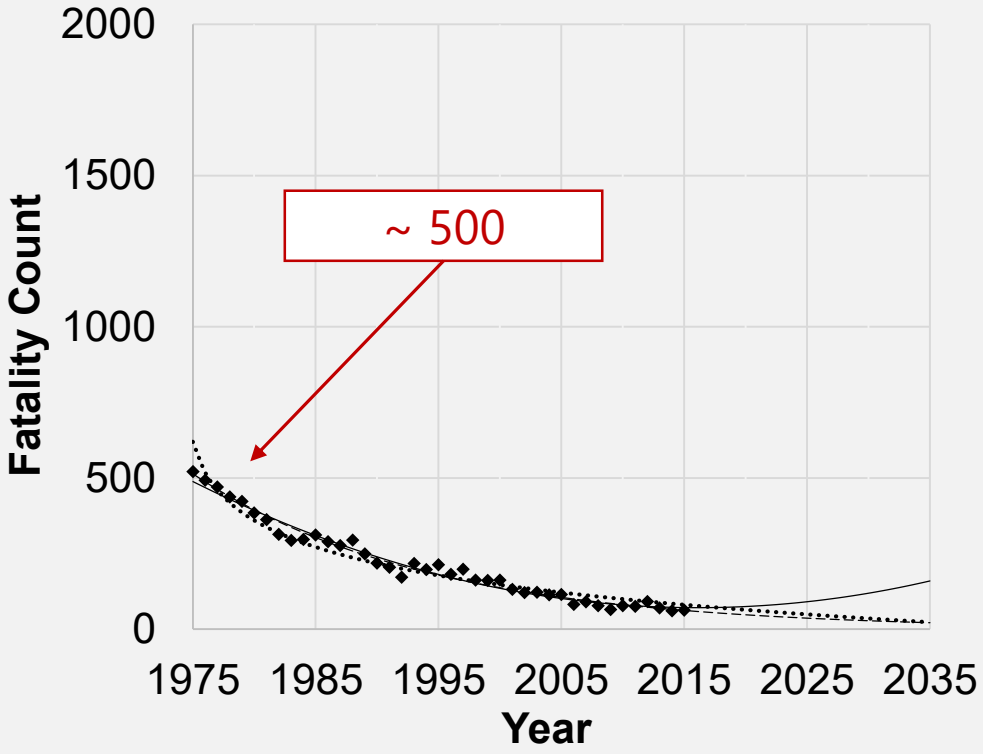
Child Pedestrians

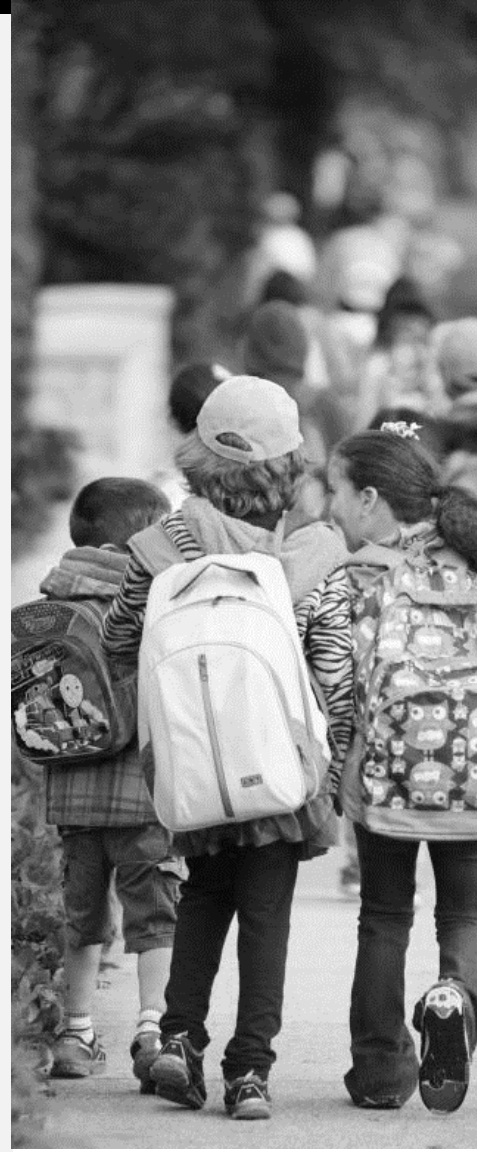
Ages 5-15

♂ Males



♀ Females





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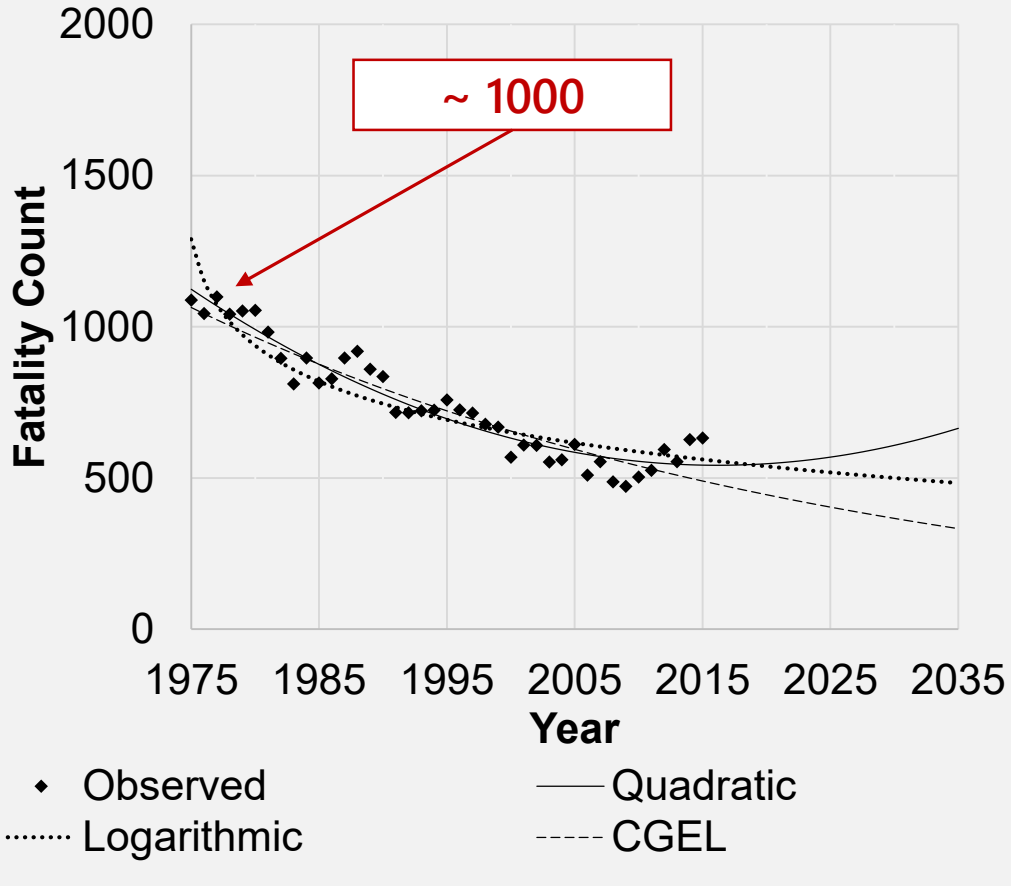
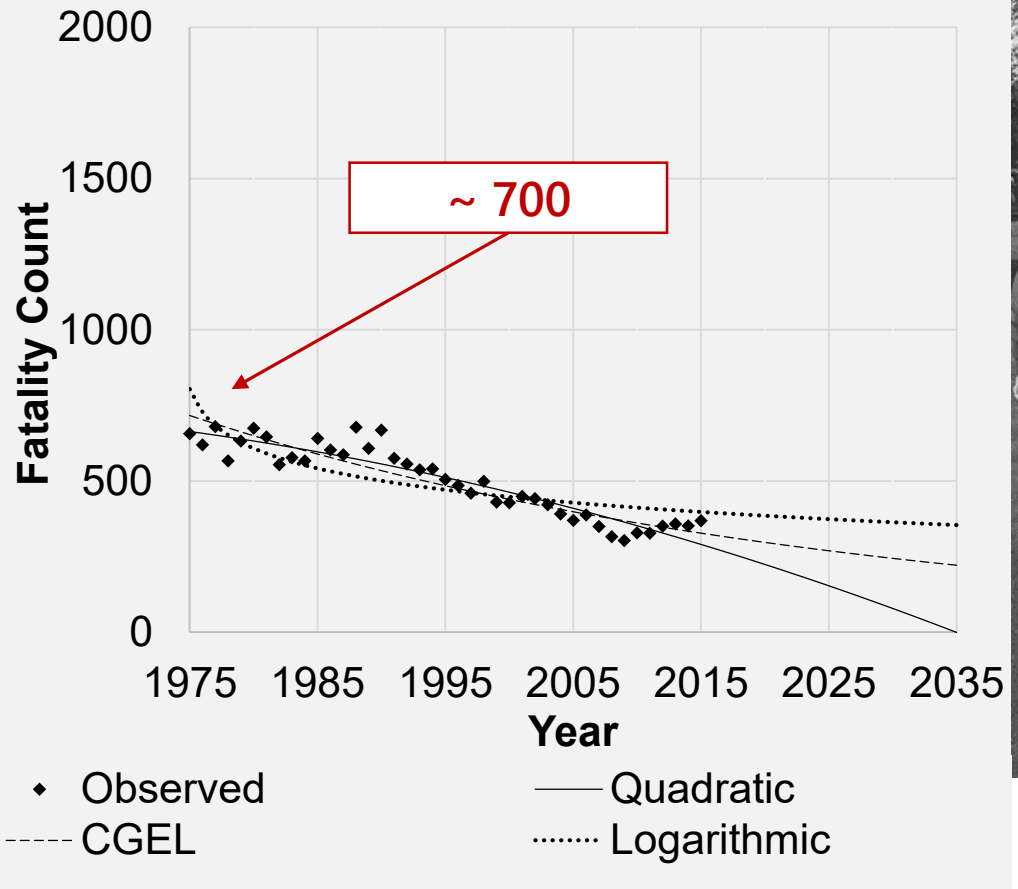
Elderly Pedestrians

Ages 65+

♂ Males



♀ Females



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Final Comments

Pedestrian fatalities among:

- **children appear to be decreasing, but stabilizing.**
  - efforts to increase exposure, while providing sufficient safety
- **the elderly have been rising since 2009.**
  - increased probability of high severity
  - average age of population ↑ ↑ ↑

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Thank You!

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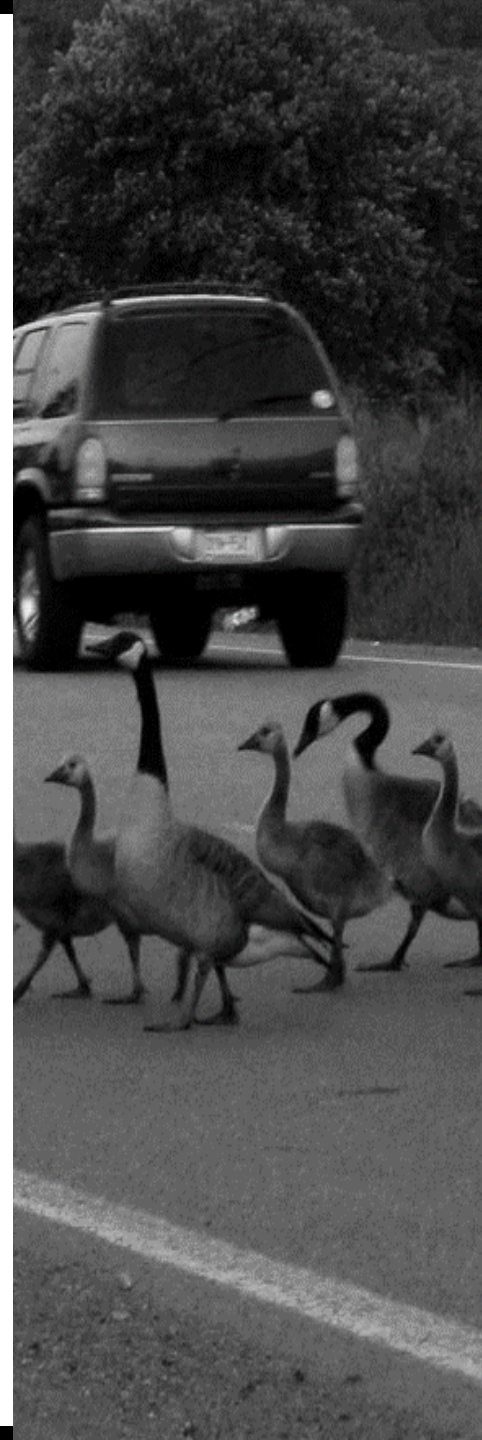
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