

# Young Researchers Seminar 2009

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## Healthy driving: A study of drivers' health condition and relative crash risk

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# Background

- Driving license and health requirements
- Physical and mental conditions
  - Functional impairments
  - Ability to drive
  - Accidents
- Limitations of previous research
  - Fail to control for confounding variables
  - Study population: elderly respondents

# Background

- Diseases
- Health plagues
- Medication use

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# Research problems

Is there an increased accident risk associated with...

- 1) ...diseases?
- 2) ...health impairments?
- 3) ...medication use?

# Methods – sample and procedure

- Institute of Transport Economics (TØI) and Gjensidige (insurance company)
- 33 000 *accident involved* drivers
- Web-based survey
- Paper version optional

# Methods – sample and procedure

- N=6111
- Response rate: 18 %
- Low response rate
- Underrepresentation in study sample
  - Males (61 % versus 64 %)
  - Young drivers ( $M_{(\text{study sample})}=48$ ,  $M_{(\text{gross sample})}=47$ )
  - At-fault drivers (54 % vs. 62 %)
- N=4703 multi-vehicle accidents

# Methods – measures

- Chronic diseases at time of the accident
- History of brain stroke and cardiac infarction
- Health plagues
- Visual-, hearing-, and movability impairments
- Medicine use at time of the accident
- Type of accident
- Exposure (annual km X 1000)
- Background variables
- Culpability

—————→ Self-report

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# Methods – Quasi-induced exposure

- Culpability in accident
  - At-fault
  - Not-at-fault
- Prevalence of the risk factor (health condition) is the same among not-at-fault drivers as in the driver population in general

# Methods – Quasi-induced exposure

$$RR = \frac{\frac{\text{(At-fault drivers with disease)}}{\text{(Total number of at-fault drivers)}}}{\frac{\text{(Not-at-fault drivers with disease)}}{\text{(Total number of not-at-fault drivers)}}}$$

# Methods - analyses

RR > 1 = increase accident risk

RR = 1 = no difference in accident risk

RR < 1 = decreased accident risk

- Crude relative risk ratios
- Logistic regression analysis

# Results

Variables	Percentage of drivers with risk factor			
	At fault n=1785	Not-at-fault n=2522	RR	95 % CI
Age				
Years with driver's licence				
Familiarity with road section				
History of brain stroke				
Sleep onset insomnia				
General tiredness				
Mild depression				
Strong visual impairment on one eye				
Strong hearing impairment on one ear				
Strong hearing impairment on both ears				
Antidepressants				

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# Results

Variables	Percentage of drivers with risk factor			
	At fault n=1785	Not-at-fault n=2522	RR	95 % CI
Age				
Years with driver's licence				
Familiarity with road section				
History of brain stroke	1.34 (24)	0.67 (17)	<b>1.99</b>	1.07-3.72
Sleep onset insomnia	4.40 (78)	3.13 (79)	<b>1.40</b>	1.01-1.92
General tiredness	11.1 (198)	6.30 (159)	<b>1.76</b>	1.42-2.19
Mild depression	1.57 (28)	0.75 (19)	<b>2.08</b>	1.16-3.74
Strong visual impairment on one eye	2.30 (41)	0.95 (24)	<b>2.41</b>	1.45-4.01
Strong hearing impairment on one ear	1.18 (21)	0.56 (14)	<b>2.12</b>	1.07-4.18
Strong hearing impairment on both ears	0.62 (11)	0.16 (4)	<b>3.89</b>	1.24-2.22
Antidepressants	4.48 (80)	3.29 (83)	<b>1.36</b>	1.00-1.86

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# Results

Logistic regression			Percentage of drivers with risk factor			
Variables	Exp (B)	p	At fault n=1785	Not-at-fault n=2522	RR	95 % CI
Age	<b>1.02</b>	0.02				
Years with driver's licence	<b>0.98</b>	0.01				
Familiarity with road section	<b>0.39</b>	0.00				
History of brain stroke	<b>2.61</b>	0.02	1.34 (24)	0.67 (17)	<b>1.99</b>	1.07-3.72
Sleep onset insomnia	1.06	0.75	4.40 (78)	3.13 (79)	<b>1.40</b>	1.01-1.92
General tiredness	<b>1.81</b>	0.00	11.1 (198)	6.30 (159)	<b>1.76</b>	1.42-2.19
Mild depression	1.57	0.22	1.57 (28)	0.75 (19)	<b>2.08</b>	1.16-3.74
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# Discussion

Accident risk increases with...

- ...history of brain stroke
- ...general tiredness
- ...strong visual impairment on one eye
  
- None of the *diseases* were associated with accident risk
- Low observations of risk factors

# Thank you!

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