E-bikes; too fast, too furious!

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Analysis of e-bike versus conventional bicycle related accidents

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Disclosure

I have no potential conflict of interest to report

Type of affiliation / financial interest	Name of commercial company
Receipt of grants/research supports	
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Stock shareholder	
Spouse/partner	
Other support (please specify)	Travelfee

Introduction

- ## 23,000,000 Bicycles in NL

  - ### 70,000 Bicycle accidents / year

  - ### 200 Bicycle accident deaths / year

    - #### 33% of total traffic fatalities

- ## Introduction E-bikes late 90's

E-bike / Pedelec

- +- 1,900,000 in NL

- Supports → 25-27km/h

- Weight → 9kg heavier

Methods

- Prospective cohort study
- Level 1 trauma center
- July 2014 – May 2016

  – Injury Severity by AIS (98)
  – Propensity score matching

Results

475 bicycle accidents

- 107 E-bikes (22.5%)
  - Mean age: 65y
  - Comorbidity present: 80 %

- 368 conventional bicyclists (77.5%)
  - Mean age: 39y
  - Comorbidity present: 37 %

- No difference in type of accident
- Helmet use in only 1 E-biker

Injury distribution

E-bike (n=107) **/ Conventional bicycle (n=368)**

**Head: 41 / 37 %**

Thorax: 11 / 7 %

Face: 31 / 38 %

Spine: 8 / 3 % *

Neck: 1 / 3 %

Upper extremity: 39 / 39 %

Abdomen: 5 / 4 %
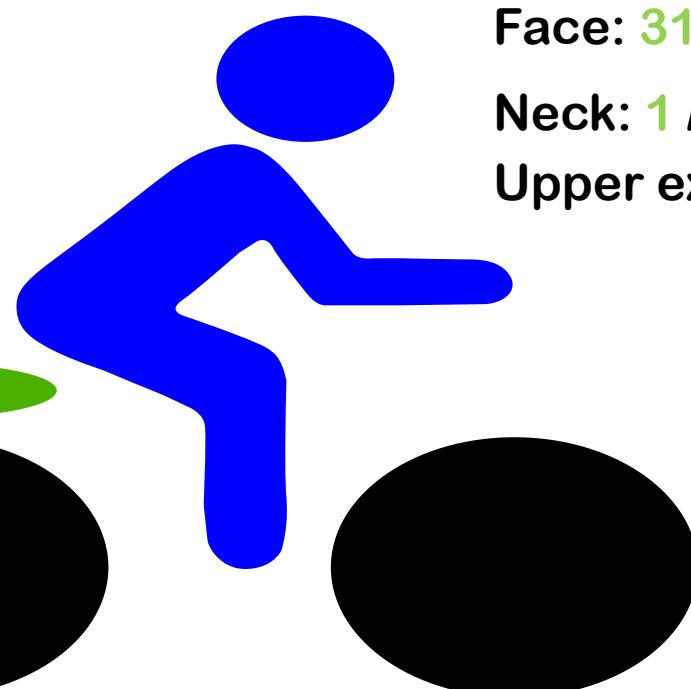
Lower extremity: 46 / 31 % *

Injury Severity

	E-bikes (n=107)	Conventional bicycles (n=368)	P-value	Matched E-bikes (n=92)	Matched conventional bicycles (n=92)	P-value
Injury Severity Score (median, range)	**6 (0-38)**	**3 (0-41)**	**<0.001**	6 (0-38)	4 (0-34)	0.07
Polytrauma (ISS>15) (n, %)	**24 (22)**	**24 (7)**	**<0.001**	**20 (22)**	**10 (11)**	**0.05**

Abbreviated Injury Scale

	E-bikes (n=107)	Conventional bicycles (n=368)	p-value	Matched E-bikes (n=92)	Matched conventional bicycles (n=92)	p-value
Abbreviated injury scale (mean, SD)						
Head	**3.0 (1.3)**	**2.2 (1.1)**	**<0.001**	**3.1 (1.3)**	**2.4 (1.3)**	**0.04**
Face	**1.5 (0.5)**	**1.2 (0.5)**	**0.02**	1.4 (0.5)	1.3 (0.6)	0.32
Neck	1.0 (0)	1.0 (0)	1.00	1.0 (0)	1.0 (0)	1.00
Thorax	2.4 (1.4)	1.7 (1.0)	0.06	2.4 (1.4)	1.8 (1.1)	0.30
Abdomen	2.0 (0.7)	1.3 (0.6)	0.06	2.0 (0.7)	1.0 (0)	0.33
Spine	2.4 (0.5)	2.3 (0.7)	0.61	2.4 (0.5)	3.0 (0)	0.27
Upper extremity	**2.0 (0.8)**	**1.5 (0.6)**	**<0.001**	1.9 (0.8)	1.7 (0.7)	0.13
Lower extremity	**1.8 (0.8)**	**1.4 (0.7)**	**0.01**	1.8 (0.8)	1.7 (0.8)	0.64

Care needs and mortality

|	E-bikes (n=107)	Conventional bicycles (n=368)	p-value	Matched E-bikes (n=92)	Matched conventional bicycles (n=92)	p-value
Hospitalization (n, %)	53 (50%)	96 (26%)	<0.001	43 (47)	35 (38)	0.23
duration, days (median, range)	6 (1-51)	2 (1-29)	<0.001	6 (1-51%)	3 (1-21%)	0.004
Intensive care admission (n, %)	18 (17%)	16 (4%)	<0.001	15 (16%)	7 (8%)	0.07
duration, days (median, range)	6 (1-34)	2 (1-29)	<0.001	8 (1-34)	2 (1-9)	0.09
Operation (n, %)	27 (25%)	34 (9%)	<0.001	21 (23%)	14 (15%)	0.19
Mortality (n, %)	4 (4%)	6 (2%)	0,24	2 (2%)	5 (5%)	0.44

Conclusions

- E-bike accidents occur more frequently in elderly

- E-bikers:
  - More often polytraumatized
  - More severe head-injury
  - Longer duration of hospital admission

- More research is needed to make recommendations on preventive measures

Questions?
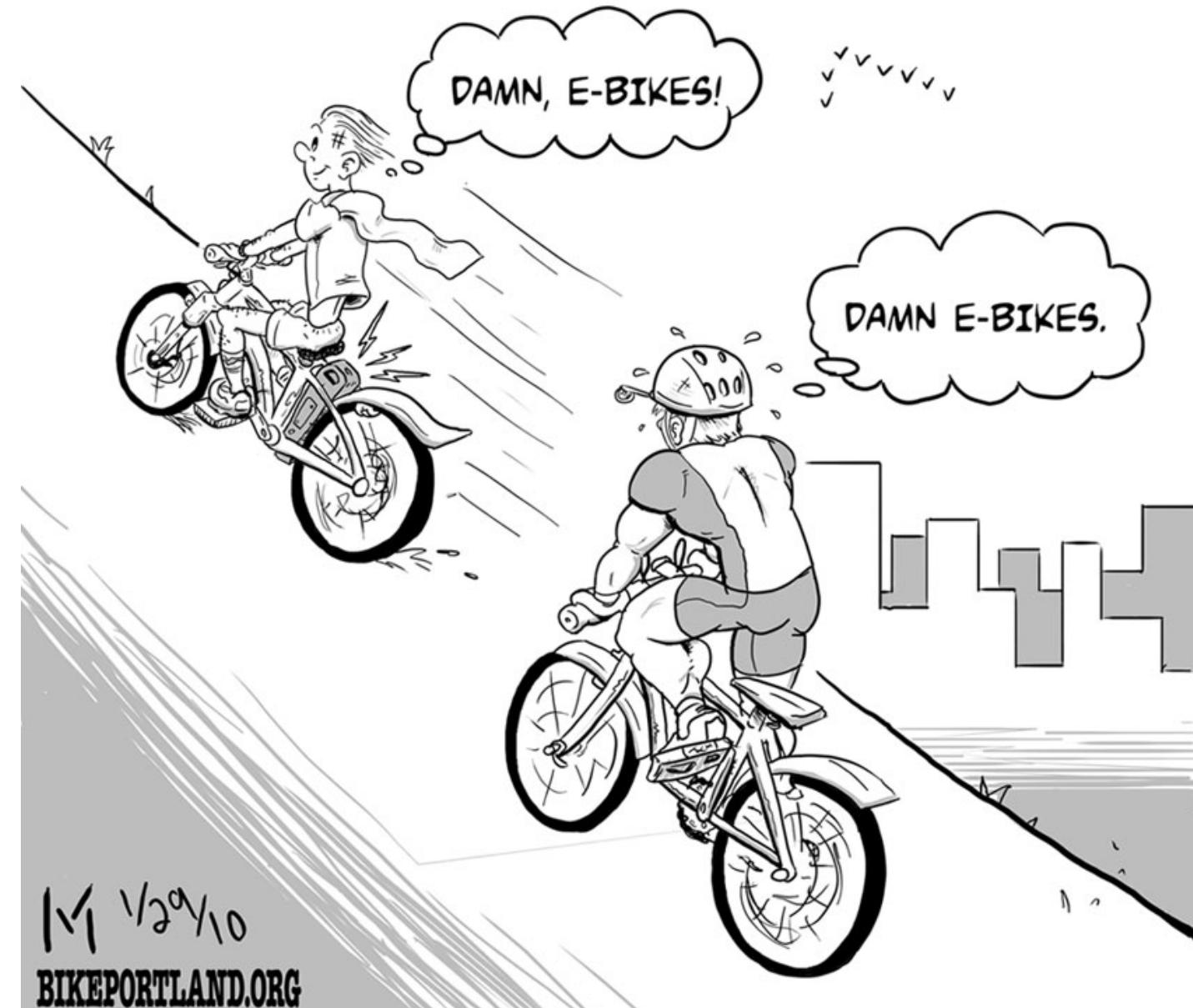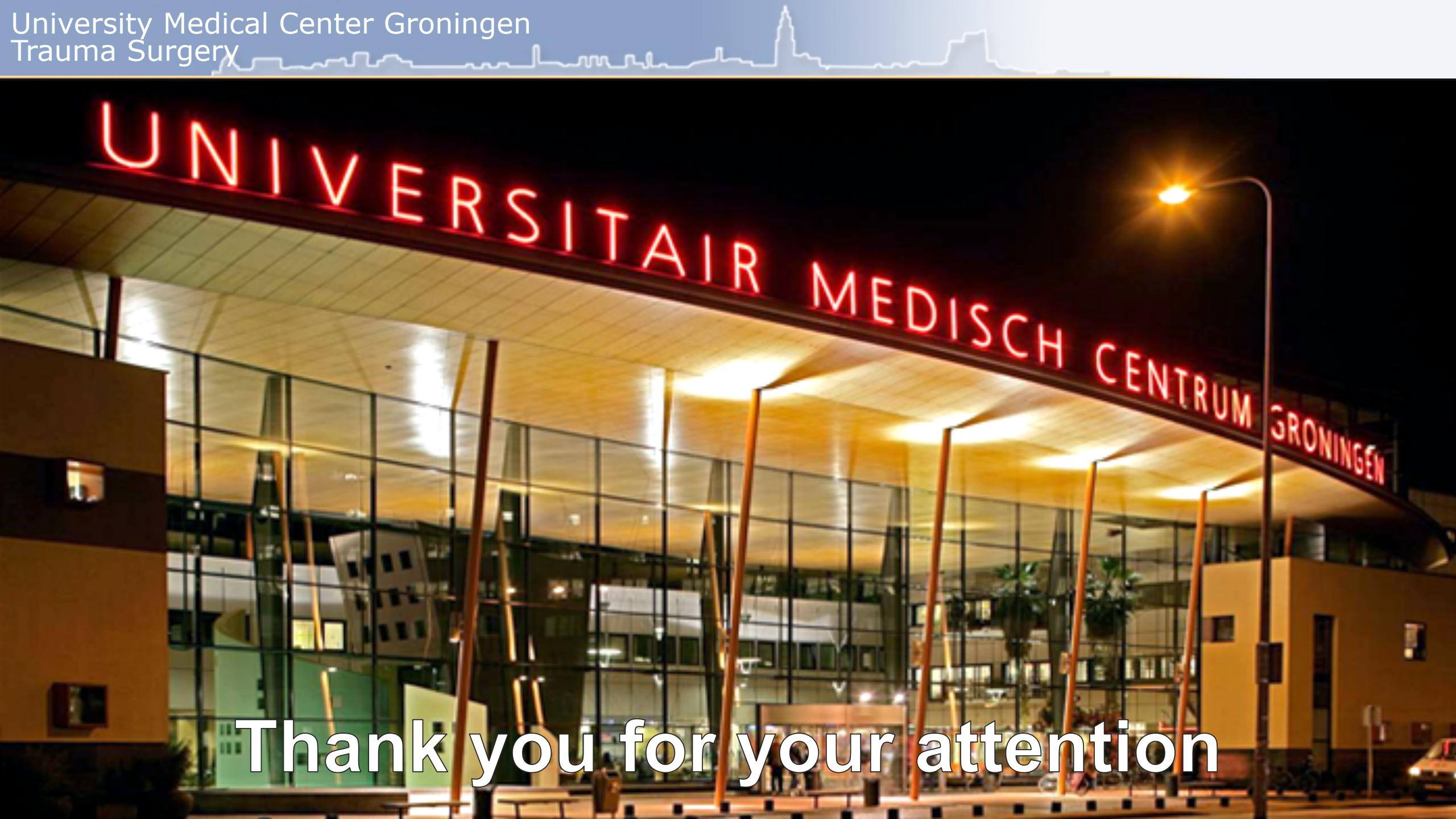
Thank you for your attention