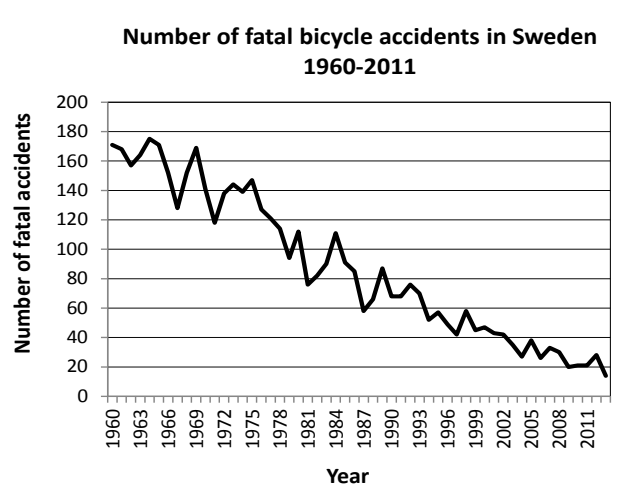
Detailed Description of Bicycle and Passenger Car Collisions Based on Insurance Claims

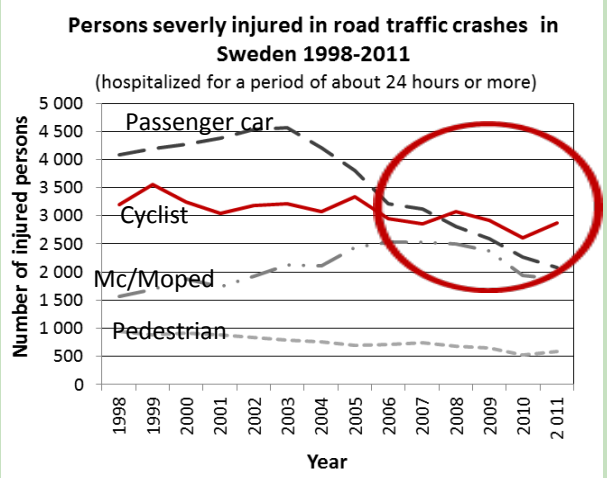
I.Isaksson-Hellman, If P&C Insurance

J . Werneke, Chalmers University of Technology

International Cycling Safety Conference, Gothenburg 18-19 November 2014

Relax, we'll help you.





Background

- **Fatal** bicycle accidents have decreased in Sweden during the last decades
- Cyclists constitute the highest percentage of **severely injured** road users in Sweden
- For bicycle accidents the **most serious consequences** relate from collisions with motor vehicles

Aim of the study

To use motor insurance claims:

- To describe and analyse the most common bicycle-car collision situations
- To relate them to the consequences in terms of injuries and injury severity
- To identify factors influencing accidents and injuries

Relax, we'll help you. if...

Methodology, data collection

882 accidents between bicycle and passenger car in Sweden 2005-2012, identified from **insurance claims**

→ Detailed description of the accident and possibilities to classify detailed scenarios

→ Crashes of all severity levels from minor damage to crashes with fatal outcome.

Detailed information is coded using:

- collision descriptions from the driver and the cyclist.
- Information from police reports (if existing)
- Sketches on accident scenarios
- 'First call' to the cyclist (if injured)
- Injury reports
- Whiteness information

Out of 882 bicycle-passenger car accidents:

- 50% reported by STRADA police (official data)
- 35% reported in STRADA hospital
  (there are also MAIS2+ injuries not in STRADA)

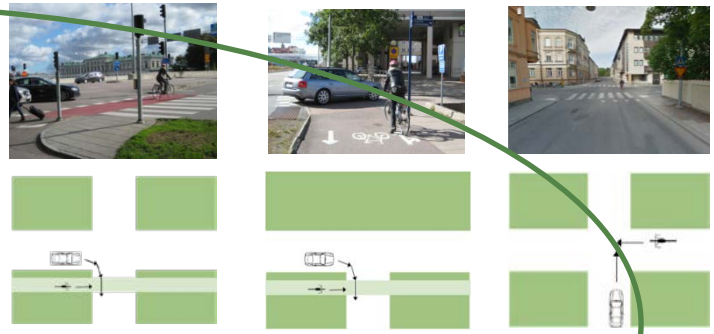
Relax, we'll help you. if...

Scenario definition

In total 32 detailed scenarios are defined
These are grouped in five main categories

Crossing situations are defined as situations in which the bicycle and car cross each other's paths.

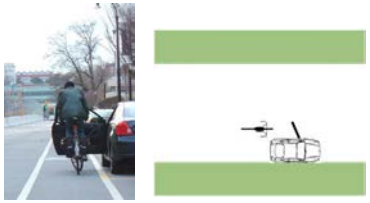
-roadway / driveway crossing situations where the cyclist either comes from a bicycle path or rides on the road.



Same/opposite direction situations includes scenarios when the car and bicycle shared the same roadway either going in the same direction or in the opposite direction

-Overtaking
-Running in from behind
-Keeping to tight

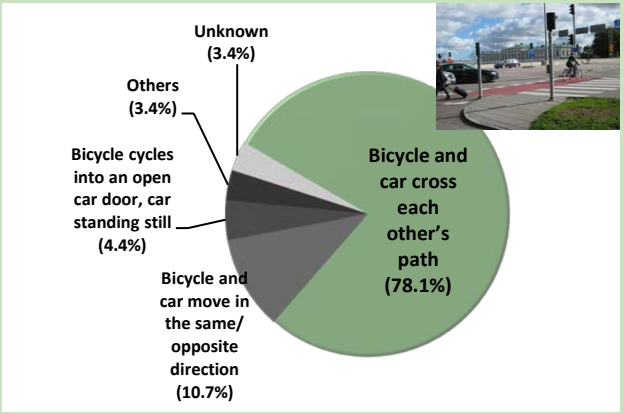
Door opening, bicycle cycles into an open car door, car standing still



Other, includes parking lot, reversing

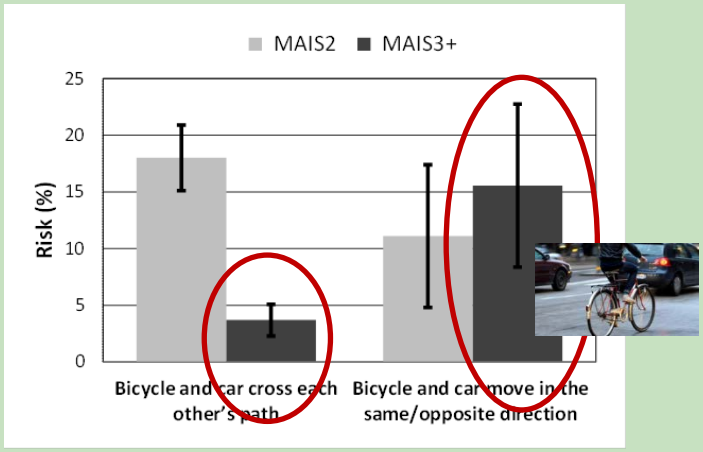
Unknown

Relax, we'll help you.

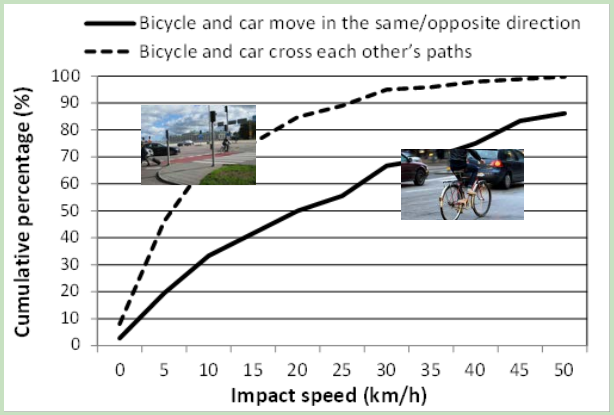


Results

Crossing situations are the most frequent accident scenarios with over 78% of all accidents



Situations where cyclist and driver shared the same roadway and moved in the same or opposite direction represented only about 11%, but had a significantly higher risk of severe to fatal injuries and than crossing situations



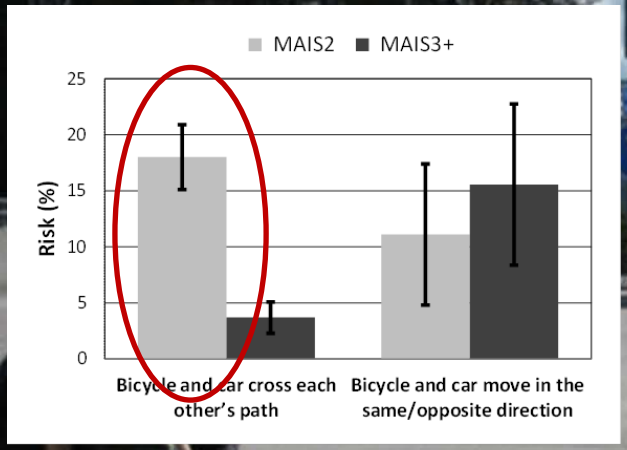
On average the impact speed was higher in accidents when bicycle and car move in the same/opposite direction than in crossing situations

Over 16% of these accidents took place in non-urban areas and with higher speed limits.

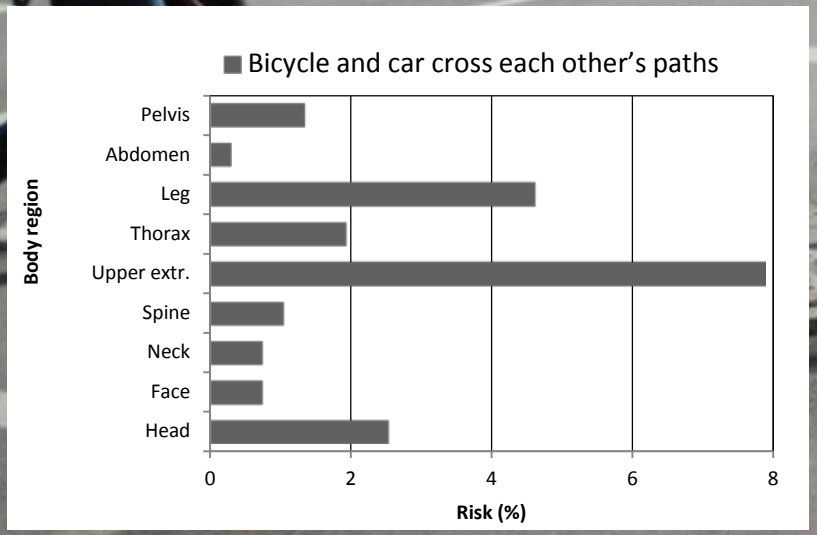
Relax, we'll help you. if...

Results cont…

Main crash categories	N	MAIS 2	MAIS 3+(fatal)
Bicycle and car cross each other's path	689	122	25 (4)
Bicycle and car move in the same/opposite direction	94	10	14 (7)



=> High frequency and risk of moderate injuries in crossing situations

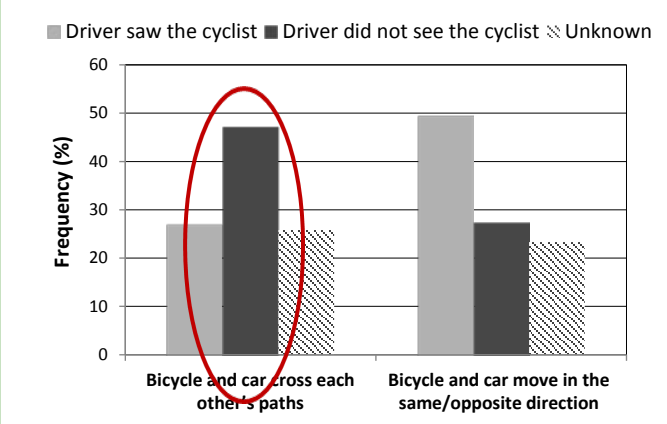


Upper extr.

Lower extr.

21 out of 60 (35%) of the MAIS 2 injuries are not reported in STRADA hospital !

Results cont…



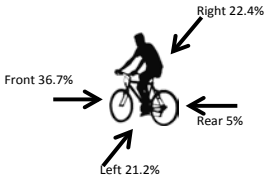
In about 50% of all crossing situations the driver reported that he/she did not see the cyclist before the collision.
This is significantly higher than in the same/opposite direction situations.

This indicates that especially in *crossing situations* which mainly occur in intersections, visibility is an important factor contributing to the collision.

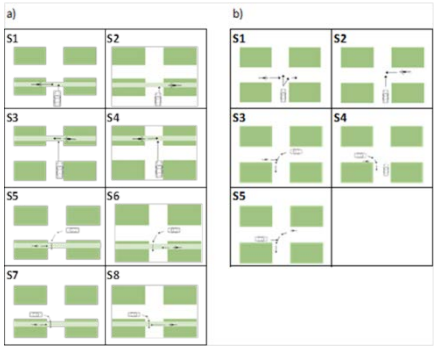
This is consistent with other research studies, especially impairment of driver's attention, expectation or attention allocation are emphasized. In these collisions also darkness and bad weather affected the visibility and are more pronounced than in the *same/opposite direction situations*

Results cont…

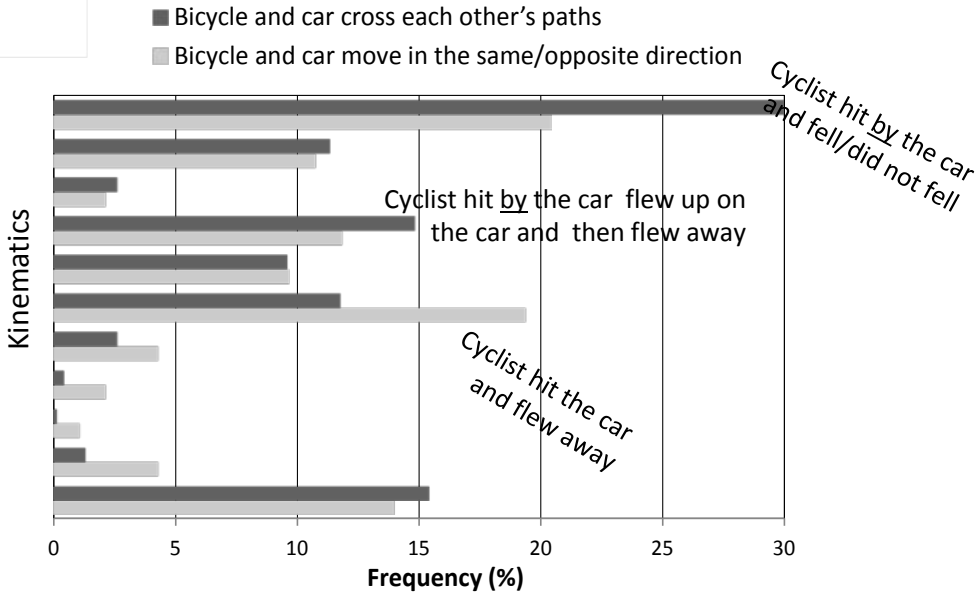
Impact direction



Scenarios



Kinematics



Deeper insight in

- Injury mechanisms
- How safety-critical situations occur

Identifying different kind of countermeasures

- Infrastructure
- Motor vehicle development
- ITS
- Information/education

Summary - main results

Detailed data from bicycle-car collisions based on motor insurance claims is used to describe and classify these accidents in order to to better understand how these safety-critical situations occur. This data is found to be very useful and supplement the official data to find countermeasures

- *Crossing situations* - are the most frequent collision situations, while collisions in the *same or opposite direction* are less frequent but with highest risk of severe injuries.

- High speed plays an important role in the occurrence of severe injuries but it is clear that also less serious but frequent accidents cause many moderate injuries for the unprotected cyclist.

- Visibility as well as impairment of driver's allocation and attention are important factors contributing to the collision in crossing situations.

- Different scenarios describing how the driver and the cyclist moved towards each other as well as impact direction, impact points etc. gives insight in what happens during the collision.

Thank You!

email:irene.isakssonhellman@if.se

Relax, we'll help you.