Pedestrian fatality risk

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Based on work with Ulrich Sander (Autoliv) and Helena Stigson (Folksam)



Presented in Åbo, 13 May 2011

Publications

- Pedestrian fatality risk as a function of car impact speed
 - Rosén E, Sander U
 - Accid. Anal. Prev. 2009(41), 536–542
- Pedestrian injury mitigation by autonomous braking
 - Rosén E, Källhammer J-E, Eriksson D, Nentwich M, Fredriksson R, Smith K
 - Accid. Anal. Prev. 2010(42), 1949–1957
- Literature review of pedestrian fatality risk as a function of car impact speed
 - Rosén E, Stigson H, Sander U
 - Accid. Anal. Prev. 2011(43), 25-33

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UK Media

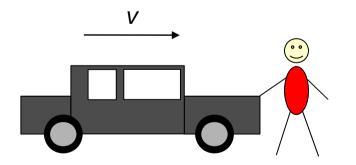
"Government admits speeding fatality statistics were exaggerated"

"Government admits to exaggerating accident statistics"

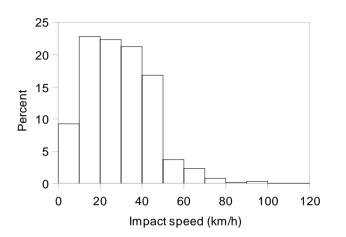
Real-World Accident Data

- GIDAS 1999–2007
- 15+ years
- Hit by front of passenger car
- Not lying on the ground

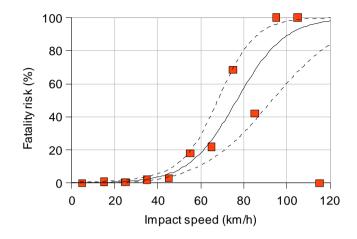
- 490 cases
- 36 fatalities
- Weight factors derived from national statistics



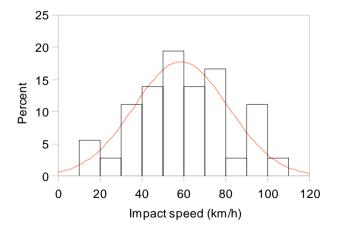
Exposure of crashes, E(v)

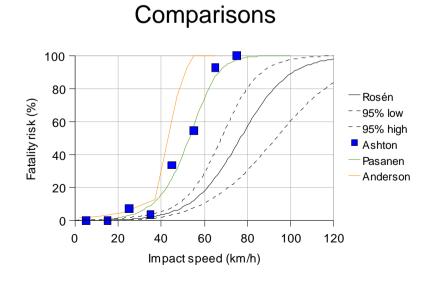


Risk of death, R(v)



Incidence of fatal crashes, I(v)

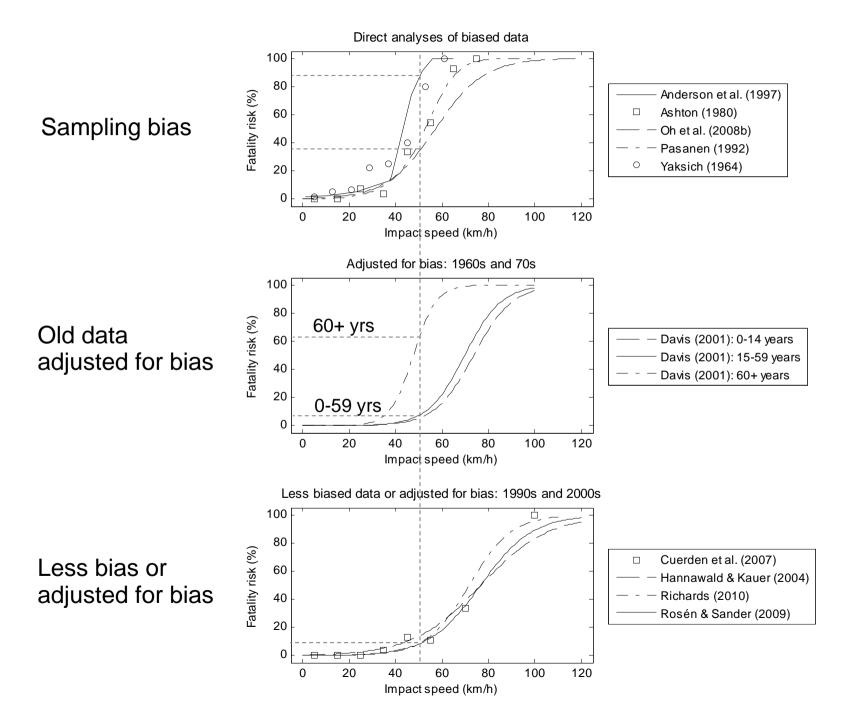




Sampling bias – an example

- Sampling scheme: Investigate
 - 1/2 of fatal crashes
 - 1/3 of non-fatal crashes
- Suppose 100 crashes occurred
 - 10 fatal
 - 90 non-fatal
 - Hence, true fatality risk is P=10/100=10%
- Database would include
 - 5 fatal
 - 30 non-fatal
 - Hence, unweighted fatality risk is P=5/35=14%

Literature review

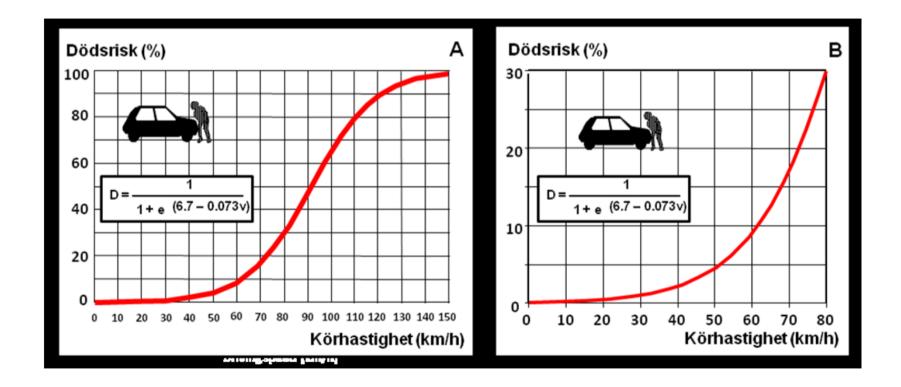


Confusion

- Waltz et al. (1983) → Anderson et al. (1995, 1997)
- Teichgräber (1983) \rightarrow Yaksich (1964)
- Ashton (et al.) (1977, 1979, 1980)
 - Only provided data, but no risk analysis
 - Ashton et al. (1977) specifically pointed out bias in the data
- Pasanen (1992) fitted a risk curve to "Ashton's" biased data

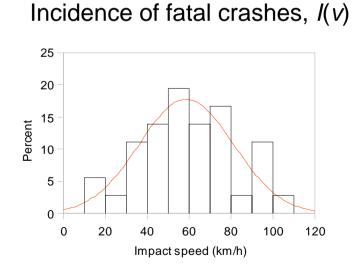
Pasanen's approach

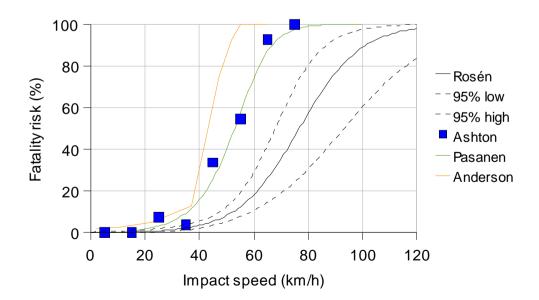
- Consider car TRAVEL speed
- Focus on the RELATIVE risk increase



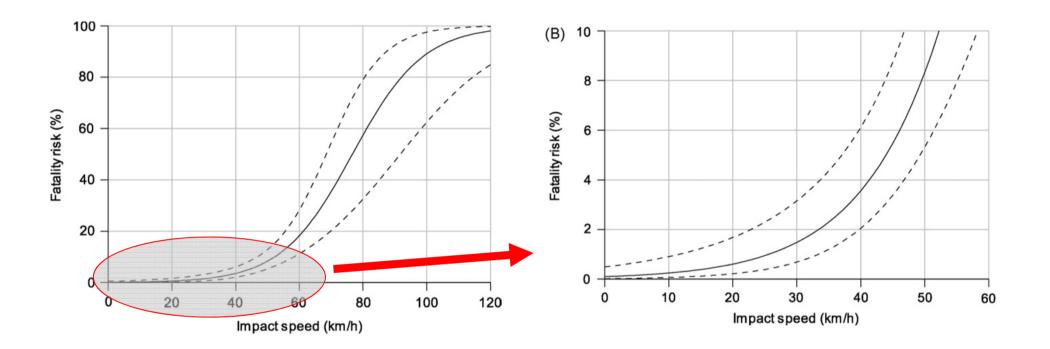
Conclusions

- A correct understanding of exposure of crashes and injury risks is needed to save and protect as many pedestrians as possible
- Decreasing impact speed is very effective both at high and low speeds





Final word: Speed is dangerous



By decreasing speed where pedestrians are at risk, injuries will be prevented and lives will be saved

Thanks for listening!

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