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The accuracy of determining speeding directly from mass crash data and using the NSW Centre for Road Safety method

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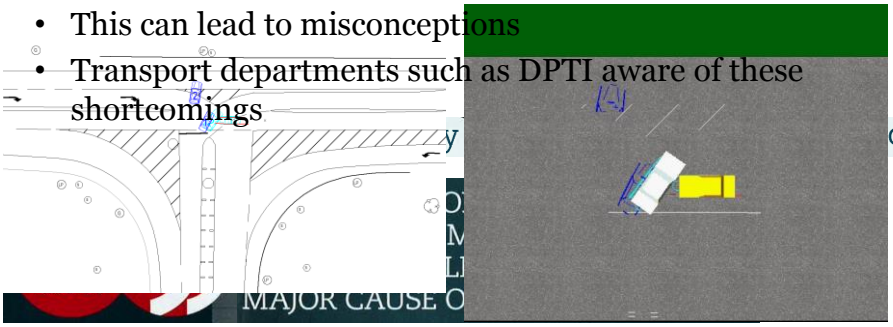
seek LIGHT

Background - speeding

- Higher travel speeds = higher risk
  Kloeden et al. 1997; Kloeden et al. 2001; Nilsson, 2004 and others)
- Speed limits raised to help control the risk
- Speeding is generally defined as travelling above the spee
- Consid rs in fatal crashes
- Major f campaigns

Background - determining speeding

- It is not easy! - detailed reconstruction generally needed
- Currently outside the scope of regular traffic policing
- Therefore thought to be under reported in data that comes from police
- This can lead to misconceptions
- Transport departments such as DPTI aware of these shortcomings



Background - determining speeding

NSW Centre for Road Safety developed method to identify speeding as a contributing factor in mass data

A motor vehicle is assessed as having been speeding if it satisfies the conditions described below under (a) or (b) or both.

a) The vehicle's controller (driver or rider) was charged with a speeding offence; or the vehicle was described by police as travelling at excessive speed; or the stated speed of the vehicle was in excess of that permitted for the vehicle controller's licence class or the vehicle weight (introduced 1 January 2010); or the stated speed of the vehicle was in excess of the speed limit.
b) The vehicle was performing a manoeuvre characteristic of excessive speed, that is: while on a curve the vehicle jack-knifed, skidded, slid or the controller lost control; or the vehicle ran off the road while negotiating a bend or turning a corner and the controller was not distracted by something or disadvantaged by drowsiness or sudden illness and was not swerving to avoid another vehicle, animal or object and the vehicle did not suffer equipment failure.

Background - determining speeding

- Adopted by states such as South Australia

- Note – NSW CRS method defines speeding as including "excessive speed for the prevailing conditions"
- This presents a couple of problems
  - It is contrary to the general understanding of speeding
  - It is not easily enforceable
- It has been criticised for lacking scientific basis (Diamantopoulou et al. 2003)

Aim

Examine the accuracy of methods of determining speeding from the mass data

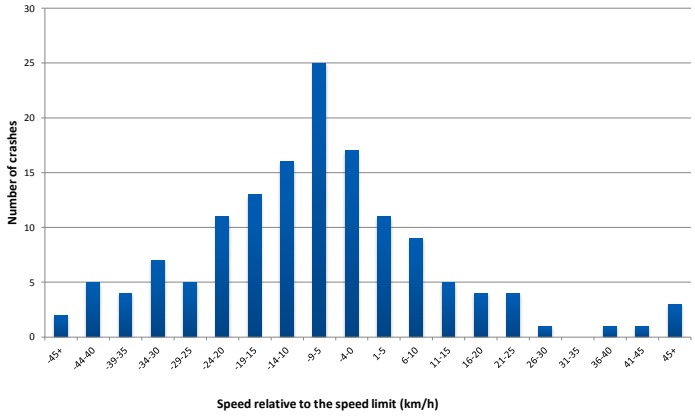
- Directly from the mass data
- Using the NSW Centre for Road Safety method

Method

- 144 Reconstructed cases from CASR's at-scene in-depth crash investigations (July 2006 to April 2012) identified
- Matched to mass data records (TARS)
- Examined "error" field in TARS where "excessive speed" can be listed
- Determined speeding by NSW Centre for Road Safety method
- Compared results against speeding determined by crash reconstruction

Results

Distribution of crash speed relative to the speed limit from the reconstructions – 39 speeding



Results – direct from mass data

Accuracy of TARS error for identifying speeding

Error recorded in TARS mass crash database	Reconstruction		Total
	Not Speeding	Speeding	
Change Lanes to Endanger	0	1	1
Dangerous Driving	0	2	2
Died Sick or Asleep At Wheel	1	0	1
Disobey - Give Way Sign	9	3	12
Disobey - Stop Sign	6	3	9
Disobey - Traffic Lights	2	0	2
DUI	2	4	6
Excessive Speed	2	0	2
Fail to Give Way	13	3	16
Fail to Give Way Right	1	0	1
Fail to Keep Left	7	7	14
Fail to Stand	8	2	10
Follow Too Closely	2	2	4
Inattention	43	9	51
Incorrect or No Signal	0	1	1
None	5	0	4
Overtake Without Due Care	3	2	5
Vehicle Fault	1	0	1
Total	105	39	144

Results – NSW CRS method

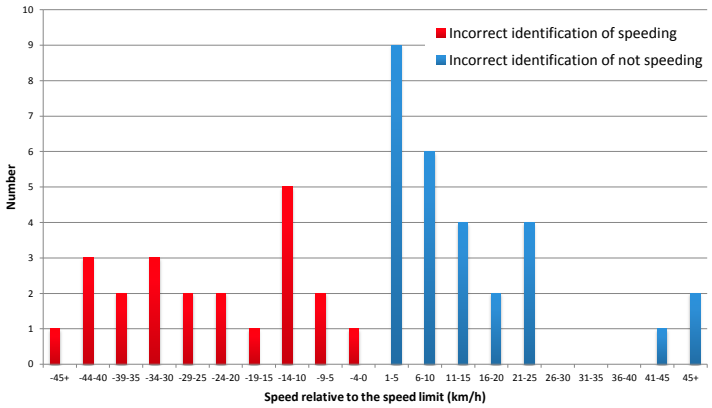
Accuracy of NSW Centre for Road Safety method

NSW Centre for Road Safety method	Reconstruction		Total	Percentage actually speeding
	Not Speeding	Speeding		
Not Speeding	82	27	109	24.8%
Speeding	23	12	35	34.3%
Total	105	39	144	27.1%
Percentage predicted speeding	21.9%	30.8%	24.3%	

Fisher exact test p = 0.281

Results – NSW CRS method

At what speeds are the errors happening?



Results – NSW CRS method

Accuracy by individual criterion

NSW Centre for Road Safety method	Criterion of method that was satisfied			
	Description	Stated Speed	Lost control	Ran off road
Correct identification of speeding	2	3	6	3
Incorrect identification of speeding	3	1	17	1
Total	5	4	23	4

Discussion

A question of definitions

- Does the TARS error “excessive speed” include?
  - Speed well above the speed limit?
  - Speed that is excessive for the conditions?
- Is it good to include “excessive speed for the prevailing conditions” in the definition of speeding?
- It dilutes its ability to justify speed limit enforcement
- It could give people an excuse to dismiss the statistic outright
- Ideally you would separate speeding (above the speed limit) and excessive speed for the conditions into separate categories

Limitations

- Bigger sample size would aid analysis
- Not a representative sample of crashes
- Reconstruction speed error - minimised by using
  - highly accurate surveying equipment
  - experienced staff to perform the reconstructions
  - programs and equations that are arguably the most accurate

Conclusions

- The error “excessive speed” recorded in the TARS database is not accurate in identifying crashes where a vehicle was speeding
- The NSW CRS method also lacks accuracy but is more accurate than the “excessive speed” error.

Recommendations

- Effort should be put into developing better methods to determine speeding from mass data sources
- Addition of a speed factor for police to fill in conjunction with some basic training may help
- All fatal crashes should be reconstructed
- Police use of Crash Data Retrieval (CDR) systems to download speed from vehicle may be feasible in the future

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Results – NSW CRS method

Percentage predicted speeding severity and speed limit

NSW Centre for Road Safety method percentage predicted as speeding		Reconstruction		Total % correct
		Not Speeding	Speeding	
Injury Severity	Minor injury	23.6 (n=38)	25.0 (n=8)	67.4
	Serious injury	23.5 (n=51)	22.2 (n=18)	62.3
	Fatal	12.5 (n=16)	46.2 (n=13)	69.0
Speed limit	40, 50, 60 km/h	4.8 (n=21)	0.0 (n=9)	66.7
	80 km/h	25.0 (n=24)	45.5 (n=11)	65.7
	100, 110 km/h	26.7 (n=60)	36.8 (n=19)	64.6