

Feasibility of Implementing International "Pedestrian Crosswalk" Laws in New Zealand



Dr Glen Koorey & Courtney McCrostie
University of Canterbury



Presentation Outline

- Road rules in New Zealand and overseas
- Research Objectives
- Crash data analysis
- Perception survey
- Delay modelling
- Conclusions
- Recommendations



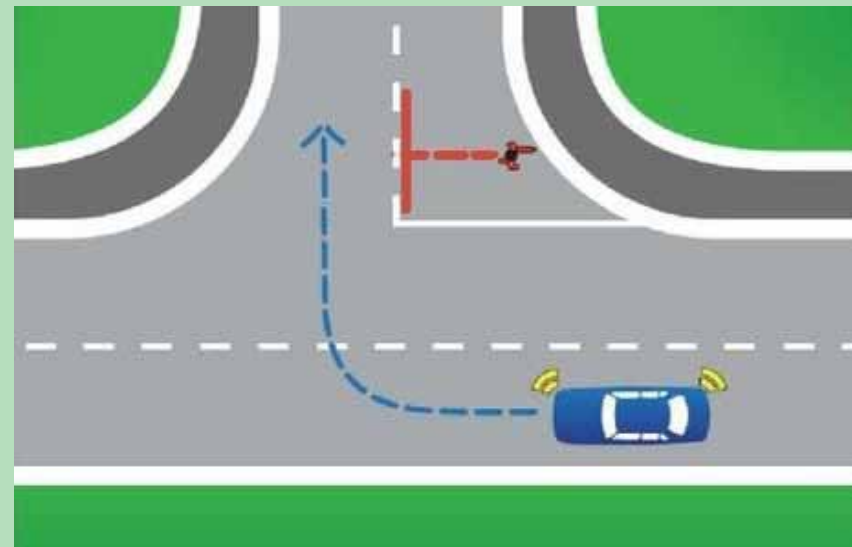
New Zealand's Pedestrian Crosswalk Laws



- In New Zealand drivers only have to give way to pedestrians at



- Signalised pedestrian crossings
- Zebra crossings
- Driveways
- Shared space zones
- But NOT unsignalised intersections



NZ: No Priority Here

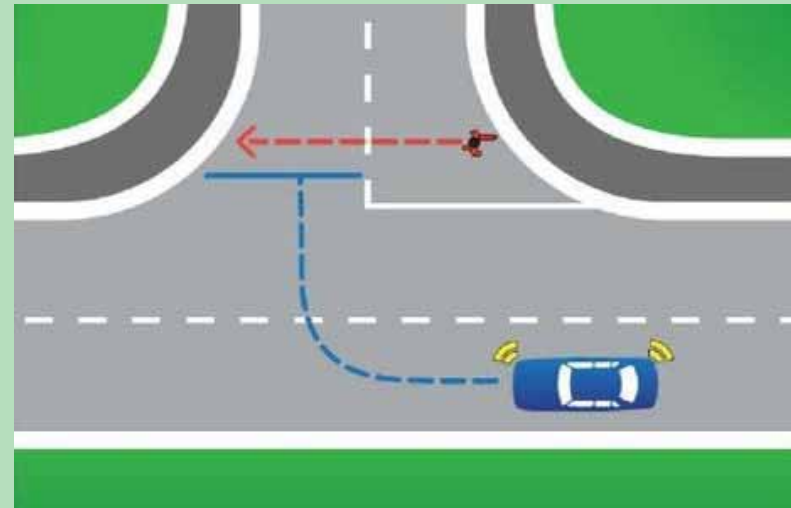


Overseas Pedestrian Crosswalk Laws



- *“Vehicles do not have an automatic right of way on the road”*

- Ireland Road Safety Authority, 2013



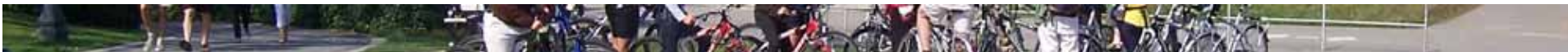
- *“... a driver must slow down when approaching an intersection and be prepared to come to a complete stop if a vehicle **or pedestrian** with right-of-way is approaching from another direction.”*

- Indiana Bureau of Motor Vehicles, 2013

US: Three Legal Crosswalks



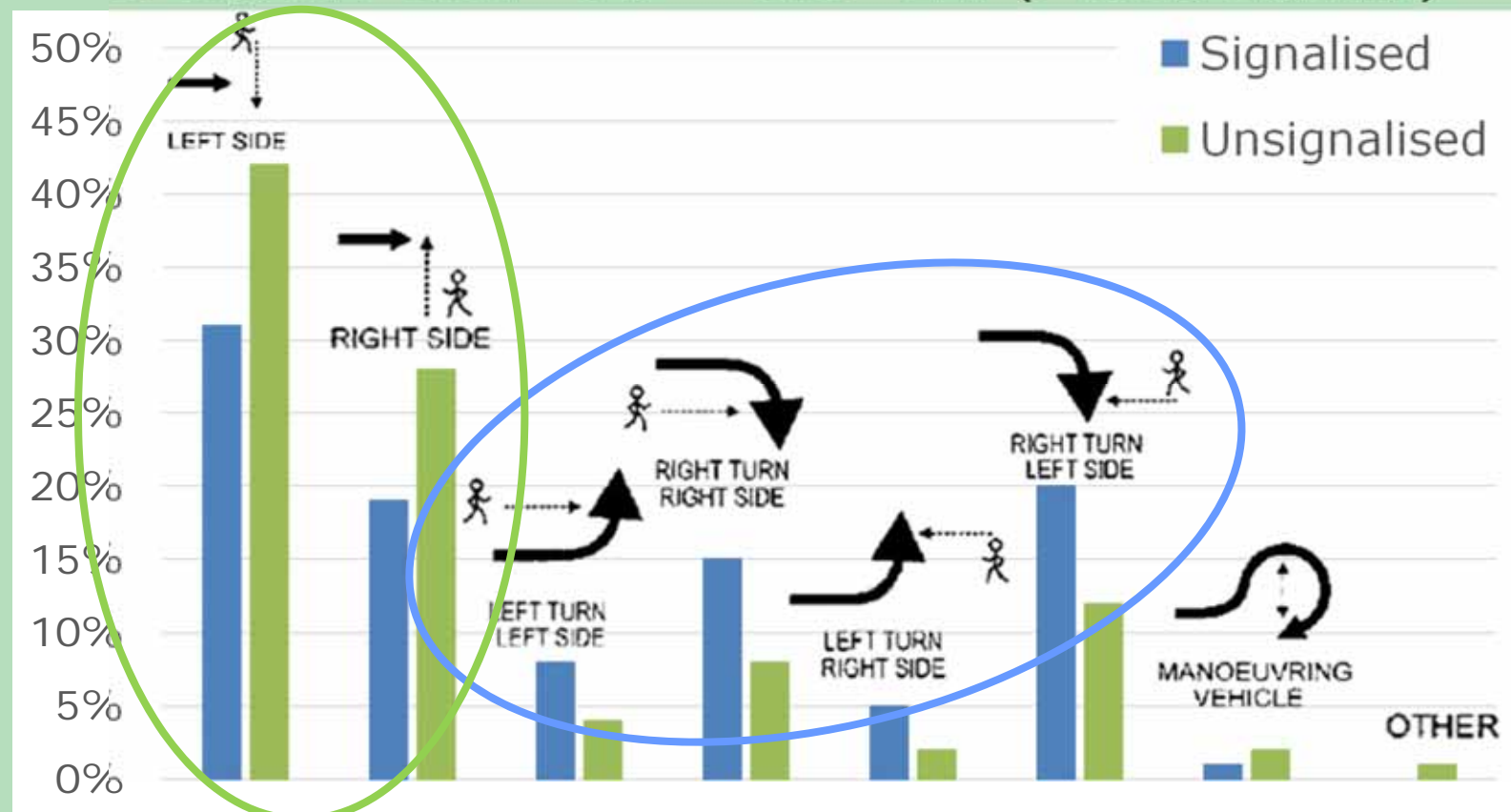
Research Objectives



- Identify the effects different laws have on pedestrian **behaviour and safety**
- Determine the public's **preferences and understanding** of law change options
- Determine the effects of rule changes on both pedestrian & motorist **delays**
- Consider the **practical aspects** of introducing a law change in New Zealand

Movements Involved in Pedestrian Crashes

- CAS Data: Jan '09 – Jul '14 (>1750 crashes)



- *Overseas ped'n crash data not as detailed*

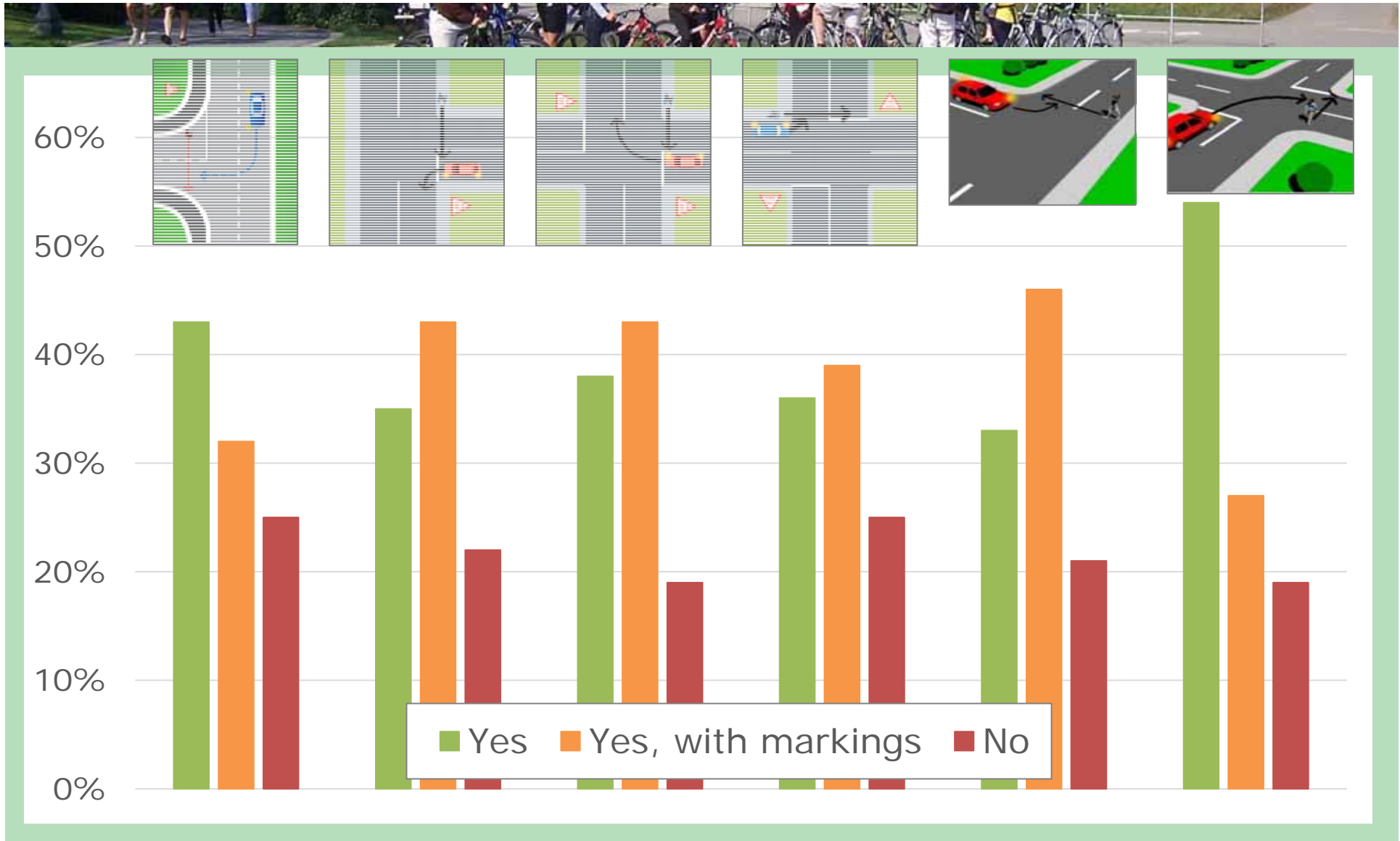
Understanding of the Current Road Rules



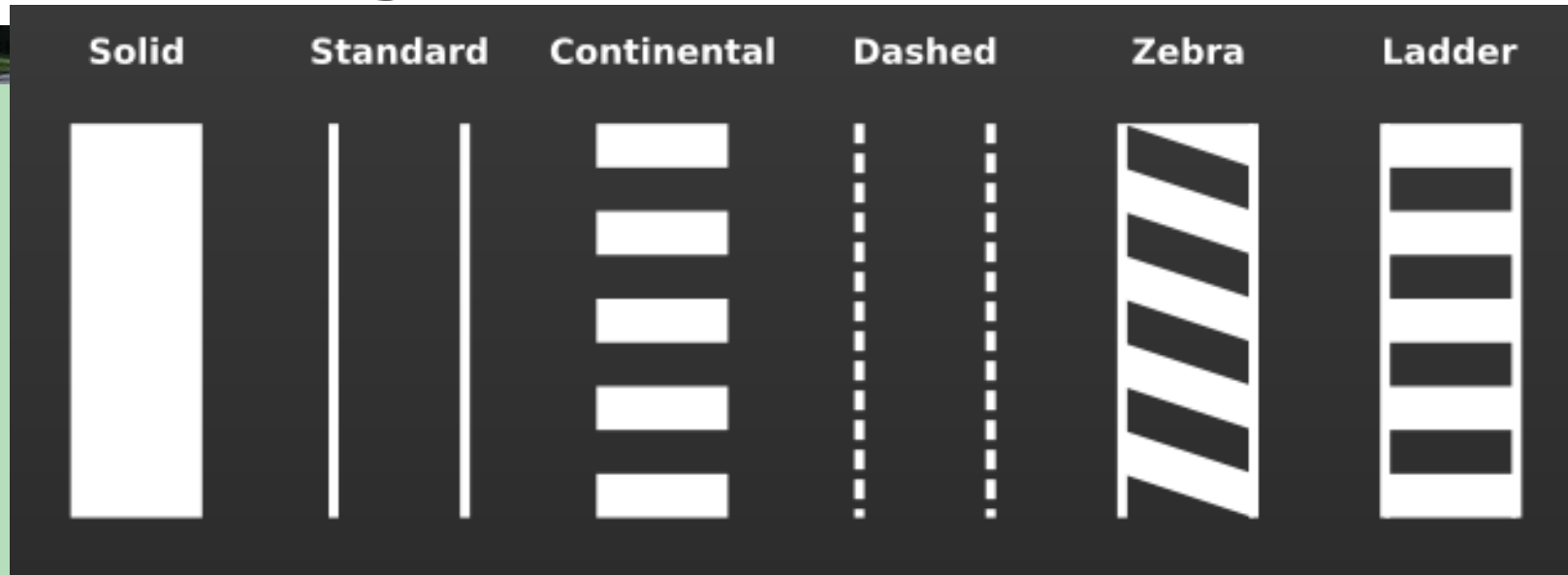
Online Survey (sample size = 876)



Willingness to Give Way to Pedestrians



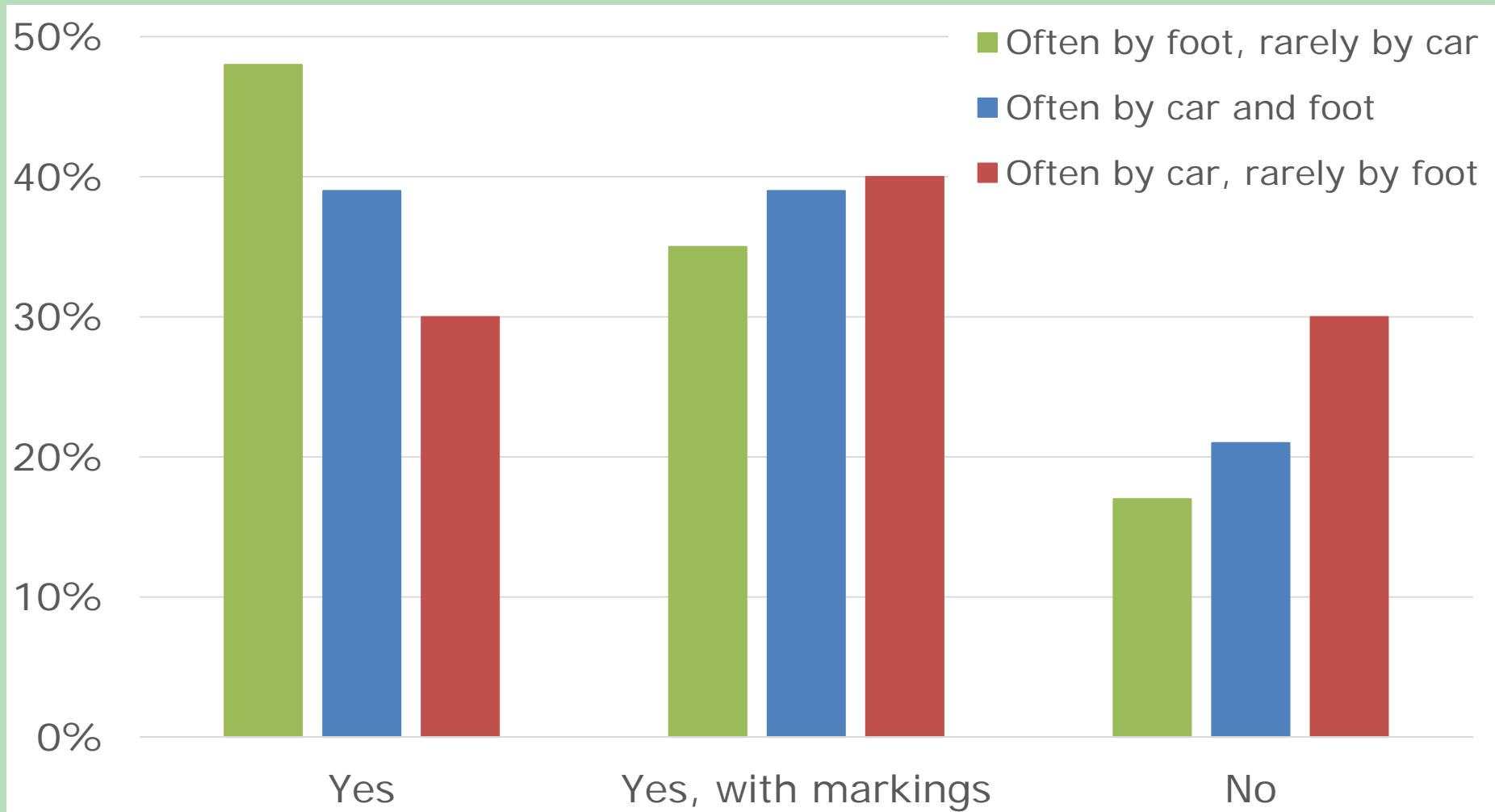
Potential Crosswalk Markings



- “Ladder” style most popular



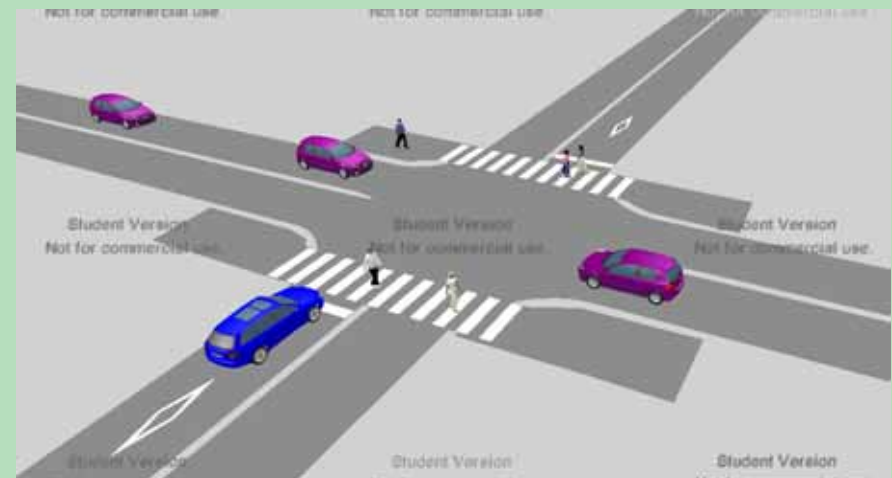
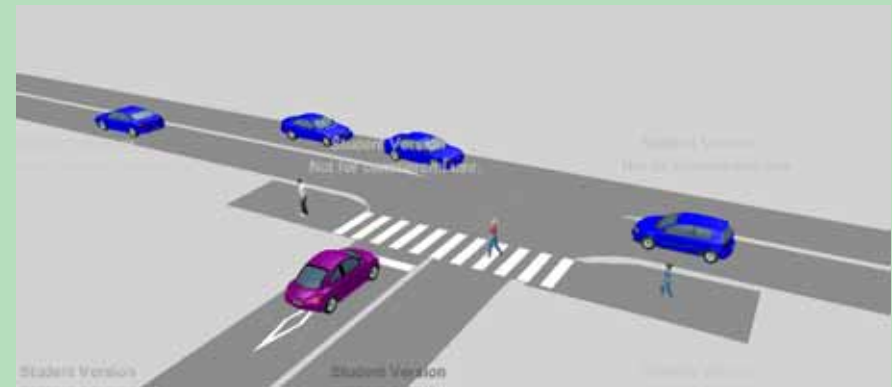
Overall Willingness to Give Way to Pedestrians



Delay Modelling Overview



- PTV Vissim 6
 - Microscopic
 - Multi-modal
- Two layouts considered
 - T intersection
 - X intersection
- Nine flow combinations
 - Max/Med/Min ped'ns
 - Max/Med/Min vehicles



Change in Pedestrian and Vehicle Travel Time (secs/hr)



		T Intersection				X Intersection			
		Vehicle				Vehicle			
Ped time saved	Pedestrian	Max	Med	Min	Max	Med	Min		
		Max	1360	366	144	2425	588	193	
		Med	432	135	35	942	310	81	
Min	144	89	-6	309	95	-8			

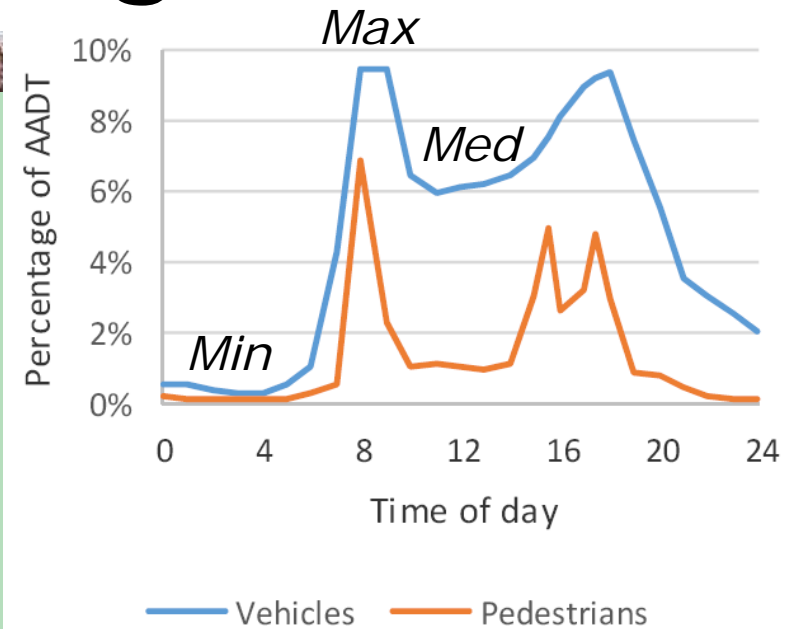
		T Intersection				X Intersection			
		Vehicle				Vehicle			
Veh time lost	Pedestrian	Max	Med	Min	Max	Med	Min		
		Max	-1599	-476	-133	-4069	-1408	-280	
		Med	-461	-150	-46	-1104	-316	-99	
Min	-110	-44	-18	-1109	-38	-33			

Delay Modelling: Cost of Implementing Change

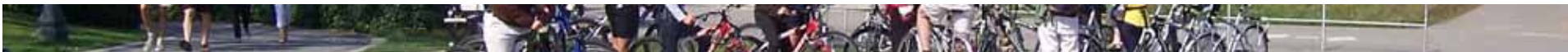
Using EEM Costs:

- Approx. Yearly cost
 - T Intersection = \$1,979
 - X Intersection = \$11,939
- 40-year life-cycle cost
 - T Intersection = \$30,661
 - X Intersection = \$184,975

*c.f. Cost of pedestrian fatality in
50km/h zone = \$3.05 million*



Project Limitations



- Crash data
 - Unable to compare to overseas
 - Didn't look at motor veh crashes e.g. rear-end
- Unable to estimate absolute safety effects
 - Use VISSIM conflicts as surrogate measure?
- Online Survey
 - Relying on what people say they *would* do
 - Response bias?
- Delay Modelling
 - Traffic behaviour assumptions in Vissim

Practical Aspects of Implementation

- All Intersections or just Specially Marked Ones?
 - What Crosswalk Markings to Use?

- Roundabouts?
- Required Road User Education?
- Effect on Road User "Culture"?



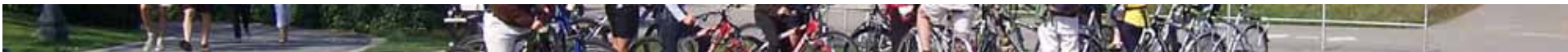
Use existing Zebra Xing?



Cyclist Priority at Sideroads?



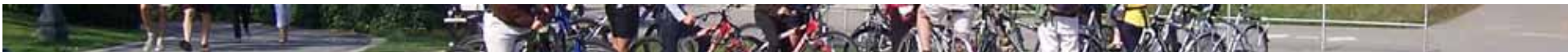
Conclusions



- Safety effects unclear (esp. absolute no.s)
 - Expect that crash patterns at unsignalised intersections will become **similar** to those at signalised intersections
- 78% of people are already willing to give way to pedestrians
- Life-cycle delay costs of change per intersection are relatively negligible

No reason so far to dismiss a law change

Recommendations



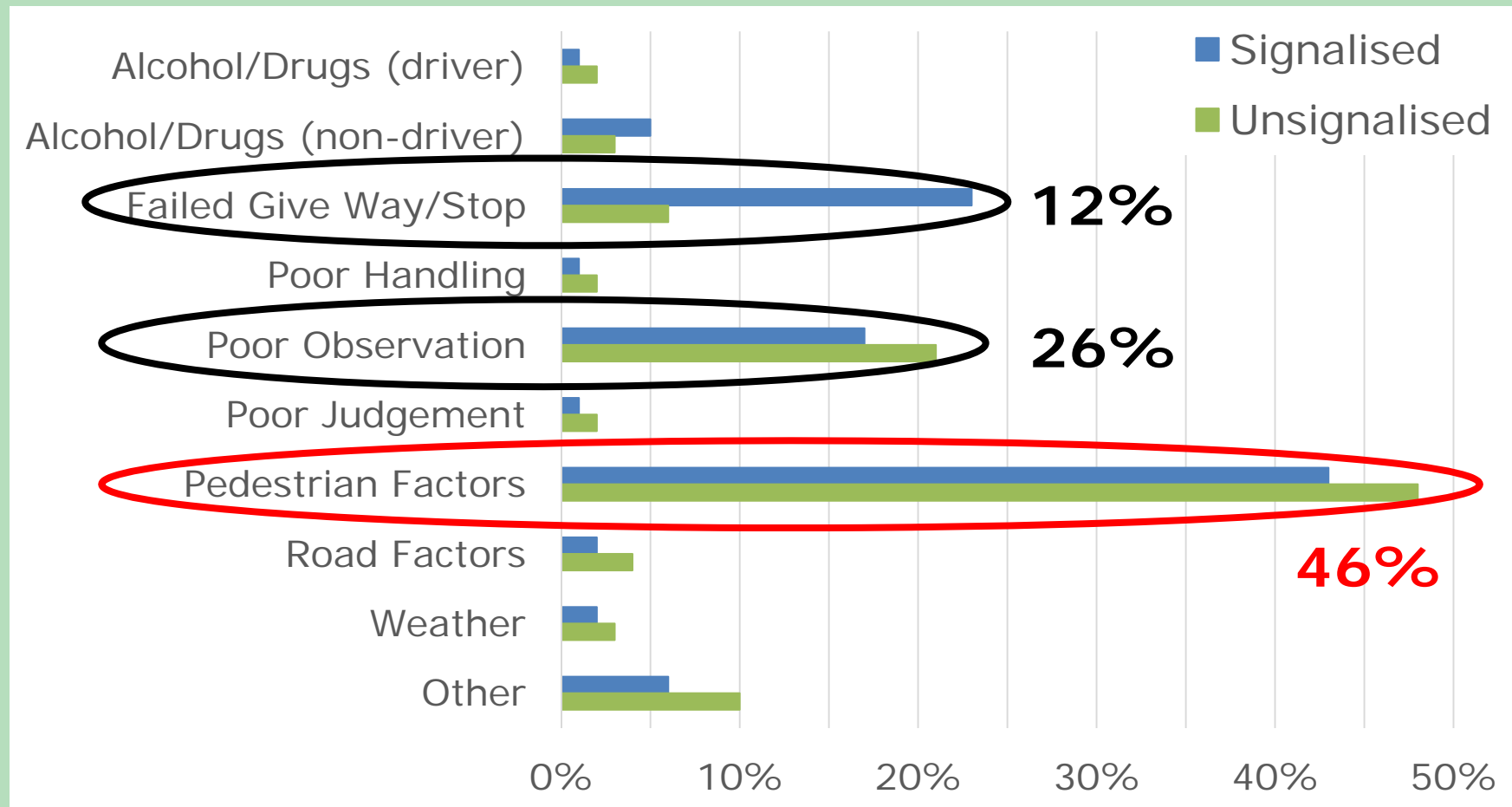
- Further research on the possible safety effects of a law change
 - Surrogate safety modelling with Vissim?
 - Physical/Simulator trials at select sites
- A more in-depth look at the economic benefits and costs of a law change
 - Particularly with any Safety assessment
- Additional study on the effect of different types of crosswalk markings

Thank You!

- Any Questions?



Factors Contributing to Pedestrian Crashes



“Pedestrian Factors” Contributing to Ped’n Crashes

