

PEDESTRIAN ROAD TRAUMA IN AOTEAROA

Rebekah Thorne, Lily Hirsch, Hamish Mackie,
Iain McAuley, Irene Tse



RATIONALE

Pedestrians made up:

- 7.9% of road fatalities and 9.3% of serious injuries in NZ in 2019¹
- 17% of road fatalities and serious injuries in Auckland from 2015-2019²

1 Waka Kotahi NZTA (7 May 2020) Personal Correspondence.

2 Auckland Transport (16 March 2020) Personal Correspondence.

RESEARCH QUESTIONS

- What Safe System factors are involved in pedestrian death and serious injury crashes?
- How do fatal crashes differ from serious injury crashes?

THE SAFE SYSTEM



METHOD

- Analysing crashes reported in Waka Kotahi Crash Analysis System (CAS)
- NZ pedestrian crashes 2013-2017: sample of 200 serious injury cases and 100 fatalities
- Auckland pedestrian crashes 2018: all 100 serious injury cases and 13 fatalities

METHOD - PILLAR TRIGGERS

SPEED ENVIRONMENT



- Vehicle speed >30 km/h
- Travel speed + posted speed limit > Safe and Appropriate Speed

VEHICLE



- No Warrant of Fitness
- SUV, ute, van, bus, truck
- Aggressivity Rating \geq 20% than benchmark
- Extraordinary factors

ROADS AND ROADSIDES



- Infrastructure Risk Rating medium high or high
- Extraordinary roads and roadsides factors
- If relevant:
 - No street lighting
 - No footpath
 - No crossing facilities
 - No shoulder or very narrow
 - Obstructed view

USER (pedestrian)



- Age ≤ 12 , ≥ 75
- Dark clothing at night
- Hit on road within 20m of a crossing
- Distraction evident
- Poor emotional state
- Running into road
- Medical condition directly contributing to the crash
- Lying on the road
- Clearly intoxicated

USER (driver)

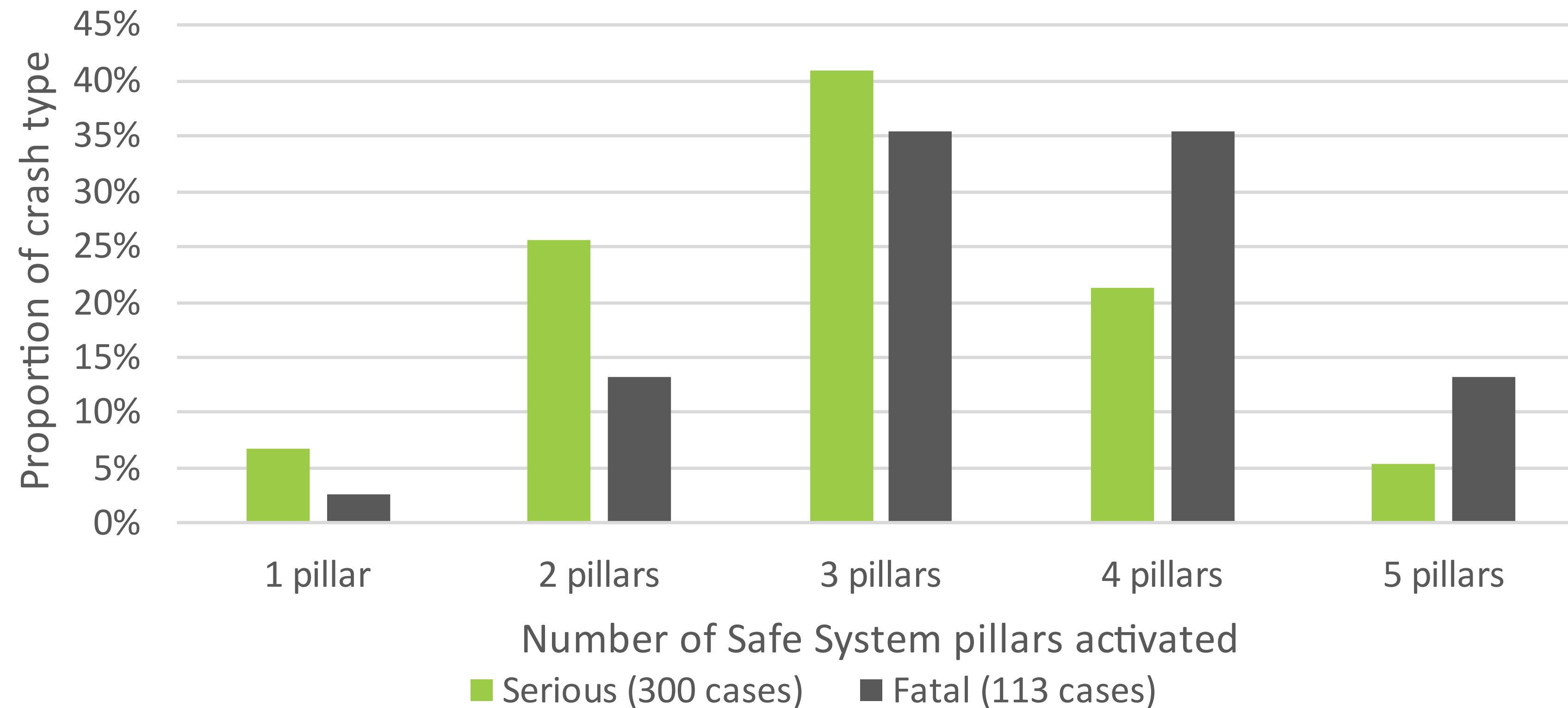


- Age ≤ 16 , ≥ 75
- Licence issues (i.e. forbidden, disqualified)
- Clearly intoxicated
- $\leq 10\%$ posted speed limit
- Medical event directly contributing to the crash
- Hit and run
- Poor emotional state
- Ran red light
- Struck ped on footpath, berm, or ped priority
- Loss of control

FINDINGS

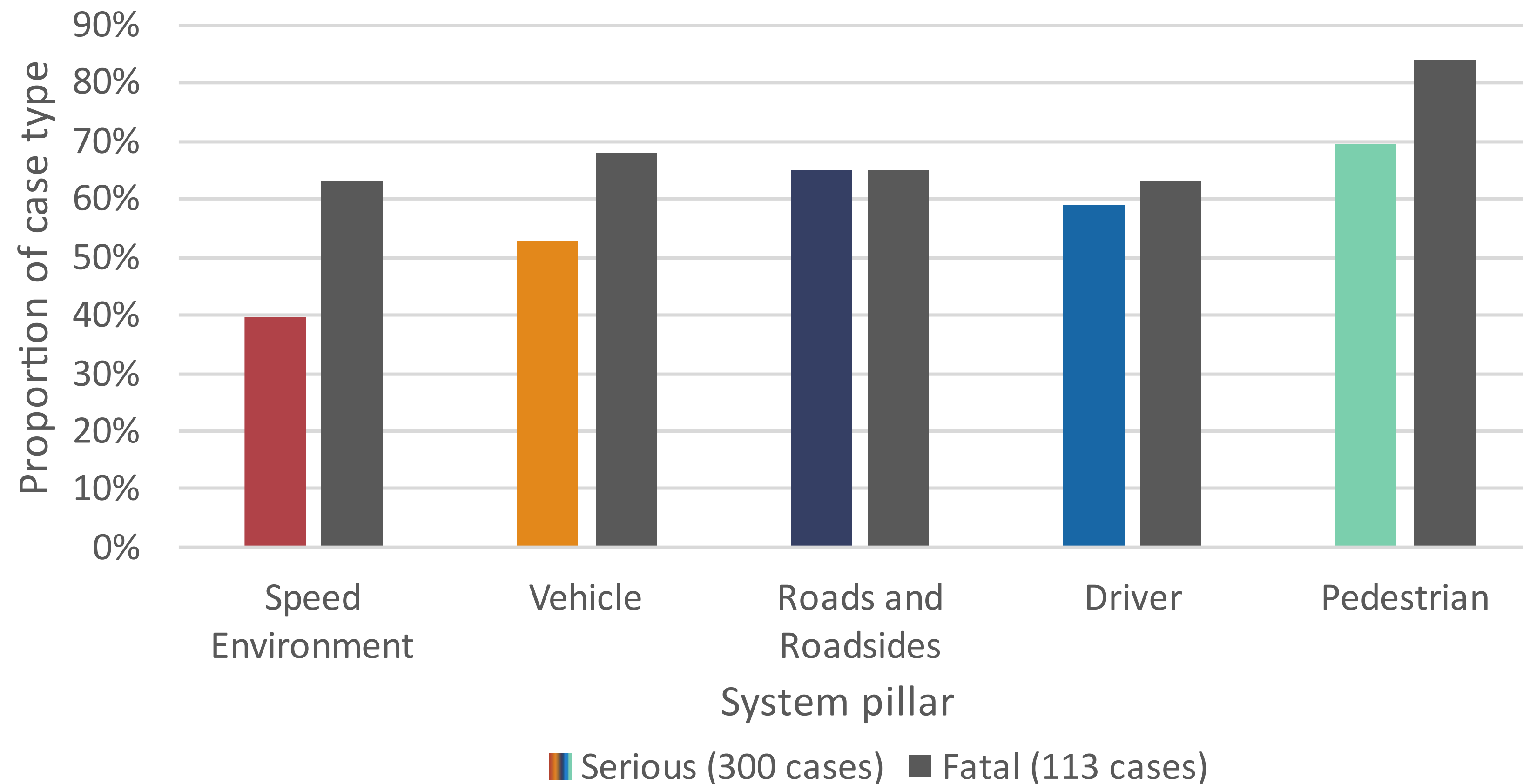
INVOLVEMENT OF SAFE SYSTEM PILLARS

Proportion of deaths and serious injuries involving multiple system pillars – all data



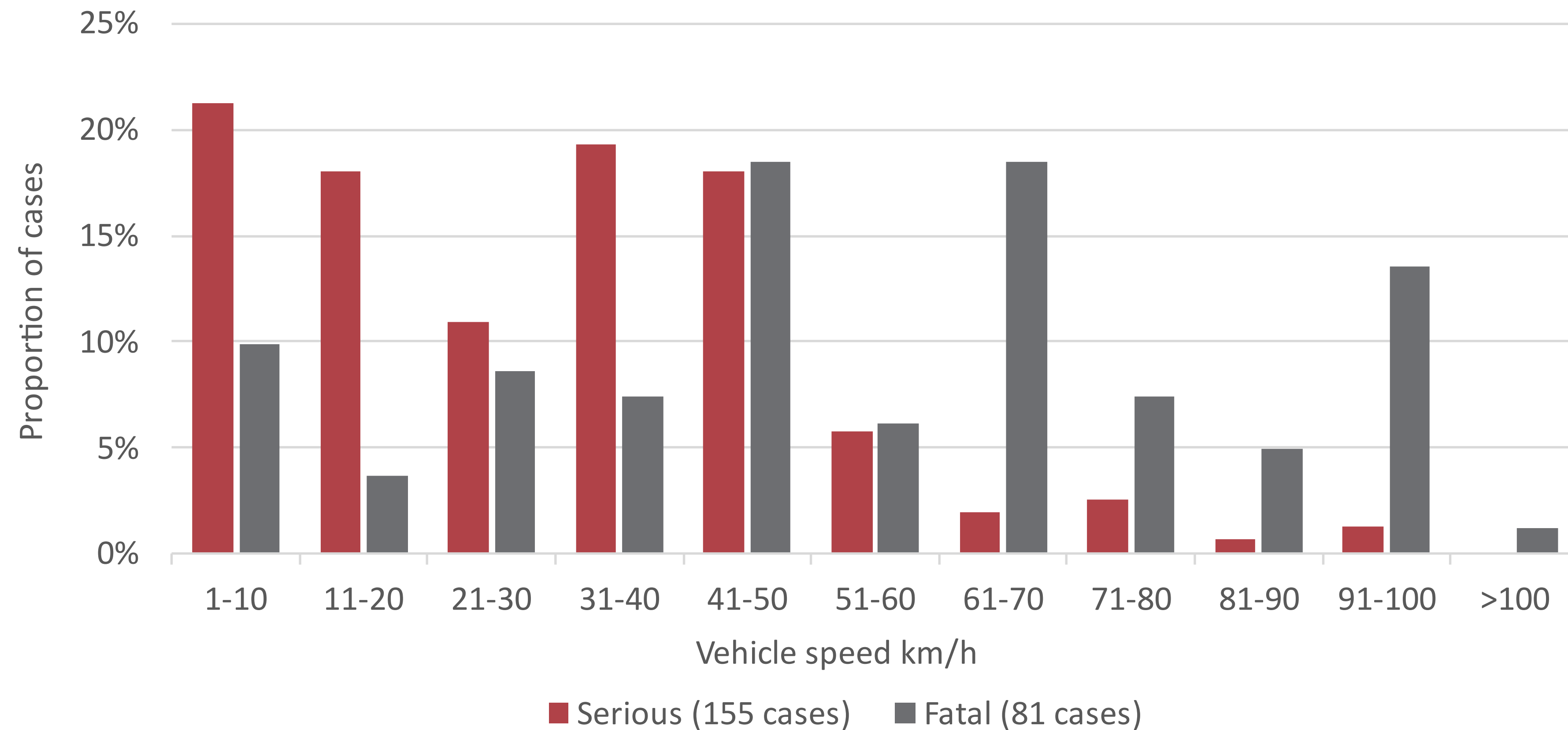
INVOLVEMENT OF SAFE SYSTEM PILLARS

*Proportion of deaths and serious injuries triggering each pillar – **all data***



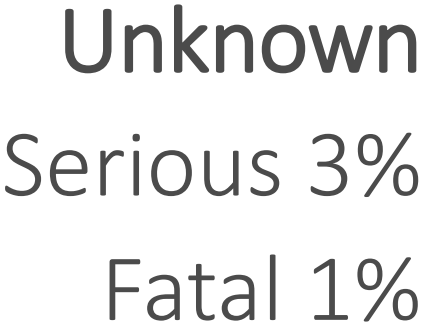
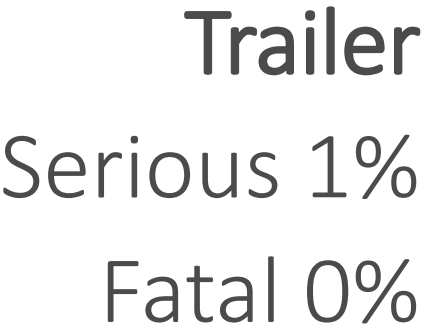
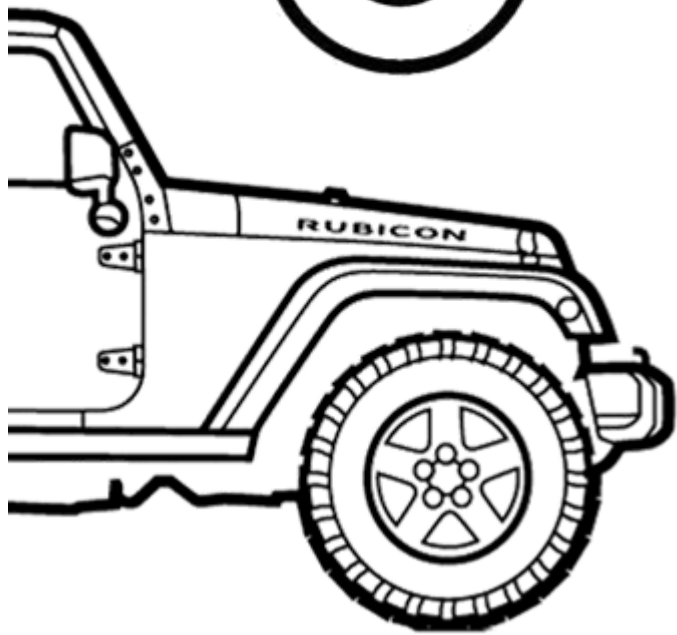
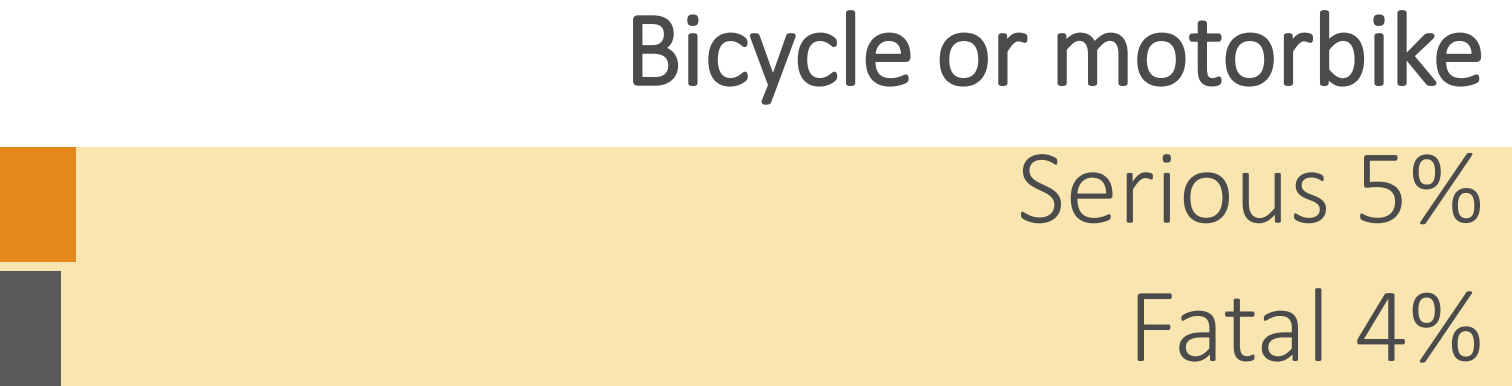
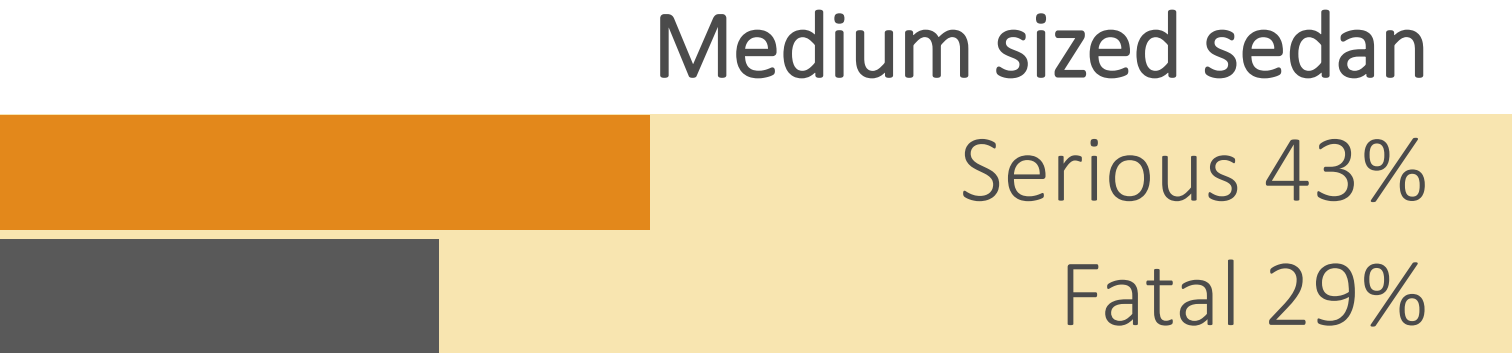
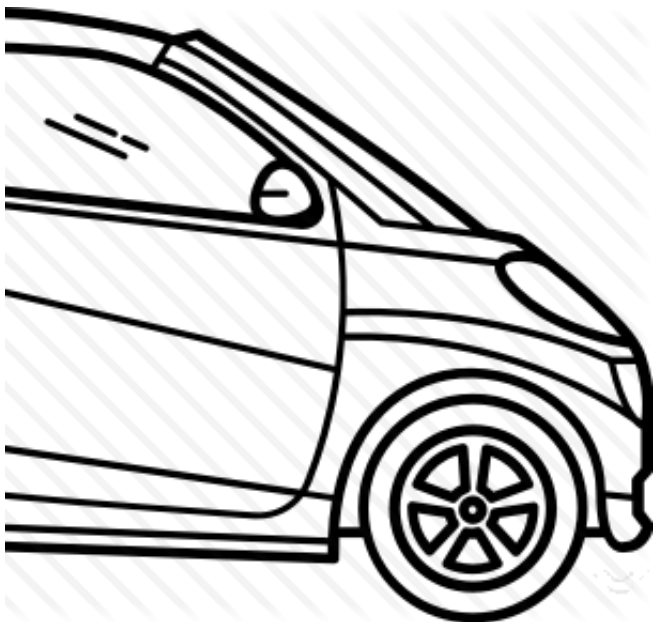
VEHICLE SPEED - NZ

Proportion of DSIs triggering speed pillar - NZ 2013-2017



VEHICLES

Proportion of serious injury and fatal cases by vehicle type



ROADS AND ROADSIDES

Recurring themes from this research where Roads and Roadsides failed to provide an enabling and/or forgiving environment for pedestrians



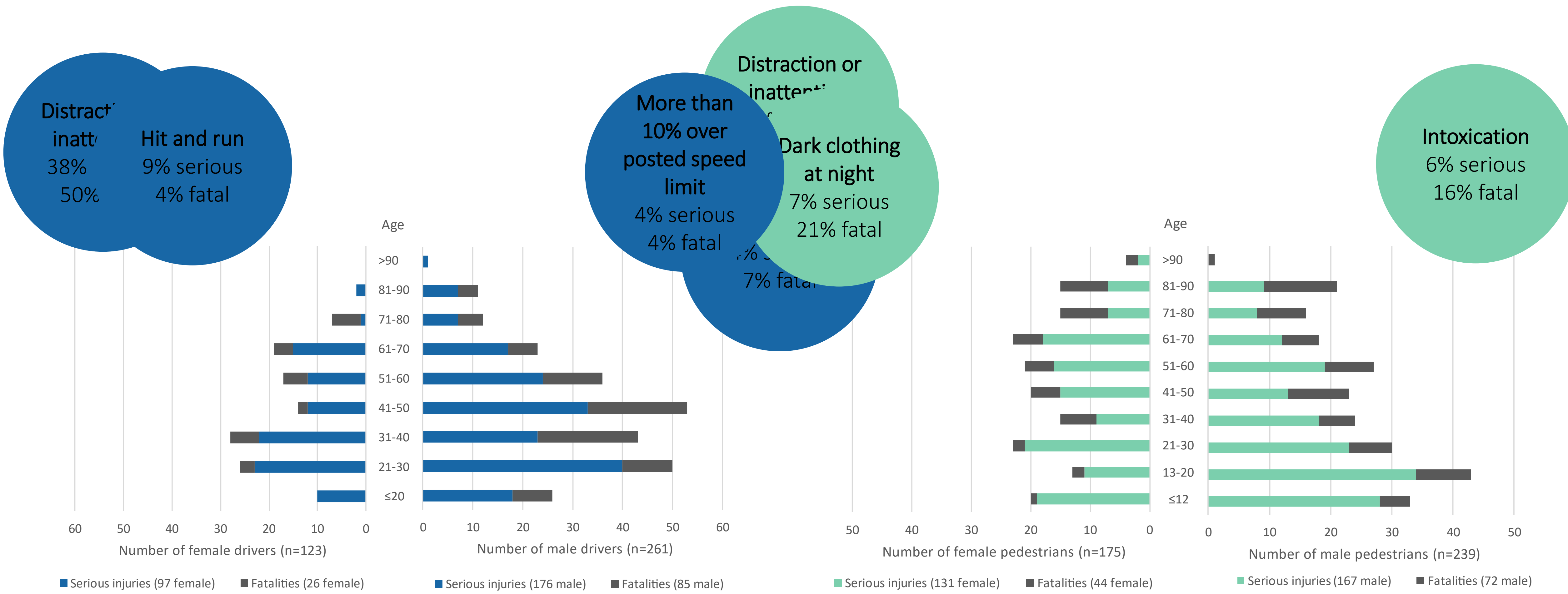
No crossing facilities

NZ 2013-2017
36% serious
27% fatal



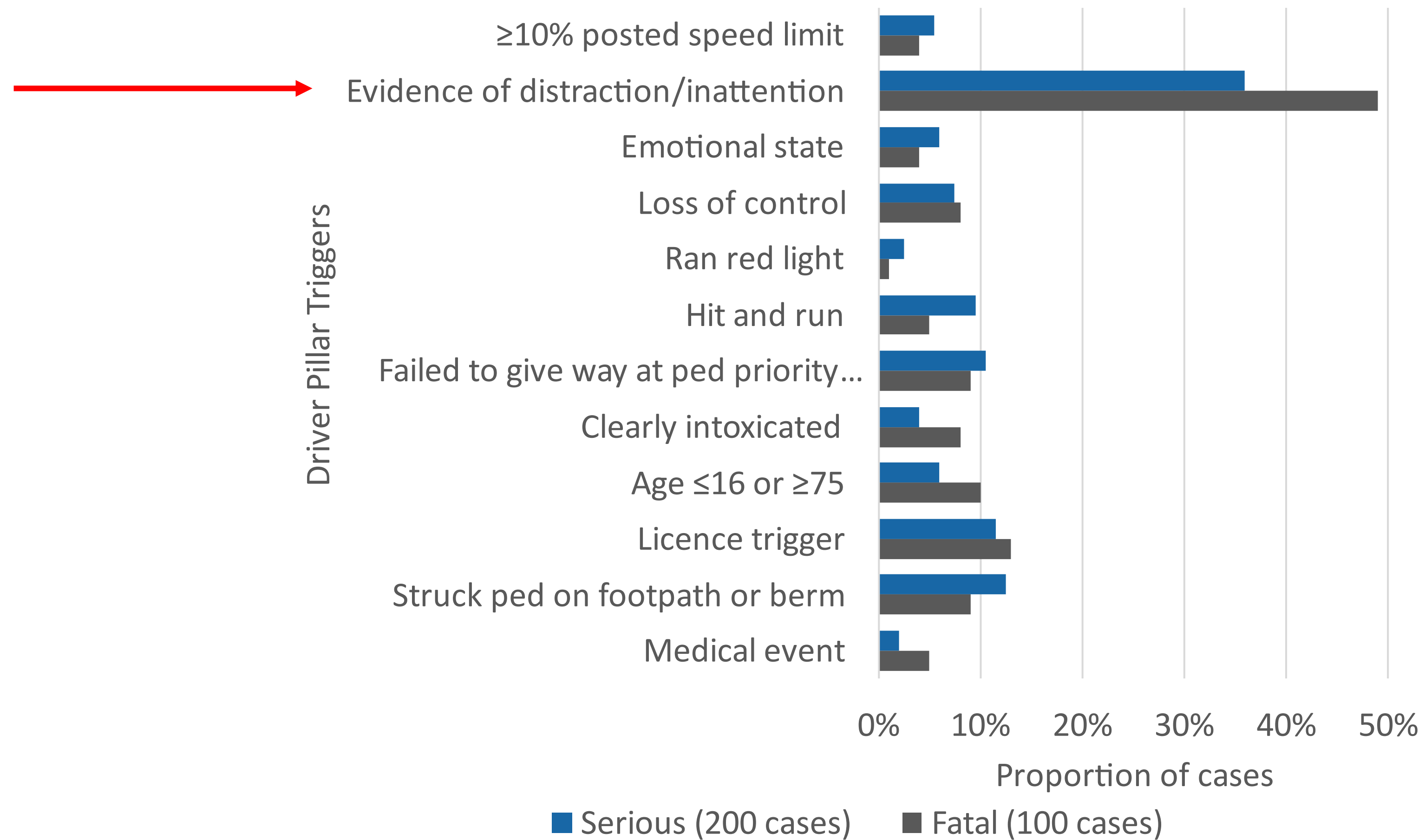
Auckland 2018
50% serious
38% fatal

DRIVERS + PEDESTRIANS



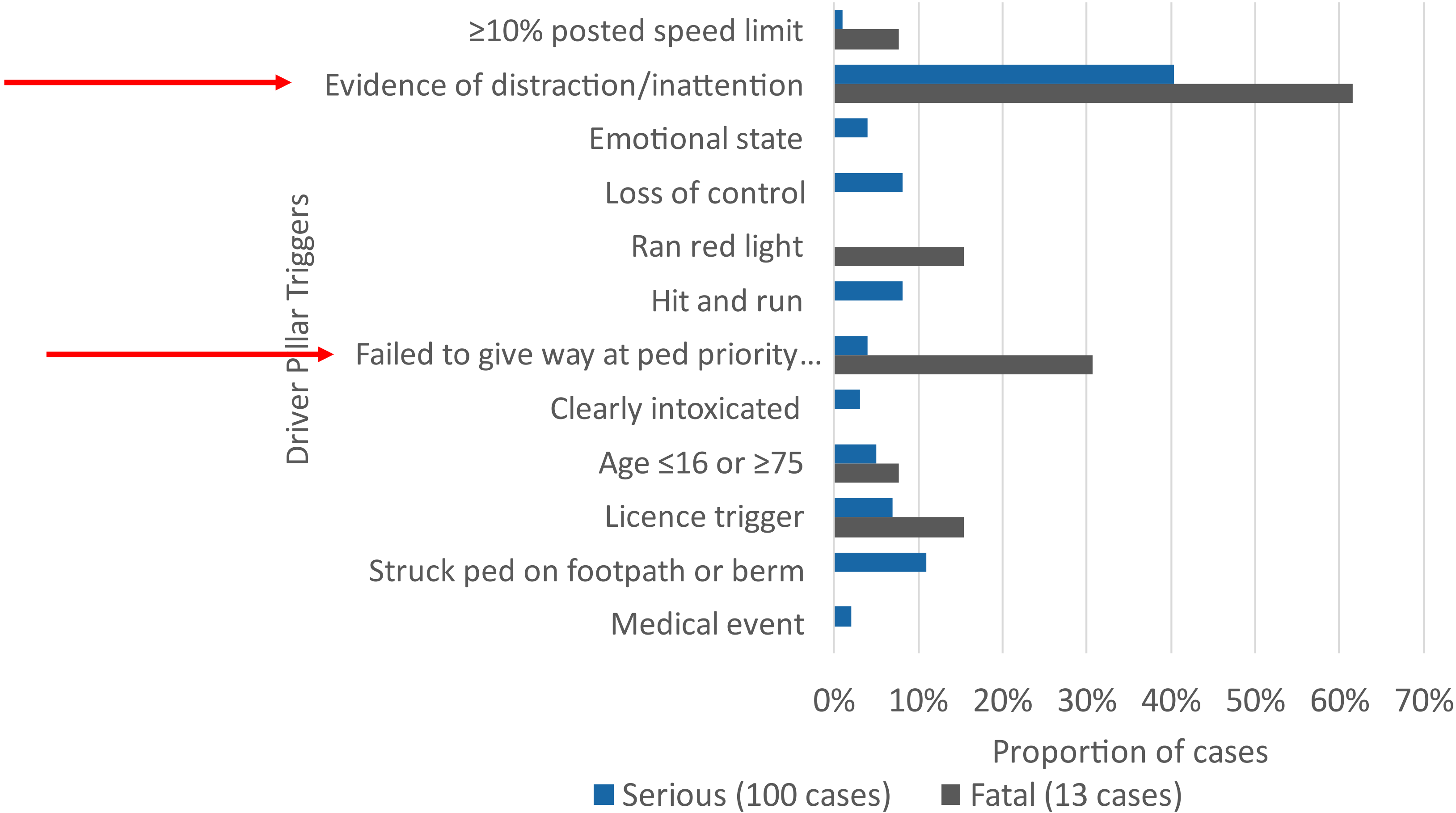
DRIVERS - NZ

Proportion of deaths and serious injuries triggering each factor – NZ 2013-2017



DRIVERS - AUCKLAND

Proportion of deaths and serious injuries triggering each factor – Auckland 2018



CRASH TYPOLOGIES

NZ 2013-2017

Crossing the road mid-block with no crossing facilities	76 cases, 25.3%
Hit on pedestrian priority crossing	38 cases, 12.6%
Children under 12 playing, hit on road	32 cases, 10.6%
Reversing vehicle	27 cases, 9%
Hit and run	10 cases, 3.3%
Pedestrian lying on the road	10 cases, 3.3%
Other	107 cases, 35.7%

Auckland 2018

Crossing the road mid-block with no crossing facilities	39 cases, 34.5%
Hit on pedestrian priority crossing	8 cases, 7.1%
Children under 12 playing, hit on road	4 cases, 3.5%
Reversing vehicle	6 cases, 5.3%
Hit and run	8 cases, 7.1%
Pedestrian lying on the road	3 cases, 2.7%
Other	45 cases, 39.8%

SUMMARY OF COMMON CRASH FACTORS



Multiple system pillars



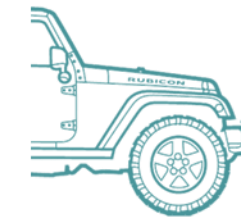
Speeds above 40km/h



Mid-block crossing, especially when no crossing facilities



Flush zebra and signalised crossings



Large mass/shape vehicles



Male drivers



Driver distraction/
inattention



Pedestrian distraction/
inattention

SUMMARY OF COMMON CRASH FACTORS

 **Multiple system pillars**

 **Speeds above 40km/h**

 Mid-block crossing, especially when no crossing facilities

 **Flush zebra and signalised crossings**

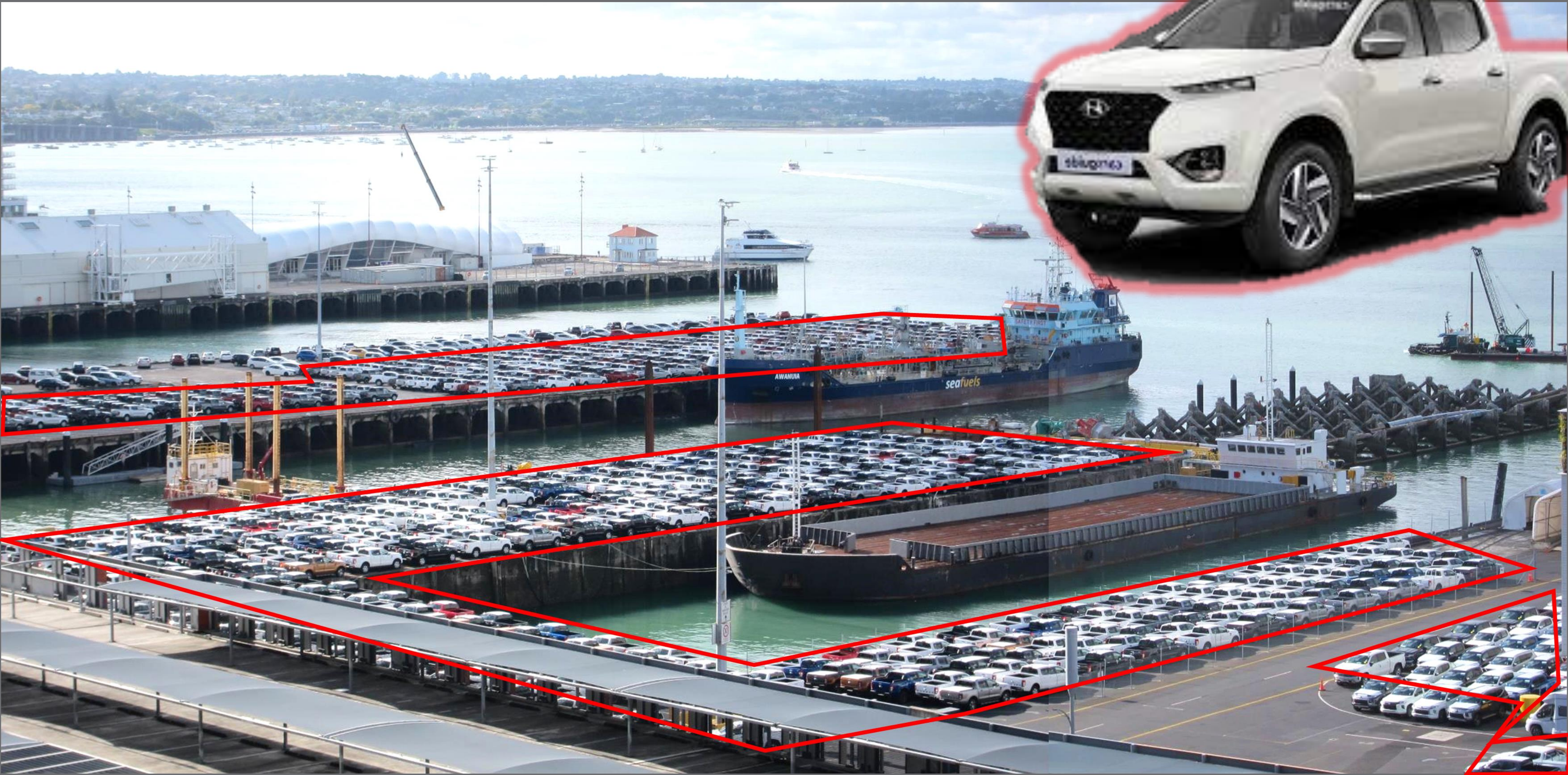
 **Large mass/shape vehicles**

 **Male drivers**

 **Driver distraction/inattention**

 Pedestrian distraction/inattention





IMPLICATIONS

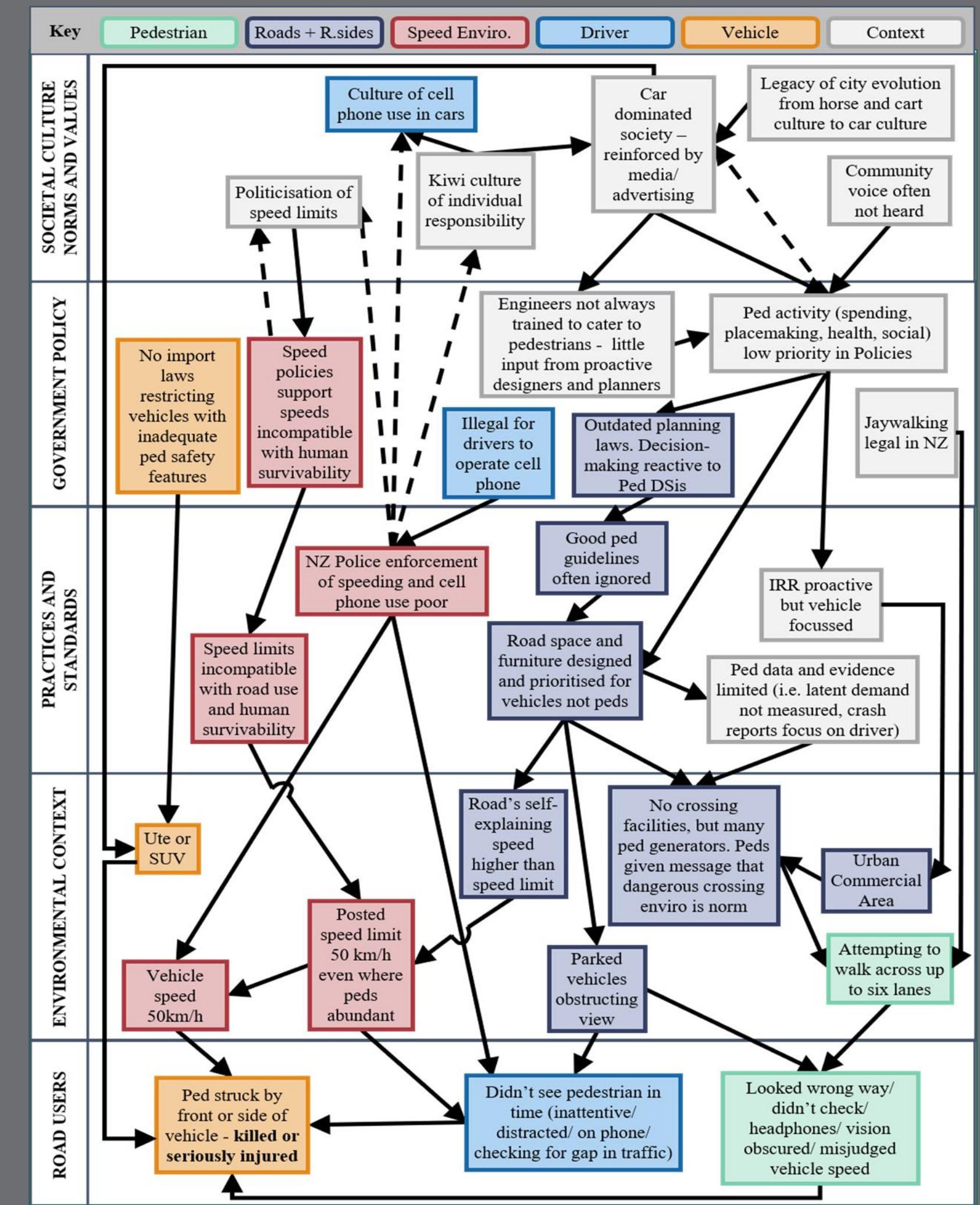
- Paradigm shift needed – road environments need to be made inherently safer for pedestrians
- Focus on priority areas identified – e.g. safe crossings, driver inattention, speeds through town centres
- Continue to develop more nuanced understanding of crash factors and contexts – e.g. using sociotechnical approach

SOCIOTECHNICAL SYSTEMS APPROACH

Safety Transport Knowledge Hub presentation, Thursday 15 April

‘Pedestrian Trauma Research: Towards system approaches for understanding crash trends’

Hirsch, L., Mackie, H., & McAuley, I. (2021). Fatal footsteps: understanding the Safe System context behind New Zealand's pedestrian road trauma. *Journal of road safety*, 32(1), 5-16.





THANK YOU

Rebekah Thorne

Mackie Research

rebekah@mackieresearch.co.nz