TE MANATŪ WAKA
MINISTRY OF TRANSPORT

Domestic Transport Costs and Charges

Information session – Other topics

Car parking, walking & cycling, taxi & ride-hailing, micro-mobility and road crashes

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Results included in this file may be subject to revision as the project team finalise the estimates for the DTCC Final Report.

Road crashes

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Task Brief

Derive estimates of the **Social costs** of road transport-related *"accidents"* in NZ

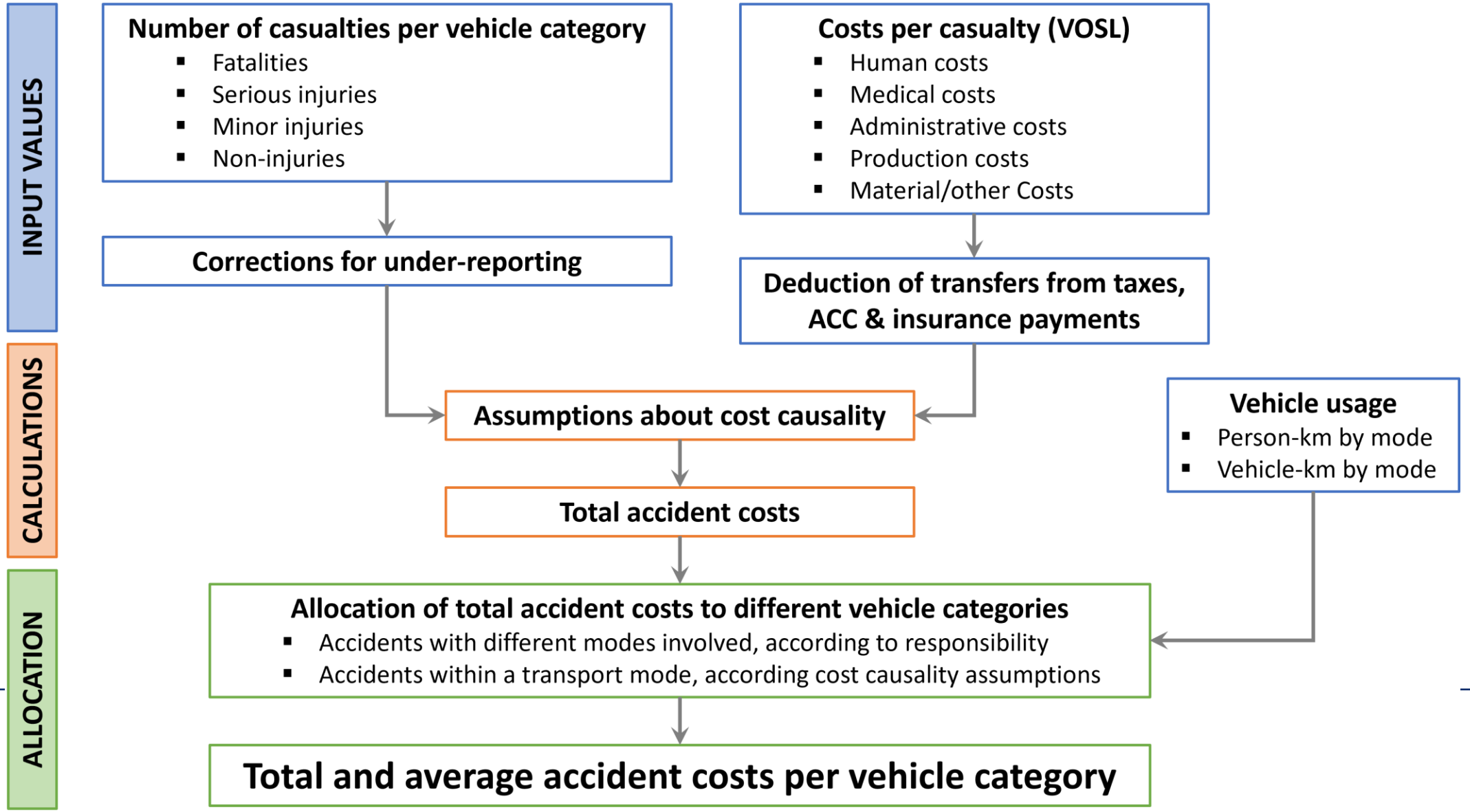
- All those involving **Motor Vehicles**
- **Non-motorised** users only (pedestrians, bicycles, etc)

(Originally also reviewed rail/sea accidents)

Costs to be investigated

- **Total** Costs (by road/vehicle type)
- **Average** Costs (per VKT / PKT / NTK)
- **Marginal** Costs (c/ΔVKT)
- Assessment of **Internal vs External** Costs

Total/Average Cost Calculation Method



Average economic/social cost per accident

Source: Miller T. R & Guria J. (1991). The Value of Statistical Life in New Zealand: Market Research on Road Safety

Cost components	Injury severity			
	Fatal	**Serious**	**Minor**	**Non-injury**
WTP to avoid: Loss of life/permanent disability	$4,527,300	$452,700	$18,100	-
Loss of output (temporary disability)	-	$1,400	$300	-
Medical (hospital, emergency, follow-on)	$7,000	$15,500	$900	-
Legal and court	$21,100	$2,800	$900	-
Vehicle damage	$6,600	$5,200	$5,200	$3,200
Total (incl. motor vehicle)	**$4,562,000**	**$477,600**	**$25,500**	**$3,200**
Total (non-motor vehicle)	**$4,555,500**	**$472,500**	**$20,300**	**$100**

DRAFT RESULTS

Total/Average Road Accident Costs Summary

Average number of casualties / year:
Fatal – 378 *Serious – 4,392*
Minor – 37,351 *Non-Inj – 272,942*

	Road type	Bicycle	Pedestrian	Cars, LCV, other	Mot'cycle including Moped	Bus	Truck	TOTAL
Total **Costs shared** ($m/year)	Open (≥80km/h)	26	42	2,809	329	52	317	**3,576**
	Urban (≤70km/h)	85	177	1,539	182	25	62	**2,069**
	All	**110**	**219**	**4,349**	**511**	**77**	**379**	**5,645**
Cost shared per distance travelled by **vehicle** (c/VKT)	All	35.7	31.0	9.9	123.1	25.5	12.6	**11.6**
Cost shared per distance travelled by **person** (c/PKT)	All	35.7	31.0	6.3	123.1	2.8	12.6	**7.4**

DRAFT RESULTS

Total/Average Non-Motorised Accident Costs (not involving motor vehs)

Average number of casualties / year:
Fatal – 1 *Serious – 183*
Minor – 36,307 *Non-Inj – 1,794*

Based on Crash Analysis System (CAS) and ACC datasets

- Including pedestrians, cyclists, wheelchair users, small-wheeled devices (skateboards, scooters, etc)

Many accidents by these modes not captured by Police crash records but reported through hospital & ACC data

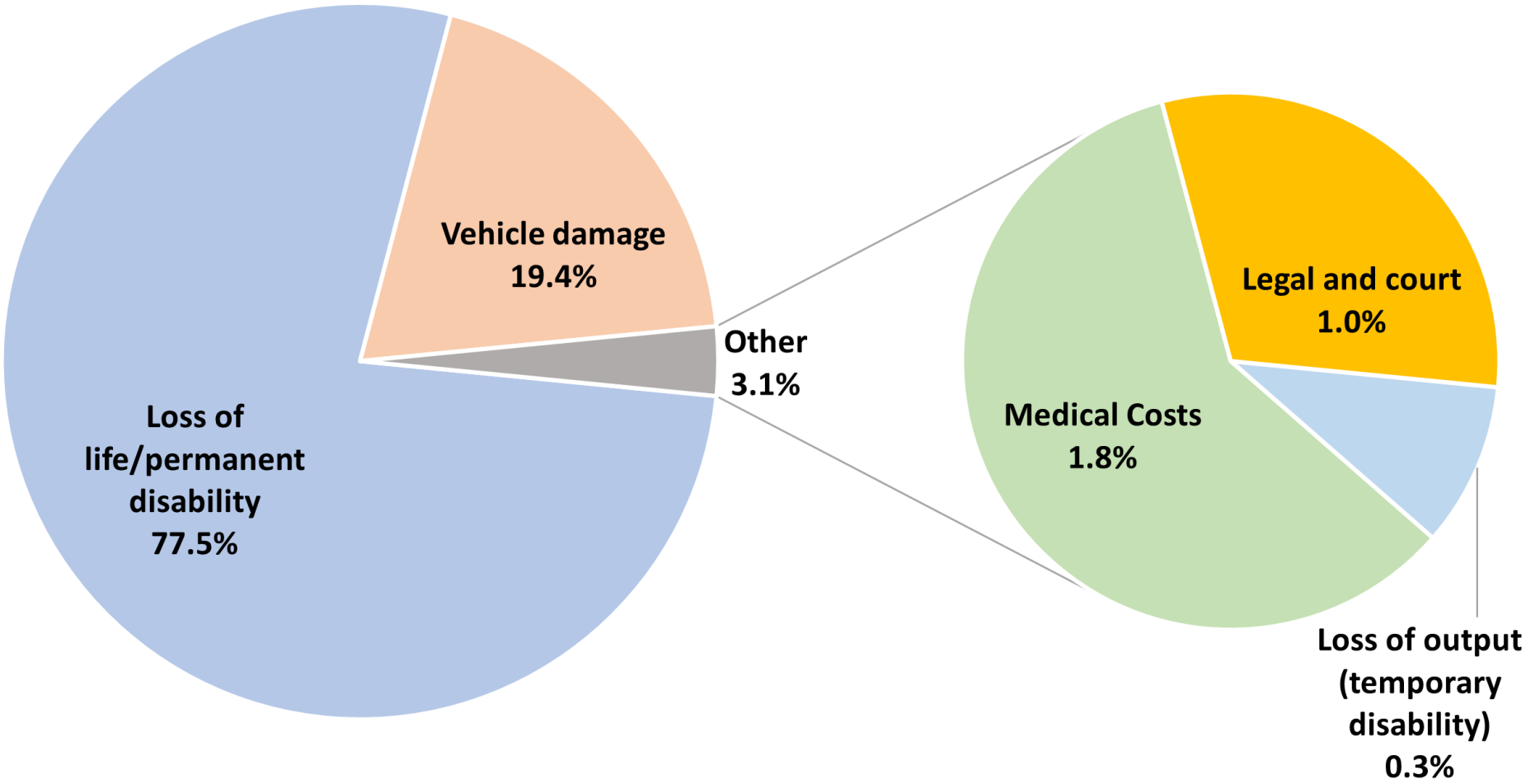
e.g. Slips, Falls

Note the health and other benefits of active modes

	Total NMU-only
Distance travelled by person (PKT, million km)	1014m km
Neutral costs shared ($m/year)	**$830m**
Cost shared per distance travelled by person (c/PKT)	82c

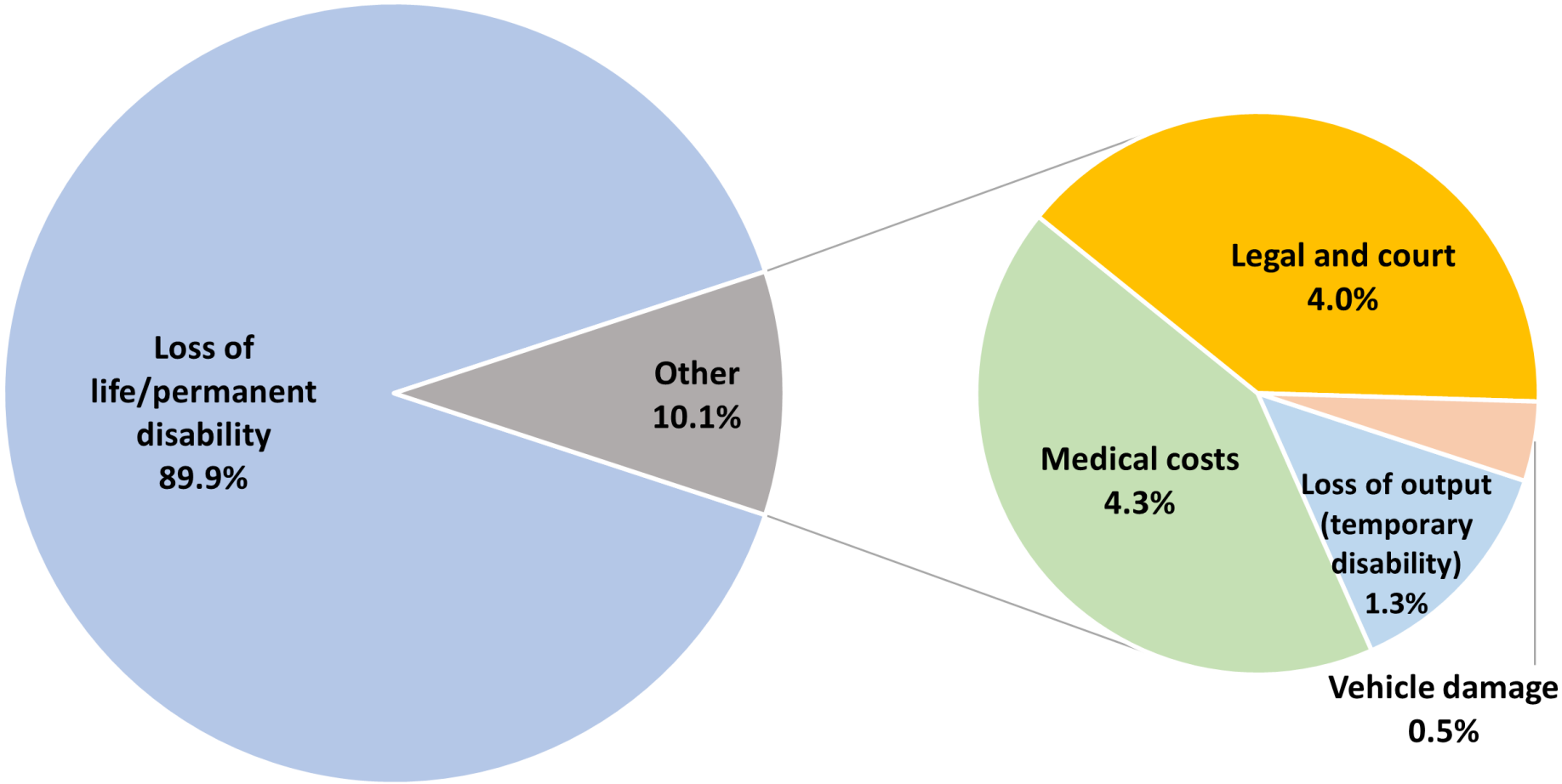
Motor Vehicle Accidents: Cost Components

Annual cost: $5.64 billion / year



Non-Motor Vehicle Accidents: Cost Components

Annual cost: $0.83 billion / year



Marginal Accident Costs

What is the extra accident cost that adding (or removing)
***one extra vehicle-km** to the traffic flow pattern brings?*

Accident prediction **models** used to estimate numbers

Average costs per accident vary in ***three*** key dimensions:

- Higher **speeds** (e.g. on rural roads) are typically associated with more serious injuries (and a greater likelihood of deaths)
- **Intersections** involve typically different accident types than mid-block sections, and different likelihoods of death & serious injury
- In **congested** situations (e.g. rush hour), traffic speeds are typically slower, reducing the average accident severity

Accident Prediction Models

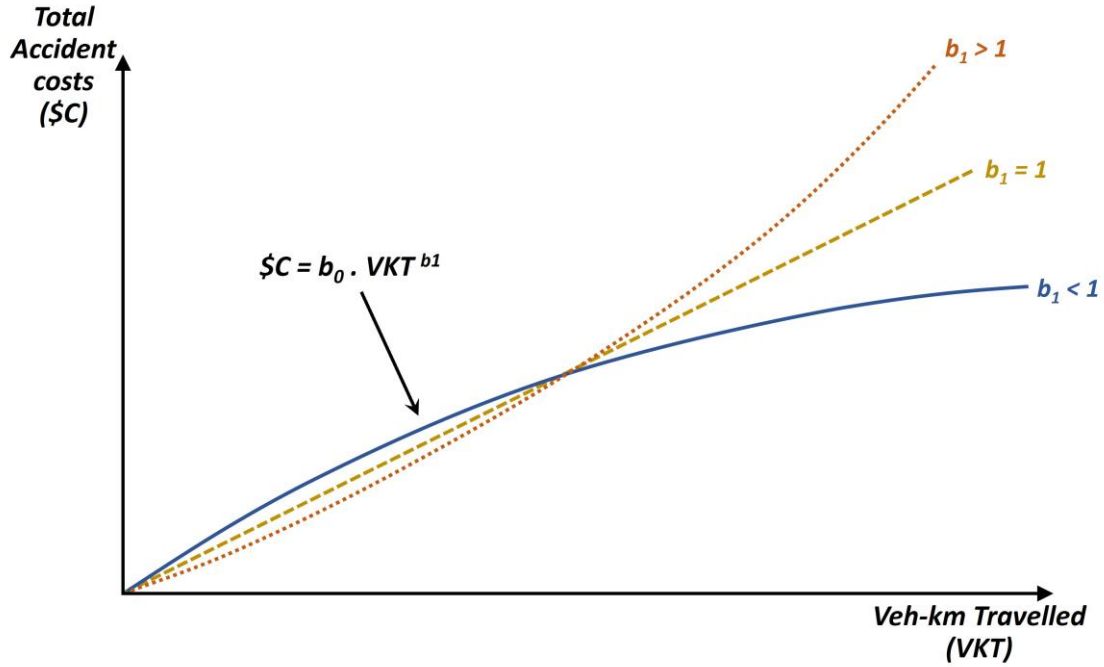
Total vehicle-kms travelled (**VKT**) is the key model input

Three different types of road environment modelled:

- Accidents on **urban** streets (speed limit of 70 km/h and less)
- Accidents on **rural** roads (speed limit of 80 km/h and more)
- Accidents on limited-access **motorways** and expressways

Urban/rural models also split by **intersection** v **mid-block sites**

Pedestrian/cycle crashes modelled using single models



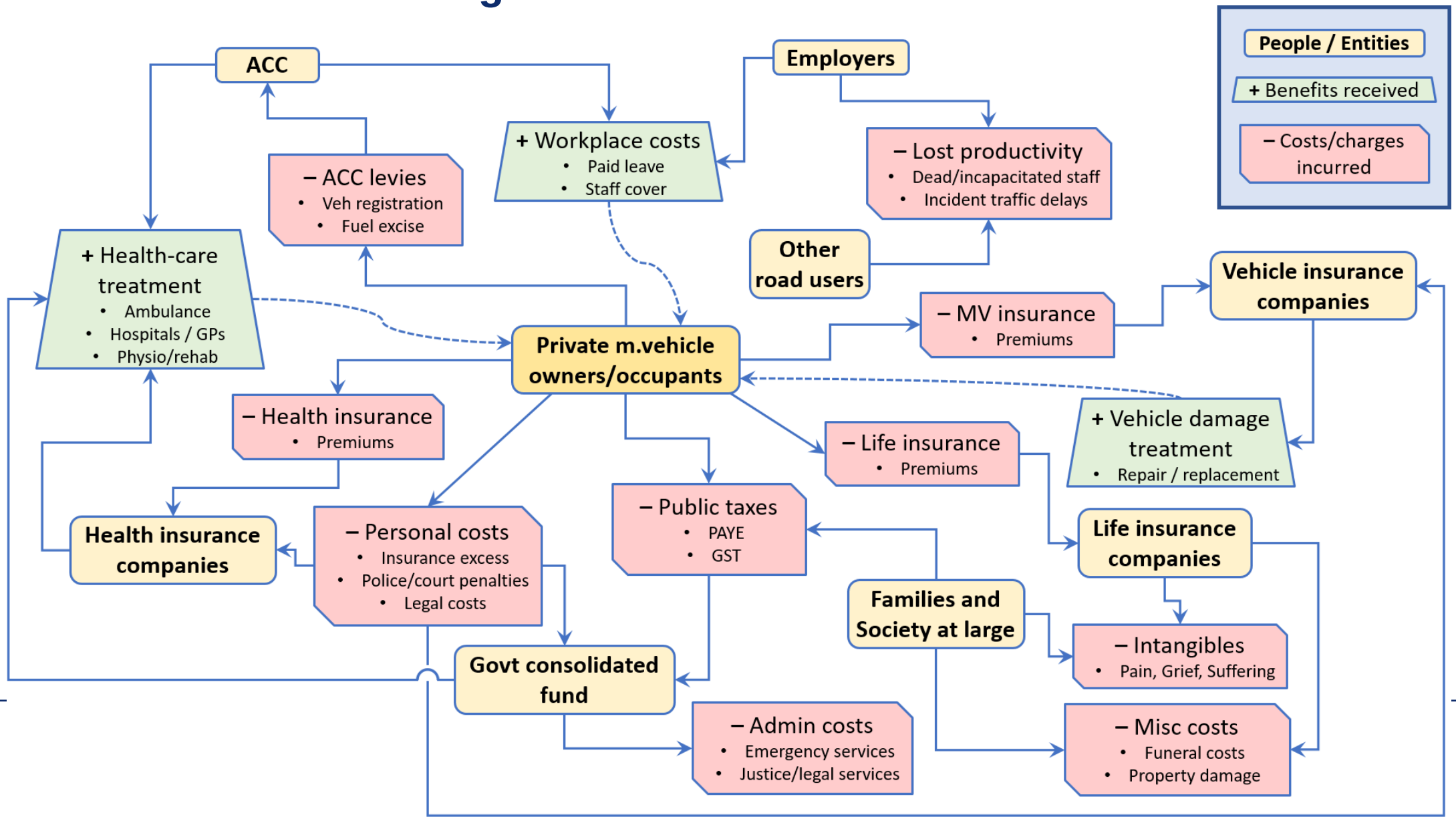
DRAFT RESULTS

Calculated Marginal Costs

**MC/AC = Ratio of Marginal Costs to Average Accident Costs*

Sub-model	MC/AC*	Marginal costs (c/VKT)	Combined MC (c/VKT)
Urban mid-block (uncongested)	1.00	13.2	Urban uncongested **17.3**
Urban intersection (uncongested)	0.44	4.1	
Urban mid-block (congested)	-1.40	-18.4	Urban congested **-33.1**
Urban intersection (congested)	-1.56	-14.7	
Rural mid-block (uncongested)	0.80	51.3	Rural uncongested **56.9**
Rural intersection (uncongested)	0.46	5.6	
Motorway mid-block (uncongested)	1.40	5.1	**5.1**
Motorway mid-block (congested)	-1.85	-6.8	**-6.8**
Cycle all (uncongested)	0.20	8.1	-
Pedestrian vs MV (uncongested)	0.40	12.4	
Pedestrian only (uncongested)	0.40	46.2	

Accident Costs & Charges



DRAFT RESULTS

Costs and charges for Motor vehicle accidents

Cost Component	Estimated social cost	Internal/ External Cost?	Main cost categories	Principal funding sources
WTP: Loss of life/permanent disability	$4,376 million (77.5%)	Mostly **Internal**	• Intangible losses: Pain, grief, suffering (largely unfunded) • Healthcare treatment ($570m - part) • Workplace costs	• Life insurance ($140m) • ACC levies ($450m - part) • Personal costs • Administration costs • Public taxes
Vehicle damage	$1,093 million (19.4%)	**Internal**	• Vehicle damage repairs	• Vehicle insurance ($2100m) • Personal costs
Medical Costs	$104 million (1.8%)	Mostly **External**	• Healthcare treatment ($570m - part)	• ACC levies ($450m - part) • Health insurance (part) • Personal costs • Public taxes
Legal and court	$54 million (1.0%)	Mostly **Internal**	• Judicial and legal services	• Personal costs • Administration costs • Public taxes
Loss of output (temporary disability)	$17 million (0.3%)	**External**	• Healthcare treatment ($570m - part) • Workplace costs	• ACC levies ($450m - part) • Health insurance (part) • Sick leave / lost productivity

Conclusions

Road accidents (motorised and non-motorised) cost NZ about **$6.4 billion** a year in social costs

- A large part of this reflects the WTP to avoid pain/grief/suffering
- Motorcycle & bicycle accidents have highest cost per veh-km
- A lot of non-motorised accidents not captured by CAS data (or MoT)

Non-injury accidents still result in high vehicle damage costs

In congested situations, marginal costs can be negative

The largest proportion of accident costs in NZ are considered internal, i.e. road users and their friends/families pay for these directly

Limitations, Further Work, and Updates: Road accidents

Limitations:

- Interpretation of ACC data used
- Available splits of VKT data by road type and vehicle type
- Robustness of accident prediction models used for marginal costs
- Inconsistent or limited usage/ injury data for new travel modes
- No breakdown of truck types

Further work:

- Refine non-motorised costs using hospital admission datasets
- Review the average social cost per road accident (incl. components)
- Refine marginal cost models
- More detailed/consistent usage data by road and vehicle types

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Questions?