Integrated Intervention Logic Model

– informing road safety investment

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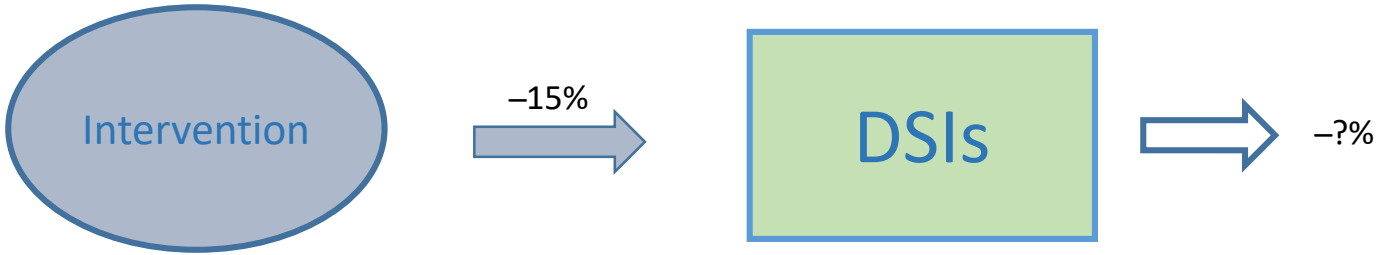
Background

"Develop an integrated intervention logic model to optimise safe system investment for the 2018-21 National Land Transport Programme"

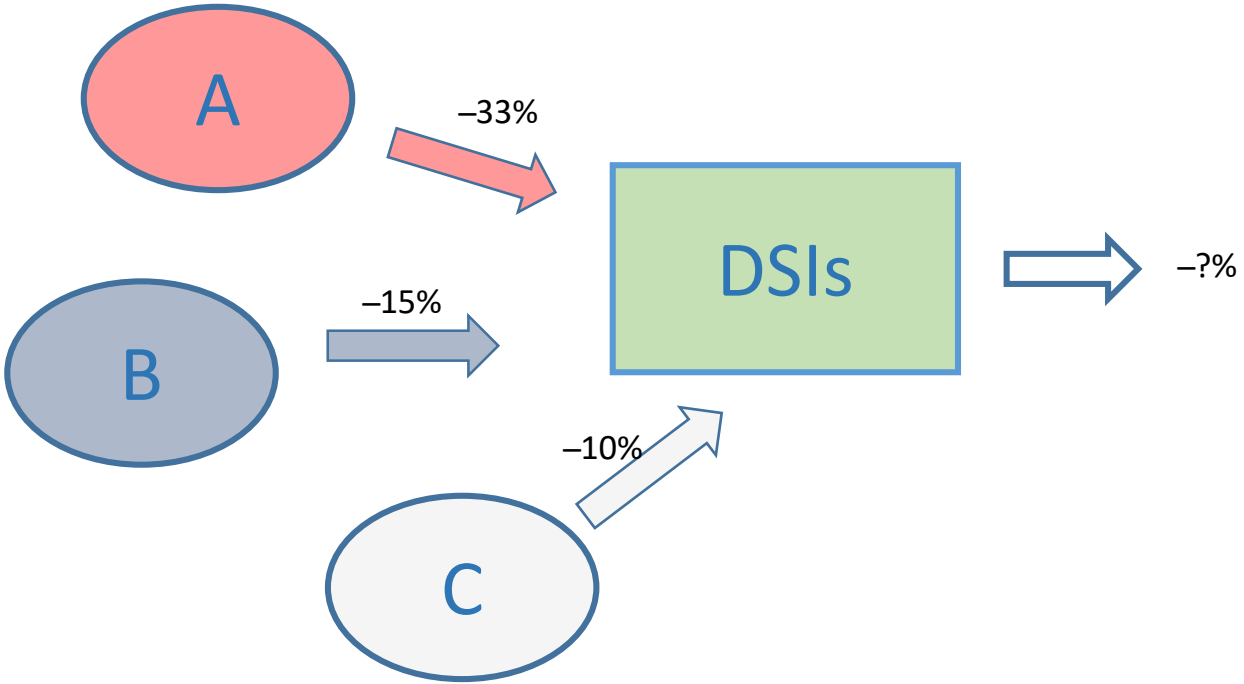
- reduced deaths and serious injuries
- optimise safety investment for future National Land Transport Programmes including Road Policing
- inform the sector's safety priorities and development of the next road safety strategy

Interventions



- may only apply to some of the population
- may only be applied at half-strength
- some of the population may already be treated / compliant
- may not be instant

Several interventions



Costs of interventions

Interventions	
A	user
B	road #1
C	enforcement

vs

Interventions	
A	user
D	road #2
E	signage

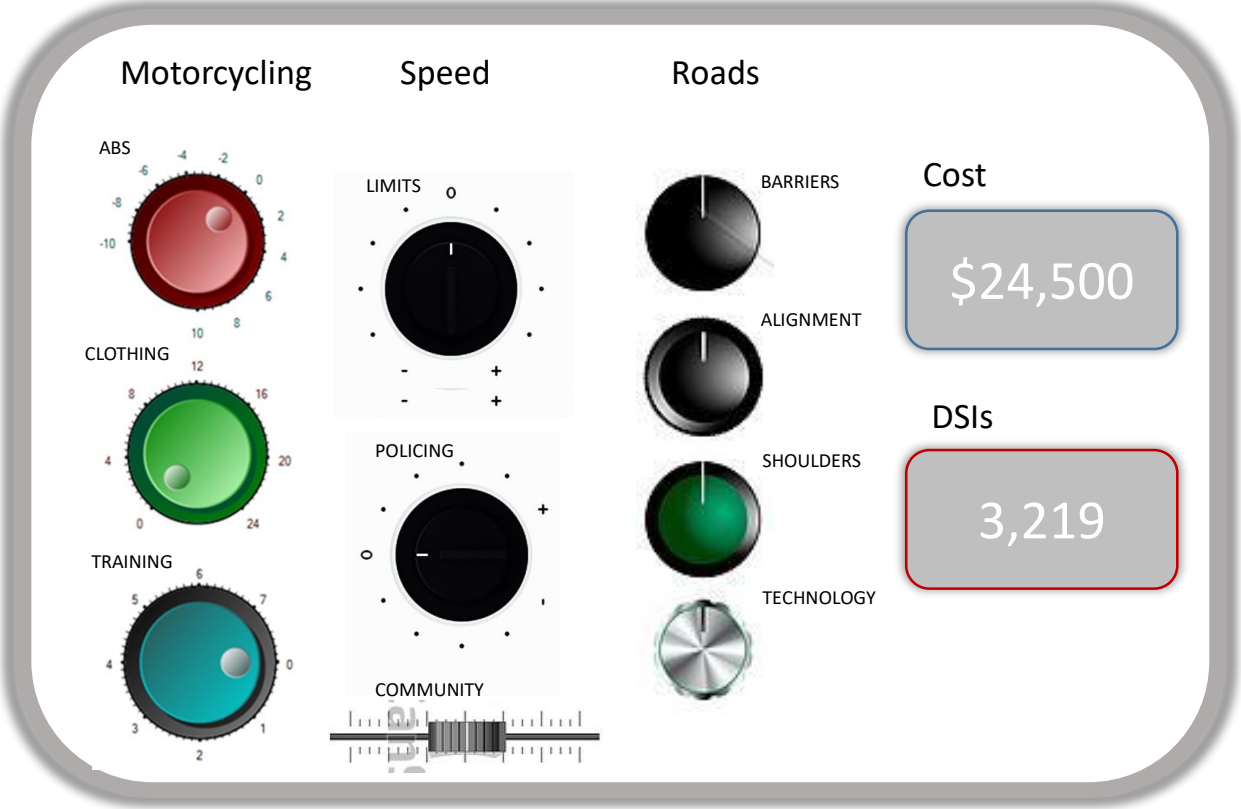
DSI reduction = xx%
Cost = $n000

DSI reduction = yy%
Cost = $m000

Safer Journeys

Alcohol and drugs	Speed	Young drivers	Roads and roadsides	Motorcycling
• *lower limit* • *interlocks* • *drug testing*	• *cameras* • *limits* • *penalties*	• *licences* • *education* • *alcohol limit*	• *give way* • *barriers* • *intersections*	• *training* • *return riders* • *ABS*
Fatigue & distraction	**High risk drivers**	**Heavy vehicles**	**Walking and cycling**	**Light vehicles**
• *education* • *workplace*	• *licence assistance* • *street racing*	• *ESC* • *operator rating*	• *school speed* • *infrastructure*	• *ESC/SCA* • *promotion*
Older road users			**Restraints**	
• *mobility devices*			• *child restraint best practice*	

Integrated Intervention Logic Model



Integrated Intervention Logic Model

- commenced January 2018
- multi-agency and international workshop
- previous models

- NZ requirements
  - transparent
  - available

Australia: METS and eMETS
Europe: SafetyCUBE
Sweden: forecast-backcast
Switzerland: Siegrist, multiplicative
LTSA: traditional

Questions and challenges

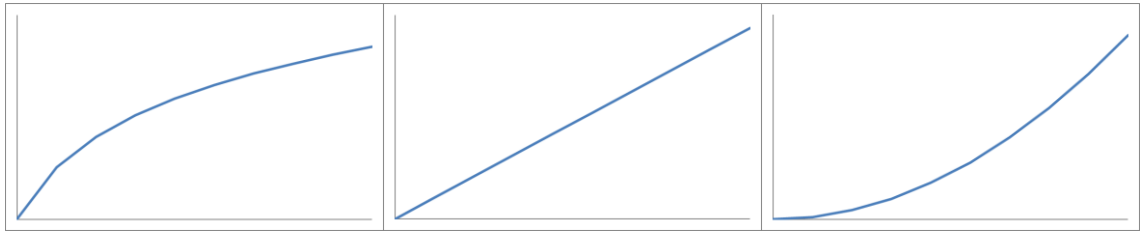
- interventions, or dose-response relationships

  - *between open road average speeds and fatalities / serious injuries [Nilsson]*
  - *between urban speeds and fatalities [Kloeden,updated/verified]*
  - *between enforcement levels and alcohol crashes [Cameron]*
  - *between GDP and fatalities [Deloittes]*
  - *between seatbelt use and fatality / serious injury risk [Evans]*
  - *between motorcycle training and crash reduction [ACC]*

Questions and challenges

- interventions, or dose-response relationships

- mathematical engine
- baseline level of DSIs
- costs; non-linear relationships; sub-groups



- *synergistic relationships; limits of estimation*


EQ
BYPASS
INPUT
GAIN
dB
-12
+12
LOW
CUT
+5
0
dB
OFF
PeakPlus
THRESHOLD
RANGE
-6
20
25
31.5
-10
0
+10
+18
OUTPUT
LEVEL (dBu)
10
6
3
1
+6
GAIN
REDUCTION(dB)
+/-15
CLIP
+10
+15
+/-6
0
0
dB
RANGE

Stage I: Pilot model

Example of intervention list

- Motorcycles: Protective Clothing
- Motorcycles: Motorcyclist Training
- Speed Enforcement
- Community Speed Programme *
- Median Barriers
- Curve Realignment
- New Lane Departure Technology

User

Speed

Road

User input

Need to know Effect, Target, Current level and Uptake

Intervention	DSI reduction	Target population	Currently treated	Extent
motorcycle clothing	21%	17%	33%	50%
speed limit reduction	31%	47%	77%	40%
curve realignment	27%	13%	56%	20%
new lane departure technology	50%	37%	1%	80%
future idea	?	?	?	?

Integrated Intervention Logic Model

How Many Interventions ?	3			Integrated RRF	Projected DSI Savings
How Many DSIs (Including Fatalities) ?	3203	DSI Year :	2017	4.53%	145
How Many Fatalities ?	378				

Intervention Details

	Interventions	% Risk Reduction Factor (RRF)	% Treated Population	Proportion DSIs Impacted	Total DSI RRF %	N	% Uptake	% Uptake * Total DSI RRF %	DSI Reduction Single Intervention
1	Motorcycles: Motorcyclist Training	11%	3%	17%	1.9%	552	50%	0.9%	30
2	Urban Speed Reduction	51%	54%	15%	7.6%	479	100%	7.6%	112
3	Curve Realignment	27%	56%	13%	3.5%	415	10%	0.4%	5

Speed Enforcement
Urban Speed Reduction
Median Barriers
Lane Shoulder Width
Curve Realignment
New Lane Departure Technology

Intervention Options List
Motorcycles: Protective Clothing
Motorcycles: Motorcyclist Training
Motorcycles: Motorcycle ABS
Speed Limits (100kph to 90kph)
Speed Enforcement
Urban Speed Reduction
Median Barriers
Lane Shoulder Width
Curve Realignment
New Lane Departure Technology

Integrated Intervention Logic Model

How Many Interventions ?	3			Integrated RRF	Projected DSI Savings
How Many DSIs (Including Fatalities) ?	3203	DSI Year :	2017	3.7%	119
How Many Fatalities ?	378				

Intervention Details

	Interventions	% Risk Reduction Factor (RRF)	% Treated Population	Proportion DSIs Impacted	Total DSI RRF %	N	% Uptake	% Uptake * Total DSI RRF %	DSI Reduction Single Intervention
1	Motorcycles: Motorcyclist Training	11%	3%	17%	1.9%	552	100%	1.9%	59
2	Urban Speed Reduction	51%	54%	15%	7.6%	479	50%	3.8%	56
3	Curve Realignment	27%	56%	13%	3.5%	415	10%	0.4%	5

Intervention Options List
Motorcycles: Protective Clothing
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Speed Limits (100kph to 90kph)
Speed Enforcement
Urban Speed Reduction
Median Barriers
Lane Shoulder Width
Curve Realignment
New Lane Departure Technology

Integrated Intervention Logic Model

How Many Interventions ?	3			Integrated RRF	Projected DSI Savings
How Many DSIs (Including Fatalities) ?	3203	DSI Year :	2017	6.0%	191
How Many Fatalities ?	378				

Intervention Details

	Interventions	% Risk Reduction Factor (RRF)	% Treated Population	Proportion DSIs Impacted	Total DSI RRF %	N	% Uptake	% Uptake * Total DSI RRF %	DSI Reduction Single Intervention
1	Motorcycles: Motorcycle ABS	40%	40%	17%	6.9%	552	100%	6.9%	132
2	Urban Speed Reduction	51%	54%	15%	7.6%	479	50%	3.8%	56
3	Curve Realignment	27%	56%	13%	3.5%	415	10%	0.4%	5

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Components of the model – next steps