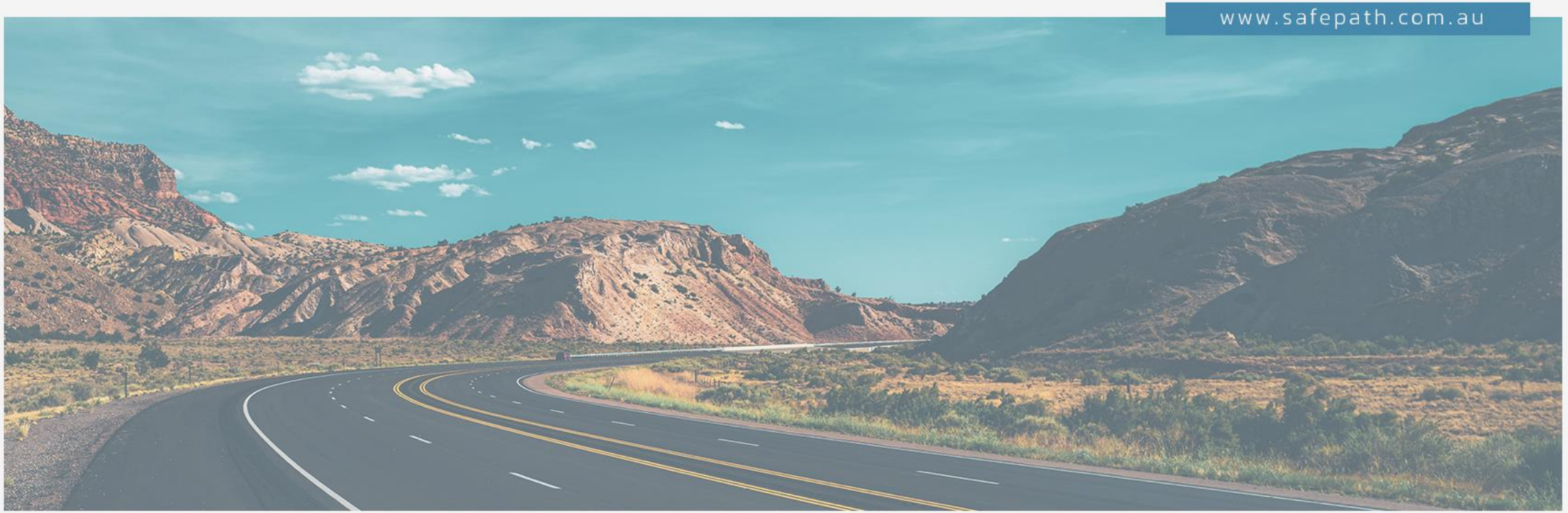

Advancing Safe System Implementation: Insights from Surrogate Safety Measures and Connected Vehicle Data in Victoria, Australia

Dr Amir Sobhani, Director, Safe Path Consulting

TRB 104th ANNUAL MEETING
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SAFE PATH CONSULTING

Acknowledgement

Transport Accident Commission

VICTORIA State Government | Department of Transport and Planning

COMPASS

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Addressing 3 key questions

Q1- How does the Victorian State Government ensure road safety investments are evidence-based?

Q2- What is the process for implementing evidence-based road safety investments?

Q3- In which areas can surrogate safety measures enhance outcomes?

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Evidence-based road safety investment

Strategic Level

- Road Safety Strategy

Tactical Level

- Investment Plans, Programs

Operational Level

- Project Development and Delivery

MONITORING & EVALUATION

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Road safety strategy development

Charting Path to Zero Death and Serious Injuries

- Definition of the Desired End-State for 2050
- Identification of Current Gaps
- Setting of Interim Targets

Shorter Term Strategies and Action Plans

- Development of strategies and action plans
- Ensure the interim targets are achieved

Austroads (2024), Victoria Road Safety Strategy 2021-2030 (2020)

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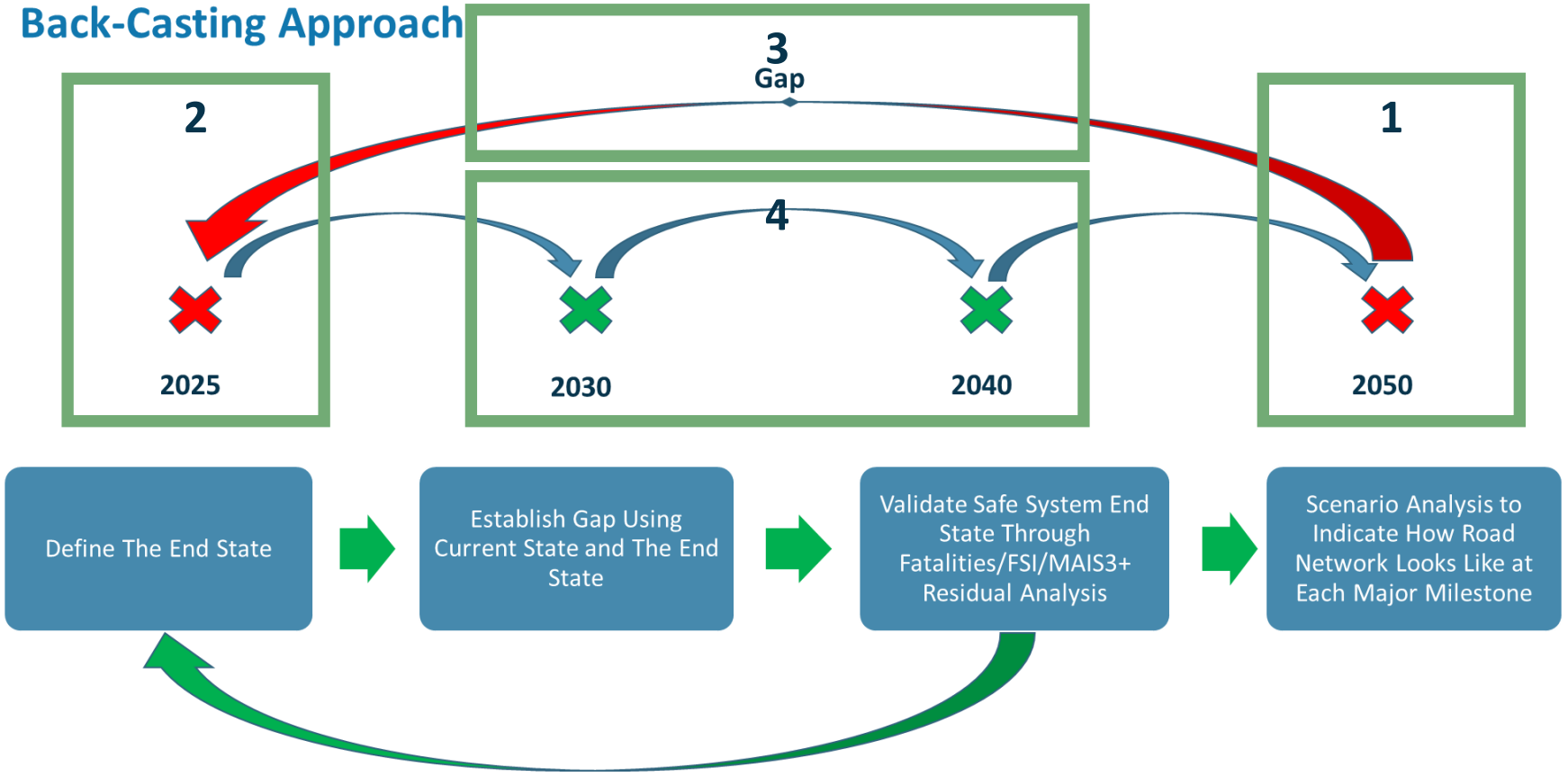
Charting path to zero death and serious injuries



Strandroth et al. (2024), Allan et al. (2024)

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Shorter term strategies and action plans

Level of Analysis	Strategy Development	Strategy Implementation	Monitoring and Evaluation
Strategic			
Tactical			
Operational			

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Shorter term strategies and action plans (con…)

Level of Analysis	Strategy Development		
	Problem Identification	Solution Development	Solution Assessment
Strategic	• Analyse five-year crash data using descriptive statistics. • Model future FSI trajectories under current conditions. • Use back-casting to identify gaps and define FSI targets. • Review evaluation results	• Deliver strategic insights on benefit measures to support decision-making. • Use back-casting results to align scenarios with strategic gaps.	• Use strategic FSI modelling to assess trajectories for proposed scenarios. • Align forecasts with targets to ensure strategic effectiveness.
Tactical	• Create a detailed risk map using robust modelling techniques. • Provide SMEs with reliable evaluation results.	• Use robust modelling to estimate countermeasure benefits accurately. • Provide SMEs with reliable evaluations for informed decision-making.	• N/A
Operational	• Make evaluation results available to the SMEs.	• N/A	• N/A

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Shorter term strategies and action plans (con…)

Level of Analysis	Strategy Implementation			
	Investment Plan (IP) Development	Program Development	Project Development	Project Delivery
Strategic	• IP targets from strategy/action plan	• Program targets from strategy/action plan/IP	• N/A	• N/A
Tactical	• Create a detailed risk map using robust modelling techniques. • Employ robust modelling to accurately estimate the benefits of the IP. • Leverage reliable evaluation outcomes.	• Create a detailed risk map using robust modelling techniques. • Use robust modelling to estimate benefits of the programs accurately. • Utilise reliable evaluation results.	• Ensure alignment of the project with the objectives and targets of the IP and associated program	• Provide delivery progress updates at both the IP and program levels.
Operational	• Make evaluation results available to the SMEs.	• Solution benefits in project level. • Make evaluation results available to the SMEs.	• Detailed problem identification and solution development in site level.	• Deliver the projects

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Shorter term strategies and action plans (con…)

Level of Analysis	Monitoring and Evaluation	
	Monitoring	Post-Completion Evaluation
Strategic	• Develop a strategic-level monitoring framework. • Gather necessary information and perform the analysis. • Design monitoring dashboards for reporting purposes.	• Create a strategic-level evaluation plan. • Oversee and coordinate the implementation of the evaluation plan.
Tactical	• Establish a monitoring framework at the IP and program levels. • Gather necessary information and perform the analysis. • Design monitoring dashboards for reporting purposes.	• Create an evaluation plan at the IP and program levels. • Manage and coordinate the execution of the evaluation plan.
Operational	• Develop a monitoring framework for specific projects on an ad-hoc basis. • Gather necessary information and perform the analysis. • Design monitoring dashboards for reporting purposes.	• Design an evaluation framework for projects on an ad-hoc basis. • Manage and coordinate the implementation of the evaluation project.

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Where surrogate safety measures can contribute

Level of Analysis	Strategy Development			Strategy Implementation				Monitoring and Evaluation	
	Problem Identification	Solution Development	Solution Assessment	Investment Planning	Program Development	Project Development	Project Delivery	Monitoring	Post-Completion Evaluation
Strategic	✓	✓	✓	N/A	N/A	N/A	N/A	✓	✓
Tactical	✓	✓	N/A	✓	✓	N/A	N/A	✓	✓
Operational	N/A	N/A	N/A	N/A	✓	✓	N/A	✓	✓

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Current practices for applying SSMs in Victoria, Australia

Level of Analysis	Strategy Development			Strategy Implementation				Monitoring and Evaluation	
	Problem Identification	Solution Development	Solution Assessment	Investment Planning	Program Development	Project Development	Project Delivery	Monitoring	Post-Completion Evaluation
Strategic	X	X	X	N/A	N/A	N/A	N/A	X	X
Tactical	X	X	N/A	X	X	N/A	N/A	X	X
Operational	N/A	N/A	N/A	N/A	X	X	N/A	X	✓

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Why?

1. High costs associated with data collection and analysis

2. Limited access to surrogate safety measures at the network level

3. Absence of guidelines for accurately estimating economic benefits and fatal and serious injury (FSI) impacts

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Opportunities to address these gaps?

1. Connected vehicle data (e.g. Compass IoT)

2. AI based platforms facilitating network-level conflict analysis (e.g., Transoft (AMAG))

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Connected vehicle data

1. Provides network-level data on speed and conflict information
2. Offers insights for individual vehicles
3. Information acquired by the Department of Transport and Planning

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Assessment of SSM applications with CV data in Victoria, Australia

Level of Analysis	Strategy Development			Strategy Implementation				Monitoring and Evaluation	
	Problem Identification	Solution Development	Solution Assessment	Investment Planning	Program Development	Project Development	Project Delivery	Monitoring	Post-Completion Evaluation
Strategic	✗	✗	✗	N/A	N/A	N/A	N/A	✓	✗
Tactical	✓	✓	N/A	✓	✓	N/A	N/A	✓	✓
Operational	N/A	N/A	N/A	N/A	✓	✗	N/A	✓	✓

✓ The use of CV data for conducting SSM analysis is under evaluation

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Pilot Study

Treated Area:

Network: The area bounded by Johnston, Hoddle and Nicholson Streets and Alexandra Parade.

Speed limit: 30 km/h (reduced from 40 km/h in 2018). Brunswick St and Smith St are excluded.

Analysis	Measure	Results
Post Completion Evaluation	FSIs	-42.6%
Monitoring Using CV Data	FSI Risk (MAIS3+)	38% Lower in Treated Area

Sobhani (2024)

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Dr Amir Sobhani | www.safepath.com.au | +61 484 619 984

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