Austroads
National Risk Assessment Model (ANRAM)

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Overview

- Context

- What is ANRAM? How it is used?

- Severe crash risk estimation

- ANRAM Toolkit

- Next steps

Context

- ## Diminishing blackspots

    – Only a third of fatal crashes occur at blackspots

    – Casualty crashes scattered on rural and LGA roads

    – Blackspot treatments alone cannot reach strategy goals

- ## Emerging need for proactive approach

    – Crash risk assessment since the late 1980s (e.g. RSAs)

    – Austroads >10 year investment in research

    – Confidence in identification of crash risk

- ## National Road Safety Strategy 2011-20, First Actions

What is ANRAM?

Australian **N**ational **R**isk **A**ssessment **M**odel

- A consistent method for the whole country
- Based on Australian crash data, speeds & traffic
- For all jurisdictions, state and local government
- Fatal and serious injury crash focus, proactive & reactive.

- Outcome of a 4-year Austroads research project
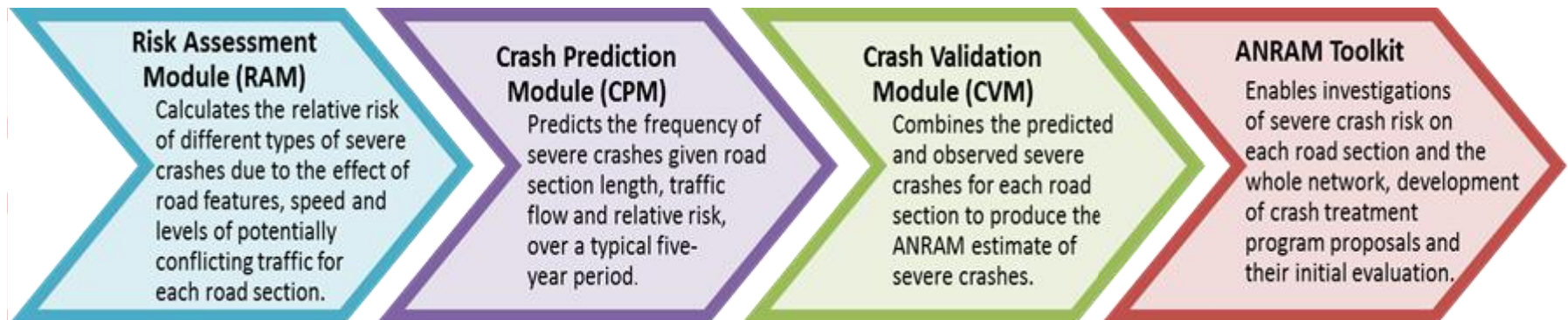
- Collaboration with iRAP

Uses of ANRAM

- Identify FSI crash risk across the road network

- Prioritise routes and road sections

- Target priority crash types, e.g. intersection

- Develop treatments and programs

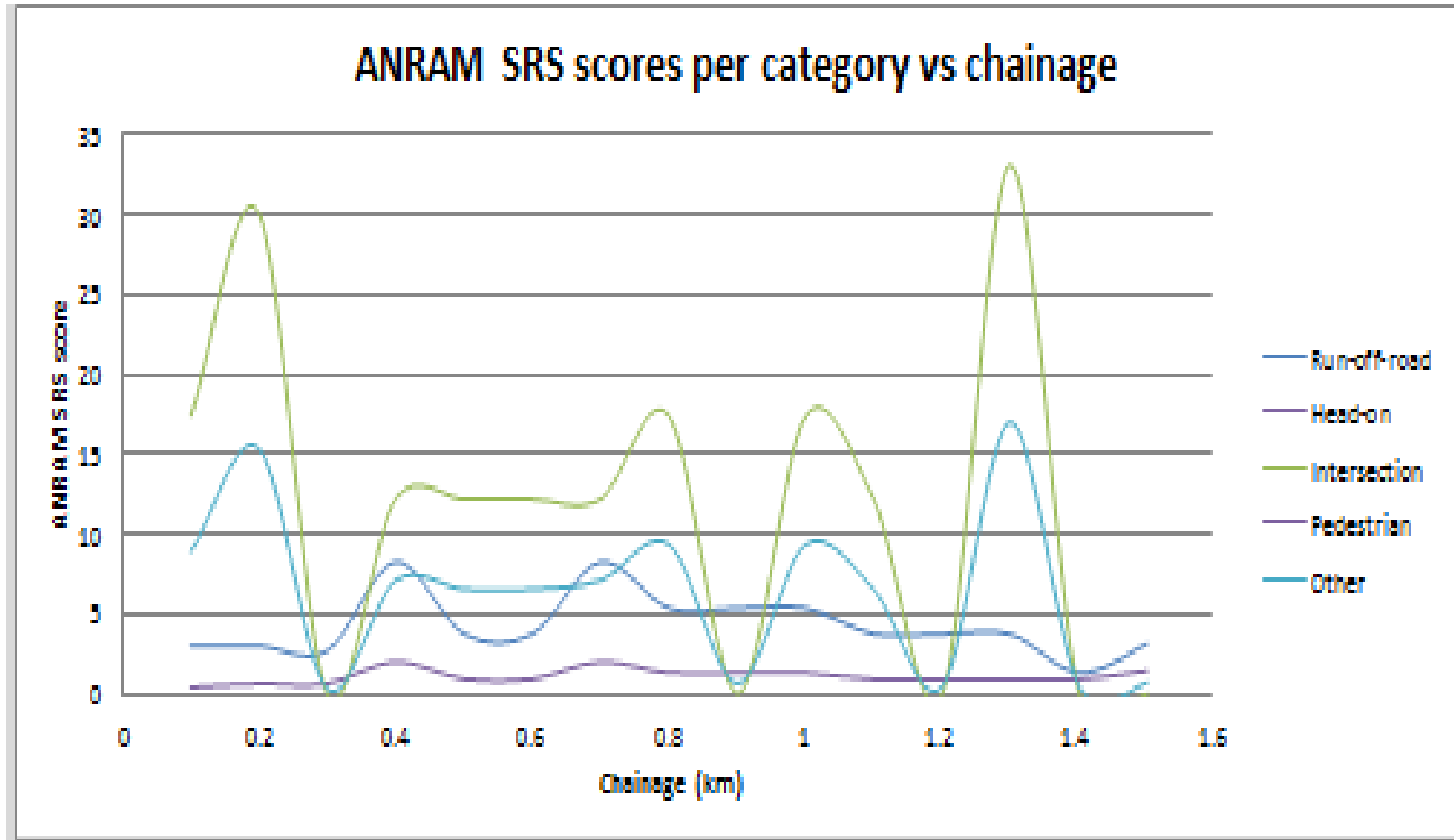- Measure progress towards Safe System infrastructure

Trusted advisor to road authorities for technical input and solutions

Severe crash risk estimation

- Run-off-road

- Head-on

- Intersection

- Pedestrian

- Other

Risk Assessment Module (RAM)
Calculates the relative risk of different types of severe crashes due to the effect of road features, speed and levels of potentially conflicting traffic for each road section.

Crash Prediction Module (CPM)
Predicts the frequency of severe crashes given road section length, traffic flow and relative risk, over a typical five-year period.

Crash Validation Module (CVM)
Combines the predicted and observed severe crashes for each road section to produce the ANRAM estimate of severe crashes.

ANRAM Toolkit
Enables investigations of severe crash risk on each road section and the whole network, development of crash treatment program proposals and their initial evaluation.

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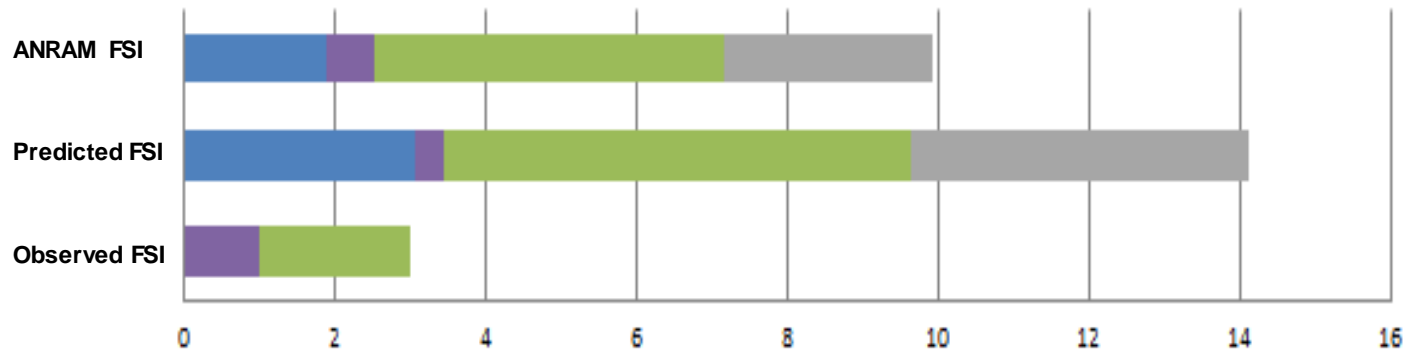
FSI crash risk analysis – ANRAM Toolkit

FSI crash risk analysis – ANRAM Toolkit

FSI crash results for section(s)

	Observed FSI	Predicted FSI	Potential FSI
■ Run-off-road	0.00	3.06	1.91
■ Head-on	1.00	0.40	0.61
■ Intersection	2.00	6.16	4.63
■ Pedestrian	0.00		
■ Other	0.00	4.48	2.79

FSI crash risk analysis – ANRAM Toolkit

- Estimate FSI crash reductions from treatments

- Create road improvement treatment programs

- Estimate BCRs

- Section, route, network, state- and nation-wide programs

Next steps

- Trials by jurisdictions – feedback and refinement

- Nationwide implementation

- Incorporation into AusRAP/ViDA tools

- Funding programs based on risk assessment

- Direction of development to be coordinated by ANRAM Steering Group and Technical Working Group
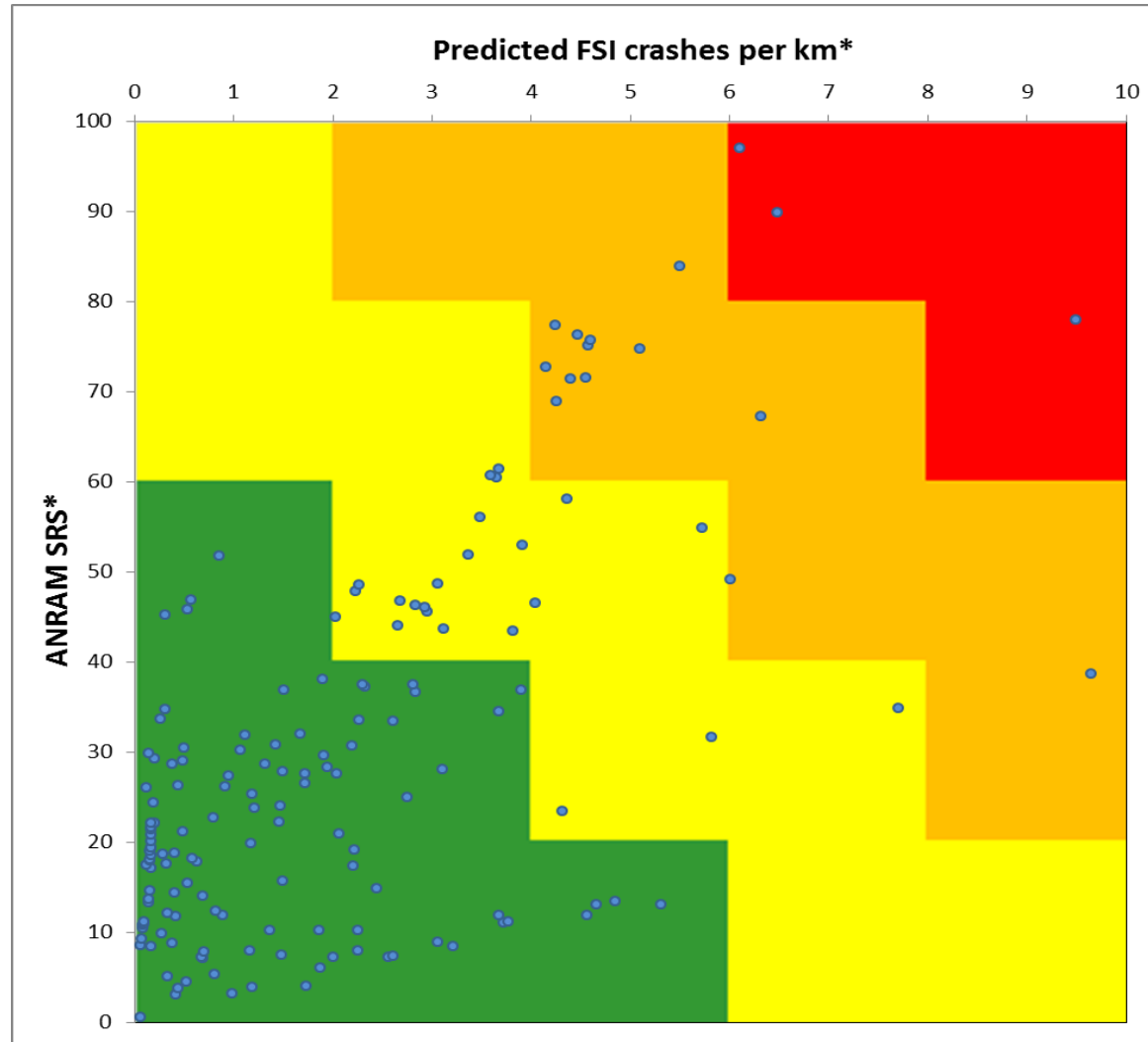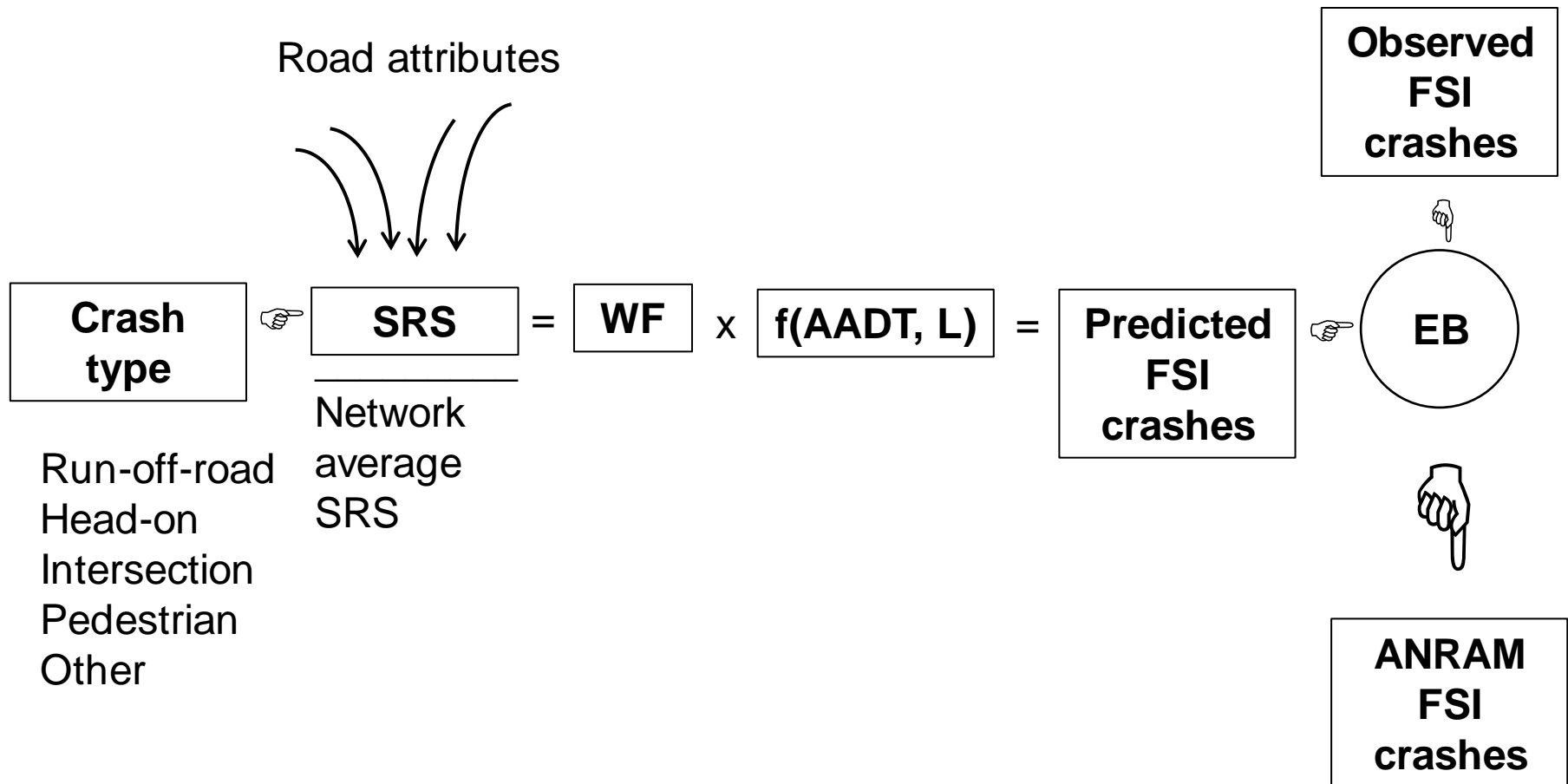
Thank you

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Strategic Approach

- NZ example

- Recognises roles of different approaches, e.g. big projects vs. mass action treatment plans

- Importance of Safety Maintenance and safety gains through asset management and technology improvements

- ANRAM quantifies benefits for all approaches

Road attributes

Crash type

Run-off-road
Head-on
Intersection
Pedestrian
Other

$$\frac{SRS}{\text{Network average SRS}} = WF \times f(AADT, L) = \text{Predicted FSI crashes}$$

Observed FSI crashes

EB

ANRAM FSI crashes

Severe crash risk prediction

For each road section...

Risk Assessment Module (RAM)
Calculate Star Rating Scores (SRS) related to each crash type from road inventory; transform them to ANRAM weight factors.

Crash Prediction Module (CPM)
Calculate mean FSI crashes for each crash type, modified by ANRAM weighting factors to produce Predicted FSI crashes.

Crash Validation Module (CVM)
Compare and combine Predicted FSI and Observed FSI crashes to produce ANRAMl FSI (also model calibration).
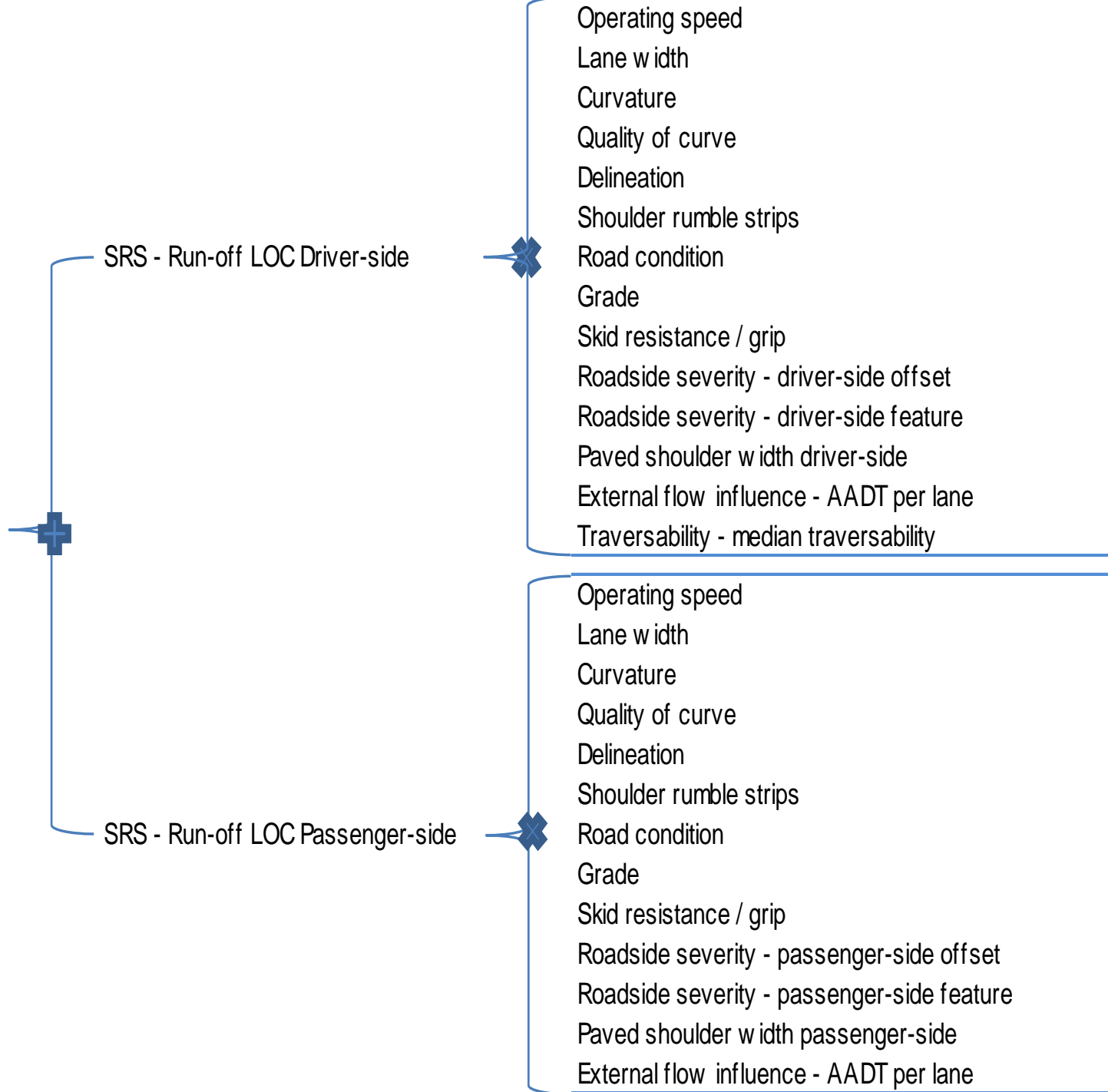
ANRAM Toolkit
Reporting, analysis of potential road user factors, mass treatment selection, BCRs.

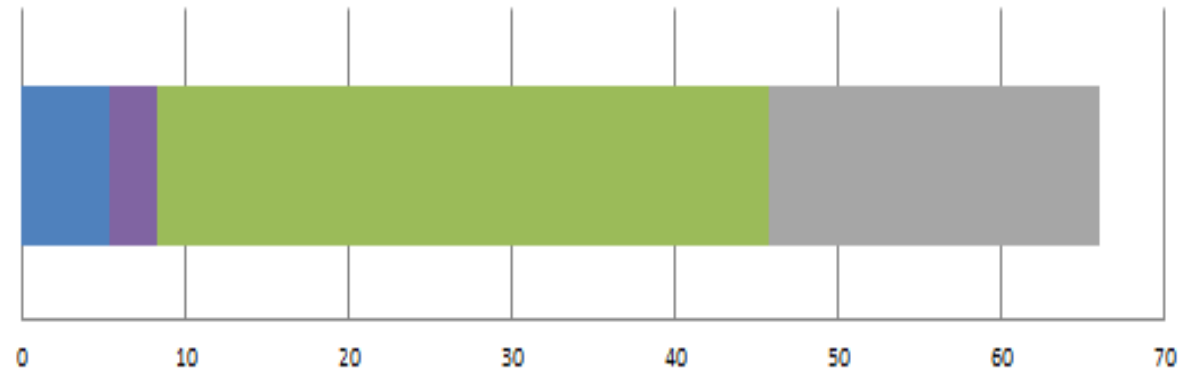**Jurisdiction, road stereotype, iRAP v3 coded data set including AADT**

Observed FSI crashes

Trusted advisor to road authorities for technical input and solutions

Run-off-road SRS

SRS - Run-off LOC Driver-side

- Operating speed
- Lane width
- Curvature
- Quality of curve
- Delineation
- Shoulder rumble strips
- Road condition
- Grade
- Skid resistance / grip
- Roadside severity - driver-side offset
- Roadside severity - driver-side feature
- Paved shoulder width driver-side
- External flow influence - AADT per lane
- Traversability - median traversability

SRS - Run-off LOC Passenger-side

- Operating speed
- Lane width
- Curvature
- Quality of curve
- Delineation
- Shoulder rumble strips
- Road condition
- Grade
- Skid resistance / grip
- Roadside severity - passenger-side offset
- Roadside severity - passenger-side feature
- Paved shoulder width passenger-side
- External flow influence - AADT per lane

ANRAM SRS score for section(s) (average)

	1
Run-off-road	5.41
Head-on	2.96
Intersection	37.48
Pedestrian	
Other	20.22

Application of Safety Performance Functions
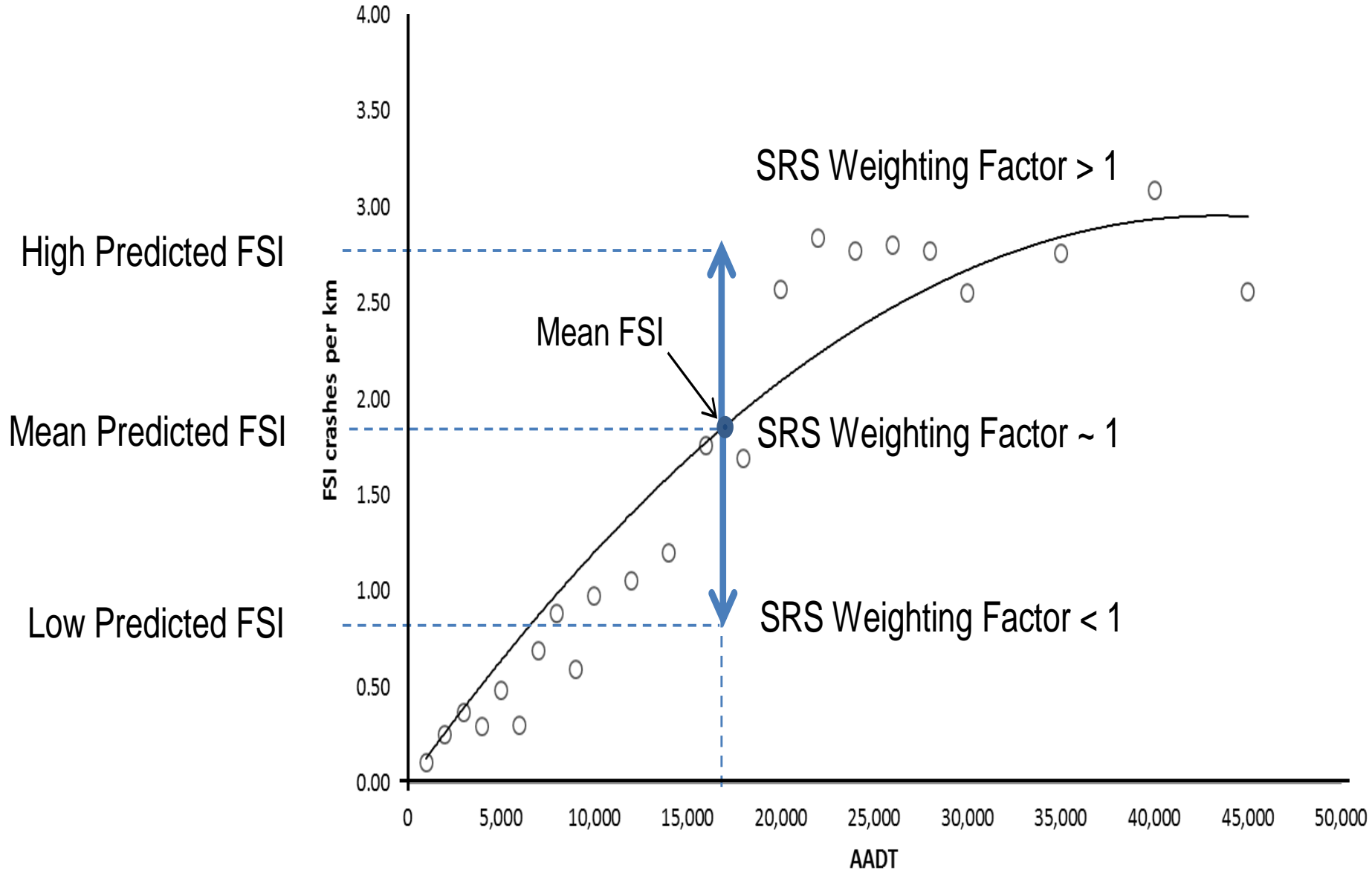
Who should use ANRAM?

- Road safety policy analysts and managers

- Funders of road safety

- Infrastructure program managers

- Regional and local government engineers

- Auto clubs, e.g. RACV