

‘Cost Benefit Analysis – Lessons for the African Continent’

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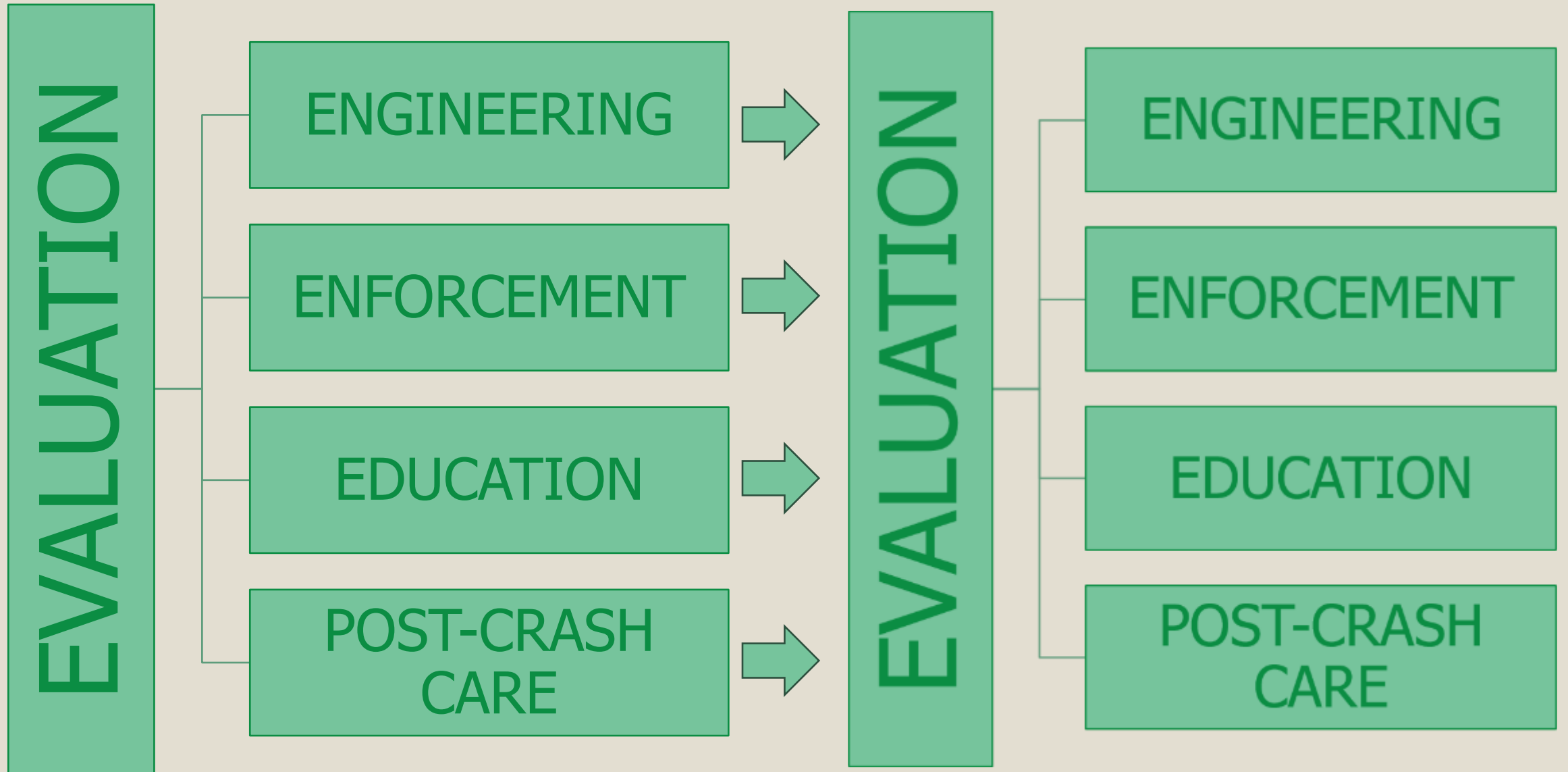
Estimating benefits



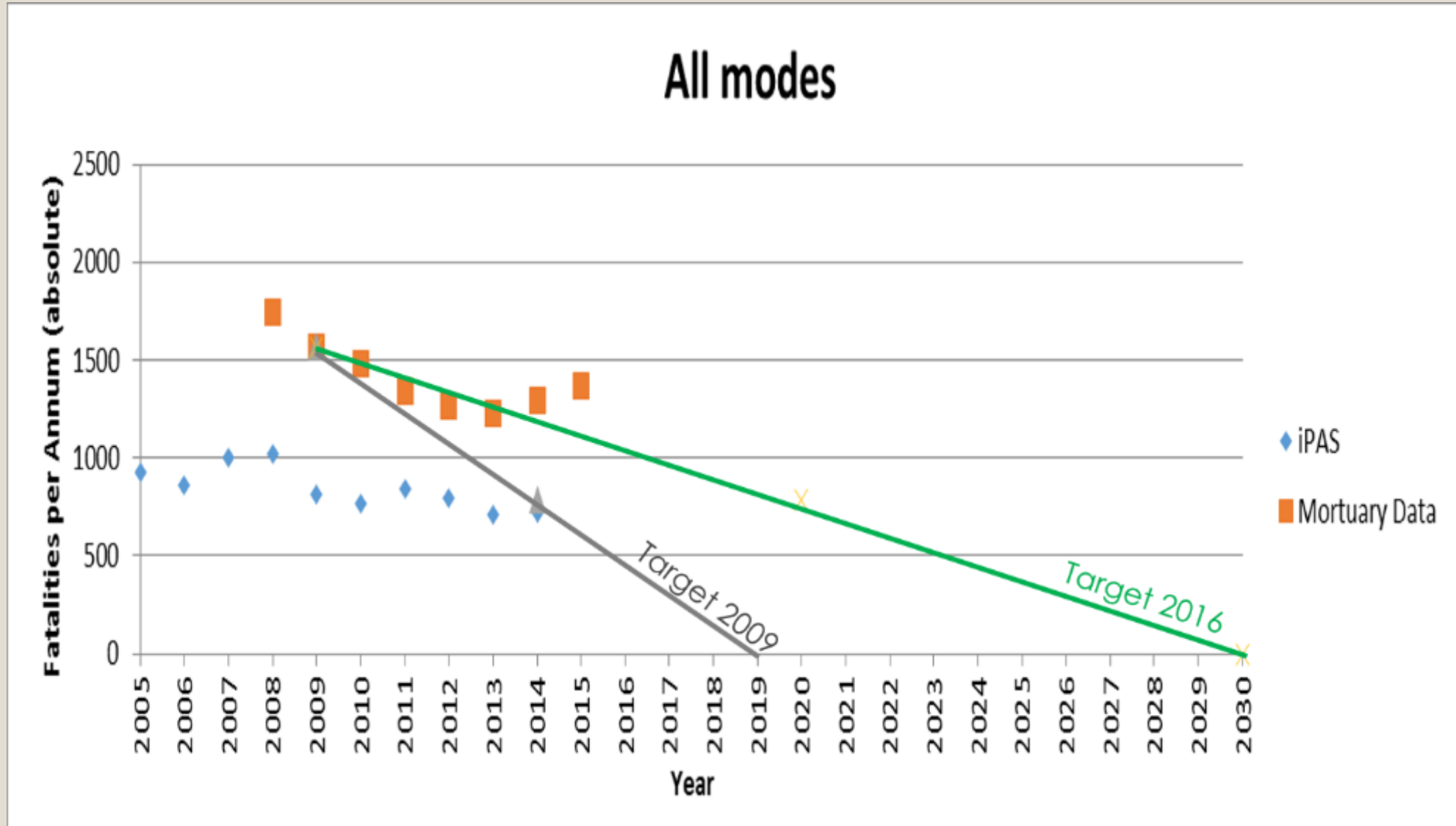
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Background

Safe Systems Approach: identifying interventions

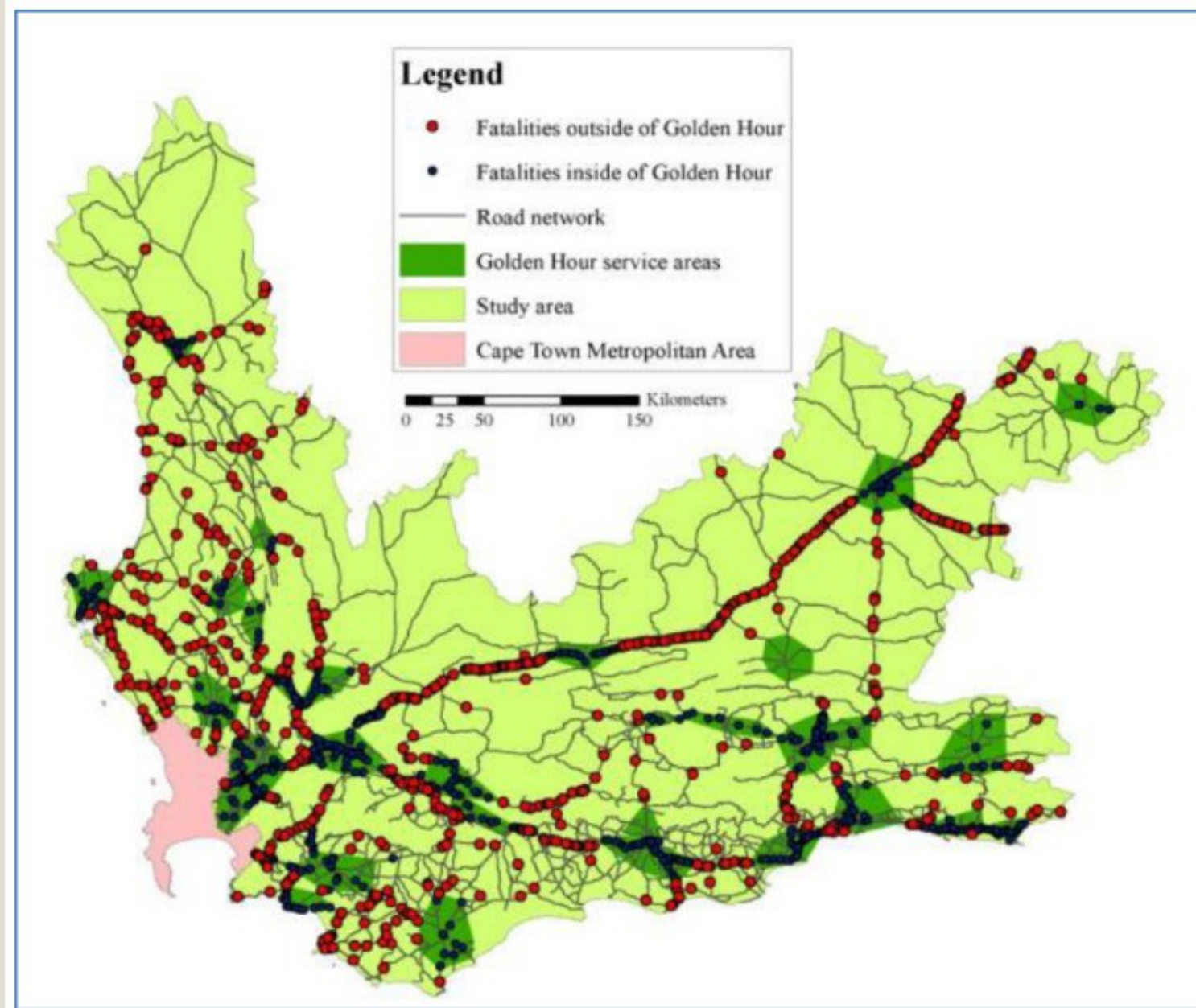


Fatality trends in absolute numbers



Source: Vanderschuren et al., 2018

Hotspot analysis and the 'Golden Hour'



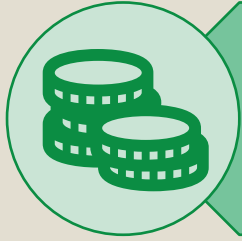
Source: Vanderschuren et al., 2018

Methodology

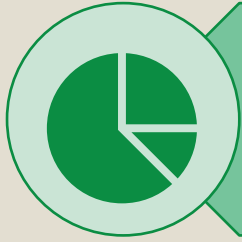
An economic assessment

- It should be noted that this approach is an **economic evaluation** of costs and benefits and does not provide a traditional cost-benefit analysis.

An economic assessment



Net Present Value (NPV) is a financial metric used to determine the profitability of an investment in absolute terms



Internal Rate of Return (IRR) is a financial metric used to estimate the profitability of an investments in percentage



Return on Investment (ROI) is a financial metric used to estimate the profitability and efficiency of an investments



Benefit/Cost Ratio (BCR) is a financial metric comparing the positive and negative benefits to the financial investment

An economic assessment









- ❑ It should be noted that this approach is an **economic evaluation** of **road safety** costs and benefits and does not provide a traditional cost-benefit analysis.
- ❑ Externalities, such as congestion, travel times, pollution etc. are not included in the analysis.

An economic assessment

- ❑ Costs for the implementation of the various interventions were obtained from civil engineering practitioners and the Young Urbanists, based on their **expected costs** for the road design elements considered.
- ❑ To account for **uncertainty** relating to cost estimates, both a conservative and optimistic scenario was modelled for each location.
- ❑ Both **capital** investments and **operational** (maintenance) cost requirements were projected over the entire 20-year period.

Estimating Costs

The Cost estimation

Unit Cost per Road Traffic Incident (RTI)				Unit Cost per Road Traffic Incident (RTC)			
							
Death <i>(R million)</i>	Serious Injury	Slight Injury	No-Injury	Fatal crash <i>(R million)</i>	Major Injury Crash	Major Injury Crash	Damage Only Crash
3 916 187	423 858	11 352	1 085	5 435 261	165 664	152 244	48 533

Source: RTMC and CSIR, 2016

The Cost estimation



Source: RTMC and CSIR, 2016; iPAS database

The Cost estimation

- ❑ There is one exception to the fatality costs displayed Calculation. For improved EMS the target is to get more patients to trauma care facilities within the 'Golden Hour'. Assumption was that faster trauma care means one less fatality but one more major injuries.
- ❑ For one potential fatality saved the calculation is:

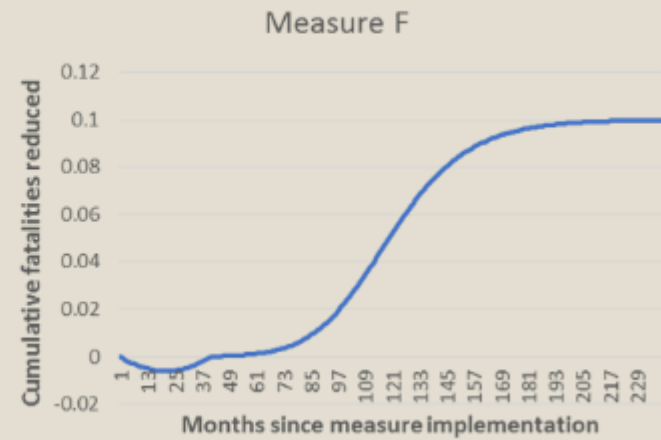
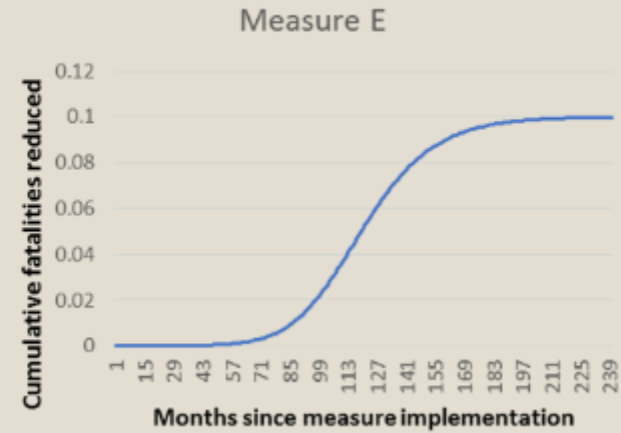
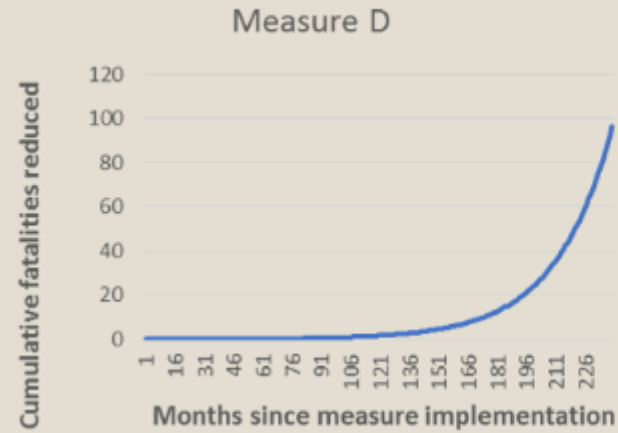
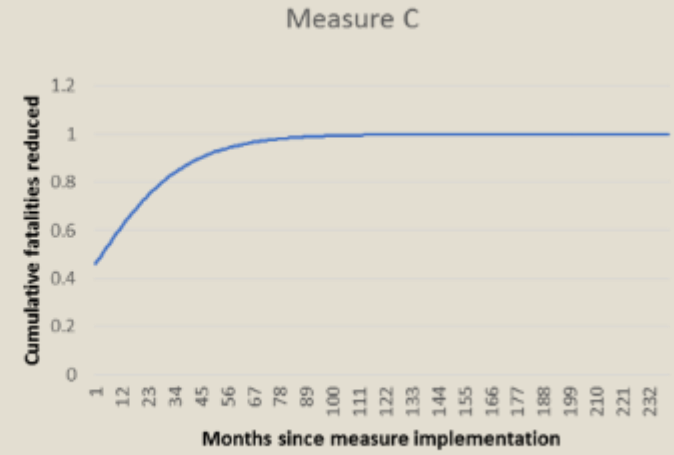
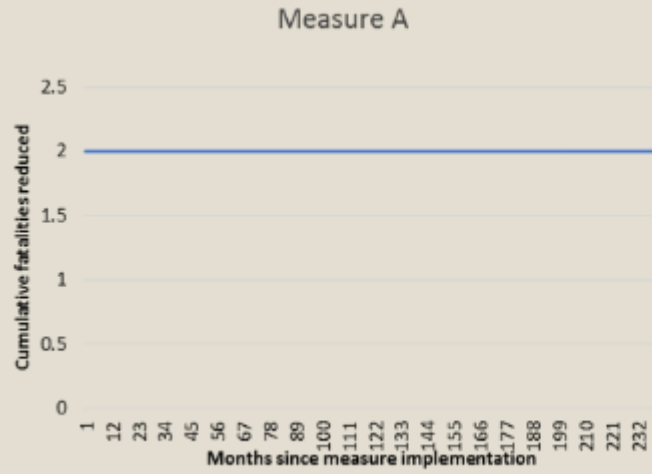
- R5 435 261

+ R765 664

- R4 669 597

Estimating Benefits

The benefit estimation



Conclusions

Benefit/Cost Ratio: Results

Name of Scenario:	Costs (R million)		Lives saved/20 years		Overall BC Ratio/20 years		Break-Even (fatalities only)	
	Capital/20 year	Operational/year	Conservative	Optimistic	Conservative	Optimistic	Conservative	Optimistic
Infrastructure based scenarios								
Prince Alfred Hamlet	9	0.0868	16.0	79.1	11.3	56.0	60 (67)	2 (29)
Khayelitsha	9	0.0868	58.4	288.9	41.3	383.2	44 (49)	28 (29)
Rumble strips in Grabouw	0.784	0.014	286.8	371.8	2113	2738	3 (4)	3 (3)
Lighting at the intersection in Rawsonville	0.135	0.001	4	16	202.9	811.5	26 (31)	13 (16)
Enforcement based scenarios								
Speed over distance in Leeu Gamka	2.1	1.0	59.13	80.41	21.0	28.5	15 (17)	14 (16)
Education based scenarios								
Campaigns	0	45.2	1238.4		15.1		19 (21)	
Emergency Medical Services based scenarios								
Improved ambulance services	1.8	0.495	200	300	67	101	1 (1)	1 (1)
Improved motorcycle services	0.6	0.145	200	280	224	314	1 (1)	1 (1)
Improved helicopter services	0	18.0	215	7648	4.7	166	1 (1)	1 (1)
All costings are based on base year values. No inflation on costs or benefits have been included								

Conclusions

- ❑ Road fatalities remain stubbornly high, especially on the African continent
- ❑ The Safe Systems Approach includes the evaluation of data to make evidence based decisions on investments
- ❑ Investments should include education, engineering, enforcement and post-crash care
- ❑ As road related calculations are for the public, a benefit/cost ratio is the only economic method to be applied
- ❑ When applying the B/C ratio, the researcher needs to be careful to not confuse negative benefits with costs
- ❑ B/C ratio calculations can assist in convincing funders to invest
- ❑ Every road fatality or injury is one too many

Thank you for your attention



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