

## From on High? A Systems Analysis of the Contributory Factors that Lead to the Fatal Five Behaviours

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### Abstract

This article presents the findings from a study in which a systems thinking framework was used to collect and analyse a range of data on the factors underpinning the so called fatal five driver behaviours. The study included an analysis of crash data, a series of surveys on drivers' perceptions on the causes of fatal five behaviours and an expert workshop. The data was analysed and mapped onto a systems model of the Queensland road transport system. In addition to well-known contributory factors, additional factors related to policy, transport system design, road rules and regulations, and societal issues were identified.

### Background

In the last decade the potential utility of applying systems theory and methods in transportation safety research and practice has been recognised (Larsson et al, 2010; Salmon et al, 2012). In response researchers have undertaken various applications of systems theory and methods to investigate the causes of road trauma. Whilst these initial applications have shed new light on the system-wide causes of road trauma, a significant limitation is the fact that the majority of crash analysis studies have focused only on a single catastrophic event and/or analysis of existing crash data only (e.g. Newnam & Goode, 2015; Newnam et al, 2017; Salmon et al, 2013). This has impacted the generalizability and validity of findings and has raised the requirement for further research utilising other data sources.

In response to this, this article describes a study that aimed to go beyond limited accident data to investigate the system-wide factors underpinning drivers' engagement in the so-called fatal five behaviours known to lead to road crashes (drug and drink driving, distraction, seat belt wearing, speeding, and fatigue). The study involved building on a recently developed systems model of the Queensland (Qld) road transport system (Salmon et al, 2016, see Figure 1) by combining accident data, driver surveys and an expert workshop to identify fatal five contributory factors across the Qld road transport system. The aim was to identify a. what factors lead to drivers engaging in each of the fatal five behaviours; and b. where these factors reside in the Qld road transport system control structure presented in Figure 1.

### Method

The aims were achieved through the conduct of three studies:

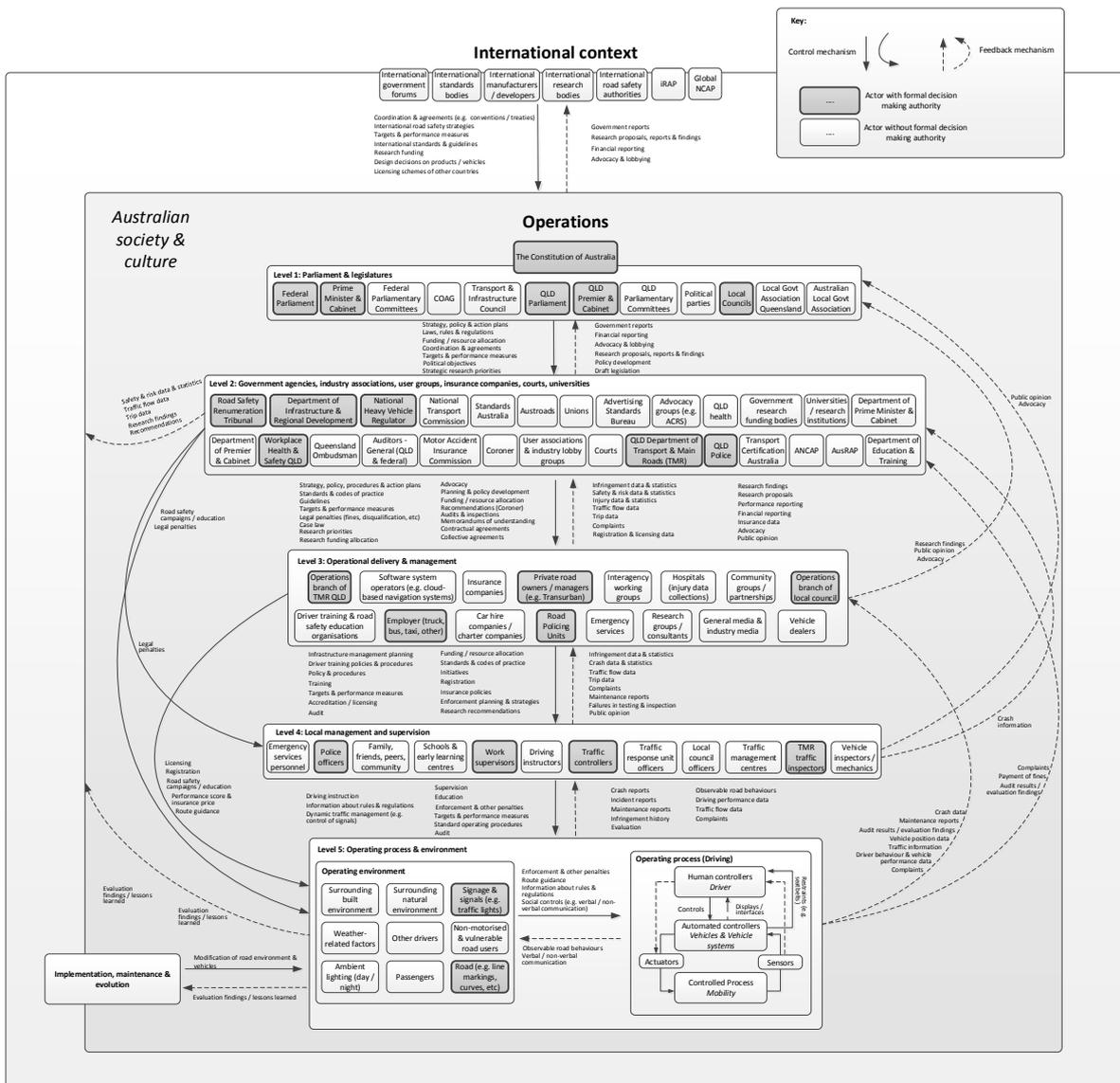
1. *Surveys of road user perceptions on the causes of each fatal five behaviour.* A total of 316 participants completed surveys designed to elicit their perceptions on why drivers engage in each fatal five behaviour;

2. *A road safety subject matter expert workshop.* Six road safety experts took part in a workshop designed to elicit their perceptions on the causes of each fatal five behaviour.
3. *Fatal road crash data analysis.* Fatal road traffic crash data for Qld between 2010 and 2015 was assessed to identify the contributory factors involved in the crashes caused by fatal five behaviours.

### Results

The data derived from each activity was analysed to identify factors across the Qld road transport system that play a role in drivers’ engagement in the fatal five behaviours. Following this, the factors identified were mapped onto the Qld road transport control structure in Figure 1 based on where in the system they were perceived by the authors to reside (e.g. ‘Stupid drivers’ resides at the ‘Operating process: Driving’ level whereas ‘Unclear rules and regulations’ resides at ‘Parliament and Legislatures’).

The results from the three studies demonstrated that, in addition to well-known factors related to the driver, vehicle and road environment, additional factors related to road safety policy, transport system design, road rules and regulations, and societal issues were identified.



**Figure 1. QLD road transport system control structure (Source: Salmon et al, 2016) - Analysis of contributory factors will be presented in the final conference article and presentation**

## Discussion

In summary, the analysis revealed that there is a complex web of interacting factors that lead to drivers engaging in the fatal five behaviours. Notably the findings show that these factors reside across all levels of the road transport system from the driver, vehicle and road environment levels to the higher government levels. The findings show the importance of targeting all levels of the system when developing road crash prevention strategies.

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