

An Investigation into Potential Migration of Run-of-road Crashes after Treatments of Sites in Rural Western Australia

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Abstract

Run-off-road crashes are especially problematic in rural Western Australia (WA), with lives lost and trauma that result placing a great burden on community. Factors that lead to these crashes, such as fatigue, are compounded by WA's vast land area and long distances between its towns.

Chow et al. (2017) found the State program aimed to reduce such crashes to be successful. However, the question arises, whether the treatments deployed acted to delay the crashes only, and whether the crashes "migrated" to other road sections after the treated sections. This new study aims to answer this question with up-to-date data.

Background

Run-off-road crashes accounted for almost 60% of road deaths and serious injuries in rural WA from 2008 to 2012 (ORS, 2014). A total of 984 kilometres of rural WA roads received treatments which included *audible edgelines* and *shoulder widening and/or sealing* under the rural "Run-off-road Crash Program" from 2012 to 2015. The earlier study by Chow et al. (2017) was performed at a time when data on traffic volume weren't readily available for all sites. This new study aims to rectify that with new data on traffic volume, and at the same time addresses the question on any potential existence of "crash migration".

Methods

A quasi-experimental *before and after* study design was used to compare: (1) *run-off-road crashes* (all severities); (2) *run-off-road casualty crashes* (fatal, hospitalisation, and/or medical treatment); and (3) *run-off-road killed or serious injury (KSI) crashes* (ORS, 2014), at sites treated during 2012-2015.

Updated crash data was obtained up to 31st December 2016, from the Integrated Road Information System maintained by Main Roads. The Road Use Movement code was used to identify run-off-road crashes at 59 case sites (before and after treatment). On the basis of Nicholson (1986), this study utilised five years of pre-treatment crashes, and up to five years post-treatment (if available). The regression of the mean effect was considered.

A comparison group of 63 sites (without treatments) was chosen, together with new data on annual average daily traffic, and other information on the sites obtained from Main Roads, for both case sites and comparison sites.

As each site received treatment in a different year so the length of post-treatment exposure was also different, a generalised estimating equation Poisson model (Dupont, 2002; Twisk, 2003) that accounted for exposure was used to compare crashes before and after each treatment.

Results

This new study found the 59 case sites to have observed a statistically significant 43.7% reduction in run-off-road crashes (all severities) that was due specifically to the treatment ($p < 0.001$). The same case sites also observed a significant 29.3% reduction in run-off-road casualty crashes ($p = 0.031$) and

significant 36.6% reduction in run-off-road KSI crashes ($p=0.039$), thus consolidating the earlier findings by Chow et al. (2017).

The study found 63 comparison sites without treatment to have observed a relatively lower 24.8% reduction in run-off-road crashes (all severity) ($p<0.001$), a relatively lower 22.9% reduction in run-off-road casualty crashes ($p=0.022$), and a statistically non-significant 22.8% reduction in run-off-road KSI crashes ($p=0.092$).

The 63 comparison sites were in close proximity to the case sites. Their crash reductions were compared to the reductions as observed by the whole lengths of rural roads where both the case and comparison sites were drawn from. There was no clear evidence of crash migration within 10 km of each case site.

While there was evidence of a downward trend in run-off-road crashes across rural WA, the treatments from the Run-off-road Crash Program did work to significantly reduce the loss of lives further.

Conclusions

The fatalities and serious trauma from run-off-road crashes place a great burden on society. Given the positive outcomes in crash reductions, it is recommended WA's "Run-off-road Crash Program" be continued and extended to roads not yet treated by the countermeasures.

References

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