Analysis of the National Coroners Information System as a data source for fatal crashes

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Abstract

This paper presents an analysis of the use of the National Coroner's Information System (NCIS) as a data source for fatal crashes, by identifying the various benefits and limitations it possesses. When compared to other road crash databases (e.g. VicRoads CrashStats, ATSB fatal road crash database, etc) the NCIS allows for more comprehensive identification of the events, including the occurrence of multiple crash events, surrounding a fatal road crash.

Despite this higher level of crash detail various limitations of the NCIS are also identified within this study. Low coroner's case report availability on the NCIS was identified as the first and most important limitation. Many NCIS cases recorded upwards of 25% of key case quality indicators being unknown. The increase in case data quality after viewing of the original coroner's case files from which the NCIS cases were built was dramatic. The addition of information from police collision reports, crash scene diagrams, crash scene photos and witness statements from the coroner's file was vital in order to minimise unknown data results to a reasonable level.

It was concluded that while the NCIS proved to be a good source of information for crash event classification (i.e. crash type and/or the identification of multiple crash events) the additional data for describing the failures of the vehicle, driver or road system was limited. This coupled with restrictions injury data lead to the finding that for a detailed study of the failures of the vehicle, road system or occupant of the vehicle crash data from the original coroner's case file from which the NCIS case was built is required.

Keywords

National Coroners Information System, NCIS, fatal, road crash

Introduction

The National Coroners Information System (NCIS) is a national internet based data storage and retrieval system for Australian coronial cases. Its primary use is for the reference of coroners but its use as a tool for researchers is growing.

The authors, through an ARC funded research project, have been undertaking a statistical investigation into fatal passenger vehicle rollover crashes. While many databases offering Australian road crash data exist (e.g. VicRoads CrashStats, the Australian Transport Safety Bureau Fatal Road Crash database, etc) many are limited in the data they present. For example few have the level of detail needed to identify if a vehicle has experienced an element of rollover during a crash. Many road crash databases only identify if a vehicle has rolled over if the vehicle has undergone a single vehicle crash without any other significant impact. However, many multi-vehicle and fixed object impact crashes also contain an element of rollover, which can contribute to occupant injuries and fatalities.

The choice to use the NCIS as a source of fatal passenger vehicle crashes for the rollover crash study was made due to the detailed crash and injury data that is available on the NCIS. The documents/reports associated with a coronial investigation often include detailed witness accounts, injury data and crash reconstruction information. Reviewing these reports and investigations allows researchers to identify the complex events that have lead to the recorded fatality. Throughout this fatal passenger vehicle rollover crash study the advantages and limitations of the NCIS as a source of fatal road crash data became evident to investigators.

Using data gathered from the NCIS two complementary studies into rollover crashes have been undertaken. Results from both of these studies will be utilised within this investigation into the suitability of the NCIS as a source of fatal road crash data. The details of these two studies will be briefly outlined in the *method* section within the body of this paper as background for the reader. This study was undertaken to investigate the availability of the types of information required to examine the general characteristics of all crash types along with an examination of some rollover crash specific characteristics.

Previous studies analysing the NCIS as a tool for research

Previous studies have used the NCIS database as a tool for general injury surveillance [1, 2]. Only one study to date [3], undertaken at the New South Wales (NSW) Injury Risk Management Research Centre (IRMRC), has analysed the suitability of this database as a source of injury information. Within this study the suitability of the NCIS as a timely and reliable fatal injury surveillance tool for NSW deaths was investigated. For this study data from two sources, being the Australian Bureau of Statistics (ABS) and NCIS, were compared to test the suitability of the NCIS. It was theorised that NCIS data would be useful for explaining observed trends in fatal injuries when compared with ABS data as it presents much greater detail for the events surrounding a death.

One of the sections of analysis presented within this study examined NSW road fatalities reported on the NCIS and found that 99% of motor vehicle transport related fatalities were reported for the period investigated. This result suggests that the NCIS is a good source of information on the occurrence of fatal road crashes. The study did not however examine in detail if information on the crash forms or occupant injury mechanisms experienced during these road crashes was readily available. As a consequence it was not established if the NCIS's data was suitable for analysing the underlying failures of the road system, vehicle design and/or occupant(s) actions or its ability to allow researchers to establish the exact biomechanical cause of death.

To extend the work of this previous study the following paper examines the NCIS database as a source of detailed fatal road crash information for all states and territories. Data from two studies undertaken into fatal passenger vehicle rollover crashes in Australia will be utilised to perform this analysis. The precise methodology used to undertake this work is outlined in the following section of this paper.

Method

As touched upon preceding this investigation the authors have performed two statistical studies into Australian passenger vehicle rollover crashes. These studies are associated with an Australian Research Council (ARC) funded research project but have yet to be published. As these studies will be used as a tool to interrogate the NCIS each is now outlined briefly for the reader's reference.

Study 1 – NCIS analysis of fatal road crashes for the year 2005

The first study to be examined is an analysis of road crashes occurring in the 2005 calendar year and also identifies the frequency of rollover crashes during this period. Data for this study was obtained from only the NCIS database. The identification of a rollover crash and the information describing that rollover crash was obtained from the data attached to each NCIS case.

Study 2 – Coroner's case analysis for contained rollover crash fatalities, 2000-2006

The second study was an analysis of a subset of fatal rollover crashes where the fatally injured occupant was contained. For this second study a higher level of detail and data reliability was deemed necessary. To this end additional information for the subset of relevant rollover crashes identified using the NCIS database were requested from various state coroner's courts. These cases were then investigated and the events surrounding the rollover crashes were described utilising data from both the NCIS and state coroner's case files.

The data sources used for these two studies are clarified in the flow diagram shown in Figure 1

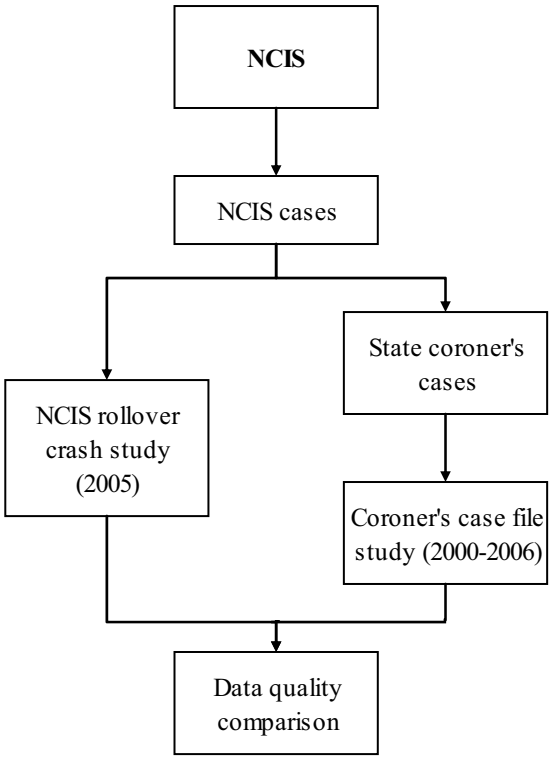

Figure 1: Flow diagram of data sources for rollover crash studies

Current study methodology

The analysis of the quality of data obtained from the NCIS database (i.e. this current study) is undertaken in four stages. These stages are listed and discussed below as well as outlined in Table 1.

1. NCIS case report availability for both *Study 1* and *Study 2*
2. NCIS study (*Study 1*) key case data analysis
3. Coroner's study (*Study 2*) key case data analysis
4. Comparison of *Study 1* and *Study 2* case data quality
    a. Comparison of key case data
    b. Autopsy and Cause Of Death (COD) injury data comparison

Analysis stage 1 introduces the NCIS and identifies the major data sources that are available through the NCIS user interface. Identifying the quality and type of information (i.e. case reports) available for each case is intended to indicate the type and level of information that is available on the NCIS. In addition a comparison of the data available from the NCIS data source (*Study 1*) to that available from coroner's file cases (*Study 2*) will also be undertaken. This will identify if a significantly greater level of crash information can be achieved by reviewing a fatal crashes coroner's file, or if the data presented on the NCIS is reflective of the amount of data present in the original coroner's file from which the NCIS case was built.

Stages 2 and 3 examine the level of data that can be extracted from the NCIS and coroner's file respectively. To do this these stages (as well as stage 4) of the investigation will make use of **"case quality indicators"**, these indicators are important crash descriptors that during a crash influence the likelihood of fatality or serious injury to a vehicle's occupant. Many previous crash studies [4-16] have identified the important parameters that relate to vehicle and occupant dynamics and occupant injury potential/severity. Eight **"case quality indicators"** are identified in Table 2 and these will be utilised during this investigation.

Table 1: Data analysis description

Analysis Stage		Investigation summary	Method of investigation
1. Case report availability/data quality		Investigate how much and what type of crash information is available on the NCIS.	Examine the number and types of reports that were attached to each NCIS case.
2. NCIS data study (*Study 1*) analysis		Analyse the level of data quality for the NCIS only study (*Study 1*).	Analyse if important **"case quality indicators"** are known or unknown for *Study 1*.
3. Coroner's file data study (*Study 2*) analysis		Analyse the level of data quality for the NCIS and coroner's case file study (*Study 2*).	Analyse if important **"case quality indicators"** are known or unknown for *Study 2*.
4. *Study 1* and *Study 2* data comparison	a. Key case data comparison	Establish if the coroner's case investigation (*Study 2*) has significantly higher data quality than the 2005 NCIS study (*Study 1*).	Compare data from previous analysis stages, 2 and 3, and examine the changes to the **"case quality indicators"** for cases examined in both investigations.
	b. Autopsy, cause of death and injury data comparison	Examine the quality of NCIS injury data	Examine if coroner's COD identifies which body region was most severely injured, as specified by a comparable injury measure.

The final stage of the investigation (Stage 4) is split into two sub-stages. Stage 4a identifies if the results of the Stage 2 and Stage 3 analyses are significantly different. This will allow conclusions to be made, in addition to those of Stage 1, as to if it is beneficial to researchers to request a coroner's case file or if these documents only present the same information already available through the NCIS. Stage 4b will compare the injury information available on the NCIS to that of the coroner's files. This will be done by comparing coroner's COD (i.e. NCIS information) to injury data summarised from the autopsy information available for *Study 2* cases.

To achieve this comparison between COD and detailed injury information the study will code injuries described in the Autopsy report using the Abbreviated Injury Scale (AIS) [17]. The AIS codes and ranks occupant injury severity on a scale of 1 (minor injury) to 6 (maximal or currently untreatable injury). The Maximum AIS (MAIS) is highest AIS ranked injury an occupant experiences. Therefore for the purpose of this study it is assumed that the body region(s) that records an occupant's MAIS injury should match the body region the coroner's COD refers to.

Table 2: Outline of case quality indicators

Crash form factors	Case quality indicators
General crash factors	• Vehicle body type, • Vehicle speed, • Occupant seatbelt use, and • Occupant seating position
Rollover crash factors	• Occupant containment, • Rollover initiation mechanisms, • Vehicle roll orientation, and • Vehicle roll direction

Results and Analysis

Following on from the *method* section which outlined the forms of analysis being undertaken within this study the study results will now be presented and discussed.

1. NCIS case report availability for both *Study 1* and *Study 2*

The first stage in analysing the NCIS database examines the NCIS report availability for the cases that made up the two separate studies. It is important that any observed improvement in case information, from *Study 1* to *Study 2*, can be directly attributed to the addition of data from those reports not available on the NCIS (e.g. police collision reports, scene diagrams, witness reports etc). Within subsequent sections two methods will be used to achieve this.

(A) Comparison of cases selected for both the NCIS and coroner's analyses.
(B) Comparison of cases where the NCIS data quality (i.e. report availability) is comparable.

Considering method A there is a total of 18 cases that are present in both (i.e. *Study 1* and *Study 2)*) datasets. Therefore these 18 cases can be used for the comparison of these two studies data quality. The limitation of method A is that only 18 cases satisfy the requirement of being investigated in both *Study 1* and *Study 2*. A concern therefore is that significant information cannot be obtained from such a small dataset. As a result method B will also need to be investigated. The comparison of results for these cases will however not be discussed at this stage of this analysis but instead is presented in section 4a.

Method B requires careful consideration and Table 3 assists in this. Table 3 shows that of the 210 cases that make up the data set of *Study 1* a large proportion of cases possess two or less case reports. This identifies that a direct comparison between the two investigation's data sets cannot be made. This is due to the fact that any possible increase in data quality for the coroner's file cases (*Study 2*) may be due to the base (i.e. NCIS) data level of these cases being higher than that of the set of NCIS only cases examined in *Study 1*.

As previously stated to allow comparison between the cases of *Study 1* and *Study 2* it is important that the two sets of cases have the same level of base (NCIS) data available and are therefore comparable. As a result of this it is required that for the analysis to follow only cases with three or more case reports attached to the original NCIS case will be chosen, while cases with less than this number of case reports will be removed from the *Study 1* and *Study 2* data sets. As a result of this decision the subset of 2005 NCIS cases (*Study 1*) will be reduced to 119 and the subset of coroner's file cases (*Study 2*) will be reduced to 89 for the analysis to follow (i.e. stage 2 to 4).

Table 3: Base (NCIS) case report availability (before coroners file viewing) for passenger vehicle rollover crash studies

Reports	*Study 1*		*Study 2*	
	Count	**Percentage**	**Count**	**Percentage**
1	65	31%	0	0%
2	26	12%	3	3%
3	29	14%	50	54%
4	90	43%	39	42%
Total	210	100%	92	100%

2. NCIS data study (*Study 1*) analysis

The second stage of this investigation is to examine the data quality of cases for *Study 1*. Table 4 presents the analysis of key data for the 2005 NCIS analysis. This table summarises each of the **case quality indicators** as either being unknown or known. The least known data indicated by this table is the general crash indicator, vehicle speed (i.e. vehicle speed at time of crash), while the data indicator with the least proportion of unknown cases is occupant seating position.

These results indicate that both general crash and rollover crash specific **case quality indicators** possess a large proportion of unknown results, with half of these indicators recording 25% (or one in every four cases) of cases being unknown. This is an unacceptable level of unknown data for a detailed analysis of crashes to be undertaken.

Table 4: *Study 1* key data summary

Indicator	Unknown	Known	% Unknown
Vehicle body type	14	105	12%
Vehicle speed	72	47	61%
Occupant seat belt use	26	93	22%
Occupant seating position	8	111	7%
Occupant containment	11	108	9%
Rollover initiation mechanism	37	82	31%
Vehicle roll orientation	38	81	32%
Vehicle roll direction	50	69	42%

3. Coroner's file data study (*Study 2*) analysis

The third stage of this investigation is to examine the data quality of *study 2* cases, which utilises data from the NCIS and original coroner's case file. Table 5 presents the analysis of key data for the coroner's case analysis. Again this table presents all crash and rollover crash **case quality indicators**. The least known piece of data presented is once again the general crash indicator, vehicle speed. The data indicator with the least proportion of unknown cases is vehicle body type (e.g. sedan vs. four wheel drive) and vehicle roll orientation (longitudinal vs. end-over-end).

These results show that the majority of both general crash and rollover crash specific data points have a low proportion of unknown results, many being below 5% (or one in every twenty cases). This level of unknown data is less likely to bias the results of the known data and is therefore a much more acceptable level of unknown data from which a comprehensive analysis of rollover crashes could be undertaken. The only **case quality indicator** that is unknown in a large proportion of cases is vehicle speed at time of crash (44%).

Table 5: *Study 2* key data summary

Indicator	Known	Unknown	% Unknown
Vehicle body type	89	0	0%
Vehicle speed	50	39	44%
Occupant seat belt use	86	3	3%
Occupant seating position	88	1	1%
Occupant containment	88	1	1%
Rollover initiation mechanism	88	1	1%
Vehicle roll orientation	89	0	0%
Vehicle roll direction	82	7	8%

4. Comparison of *Study 1* and *Study 2* data quality

The final stage of investigation and analysis of results is presented below in two sub-sections. Sub-section 4a will compare the results for the analysis of case quality indicators for the two studies, while sub-section 4b will examine Autopsy report, COD and injury data.

4a. Key case data analysis

The first comparison made within this sub-section between *Study 1* and *Study 2* is performed using the data presented in Table 4 and Table 5, shown in the Stage 2 and 3 discussions. The data shown in these tables indicates that analysis of a fatal crash that utilises data from both the coroner's files and the NCIS (i.e. *Study 2*) leads to a lower proportion of unknown results for all eight **case quality indicators**. For the majority of **case quality indicators**, when considering coroner's case file data, the percentage of unknown cases is below 5% with only two indicators being greater than this figure. As discussed an unknown data level of 5% is much more acceptable than the proportions observed for the 2005 NCIS case study (*Study 1*).

Despite the improvement in the majority of **case quality indicators** on viewing of the corner's file case information and therefore data for the vehicle's speed still remains unsatisfactory with a high proportion

of unknown results (44%). This is a concern in the analysis of both rollover and non-rollover crashes as high vehicle speeds increases both the probability and severity of crashes [10, 14].

In addition to the analysis presented in Table 4 and Table 5 a total of 18 cases analysed in both the 2005 NCIS investigation (*Study 1*) and the detailed coroner's case file investigation (*Study 2*) will now be used to establish further what was found in Stage 1 to 3 of the results and analysis. The results of this analysis are presented in Table 6 and Table 7. The first of these summaries, Table 6, presents data investigating the proportion of unknown data (for these 18 cases) for each of the **case quality indicators** established previously. These results display a similar trend to the results summarised in Table 4 and Table 5 with coroner's file cases possessing a much lower percentage of unknown data results.

Table 6: Case comparison, unknown data

Indicator	*Study 1* cases		*Study 2* cases	
	Count	Percentage	Count	Percentage
Vehicle body type	4	22%	0	0%
Vehicle speed	9	50%	4	22%
Occupant seat belt use	5	28%	0	0%
Occupant seating position	0	0%	0	0%
Occupant containment	0	0%	0	0%
Rollover initiation mechanism	1	6%	0	0%
Vehicle roll orientation	1	6%	0	0%
Vehicle roll direction	3	17%	0	0%

Table 7 presents further analysis of these 18 cases. This analysis examines the frequency and types of changes made by researchers. Changes to data were made when a researcher deemed that the information/description obtained from the NCIS (*Study 1*) was incorrect or misleading. In such a case the more detailed information of the coroner's case file (*Study 2*) will have indicated a different or more accurate result. The second column in Table 7 show the total number of changes made, for each **case quality indicator**. This result shows that at least one case for every indicator is changes on the viewing of information available through the coroner's case file. Many indicators have multiple changes made with the indicator having the most changes being vehicle speed. Table 7 shows that 9 cases (50%) have their vehicle speed information changed when the coroner's file is viewed.

Table 7: Case comparison, changed data

Indicator	All changes		Changes to unknown data	
	Count	Percentage (of 18 cases)	Count	Percentage (of changed)
Vehicle body type	6	33%	4	66%
Vehicle speed	9	50%	6	66%
Occupant seat belt use	5	28%	5	100%
Occupant seating position	1	6%	0	0%
Occupant containment	1	6%	0	0%
Rollover initiation mechanism	3	17%	1	33%
Vehicle roll orientation	3	17%	1	33%
Vehicle roll direction	8	44%	3	38%

It is important to identify how many of the changes made to *Study 1* data by researchers were made to data that was originally unknown. To aid in analysing this columns four and five are also presented in Table 7. For some indicators, e.g. occupant seat belt use and vehicle body type, all or most of the changes were made to unknown data, which displays an overall increase in the data quality during *Study 2* but does not indicate any problems with *Study 1* results. For other indicators, e.g. vehicle roll direction, many of the changes were made to data that was originally known. This means for these cases data from the NCIS alone allows researchers to conclude a different result than is concluded when the higher level of

data (e.g. *Study 2*) is examined. This reduces confidence in the results of analysis that only uses NCIS data as a reference.

4b. Autopsy, cause of death and injury data comparison

Firstly within sub-section 4a the original (non-reduced) case sets (see Stage 1 discussion) will be analysed to investigate if the NCIS can be used as a source of detailed injury information. The most detailed source of injury data presented on the NCIS is the Autopsy report. Therefore the primary measure of injury data quality is the availability of these Autopsy reports. Table 8 examines this by presenting the Autopsy report availability of both studies. It is important to note that the coroner's file case analysis (*Study 2*) data presented in Table 8 establishes if the coroner's case file of these crashes contained an autopsy report. It does not present if an autopsy report was available on the NCIS for these cases, as was the case for Table 3.

Table 8: Case autopsy report availability

Autopsy availability	***Study 1***		***Study 2***	
	Count	**Percentage**	**Count**	**Percentage**
Available	103	49%	88	96%
Unavailable	107	51%	4	4%
Total	210	100%	92	100%

The increased proportion of autopsy reports after the coroner's file case is viewed is significant, with the proportion of cases without autopsy information being reducing from a proportion of 51% to 4%. A concern when considering the NCIS data source is why these autopsies, that have been performed and can be viewed in the coroner's case file, were not uploaded to the NCIS.

Following on from and to confirm this result a more detailed investigation of occupant injury information will take place. Two sources of injury related data for fatal occupants are available through the NCIS. These are an autopsy report and the coroner's COD. Due to the finding summarised in Table 8 the analysis of injuries performed during *Study 1* utilises the coroner's COD classification as a guide for the body region most critically injured during each passenger vehicle rollover crash. To establish if this analysis technique is valid the results of a COD analysis need to be compared to occupant injury distributions using another injury scale. As presented within the *method* section the injury measure used in this comparison is the AIS.

Table 9 compares the coroners COD and MAIS for the coroner's file cases (*Study 2*). It can be seen that the MAIS attributes a larger proportions of fatalities to Thorax and Head injuries than that COD results. The most obvious reduction in share for any body region occurs for the Neck/Spine grouping. The cause for this reduction may be a result of two phenomenons; an under quoting of severe/fatal Thorax injuries by coroners, or a reduction in MAIS Neck/Spine injuries due to limitations of this injury coding technique and Autopsy report data.

Table 9: Cause of death and MAIS comparison

Body Region	**Cause of Death**		**MAIS**	
	Count	**Percentage**	**Count**	**Percentage**
Head	43	48%	46	52%
Neck/Spine	15	17%	12	13%
Thorax	7	8%	21	24%
Abdomen	0	0%	2	2%
Extremities	0	0%	0	0%
Other/Unknown	33[1]	37%	15[2]	17%

[1] Other/Unknown COD count are due to COD specified as either Unknown, Multiple injuries or some similar inconclusive specification

[2] Other/Unknown MAIS classification are caused by Autopsies which only included external examinations thus the actual MAIS body region could not be conclusively found

The phenomenon presented above is relatively self explanatory. That is that the increase in recorded Thorax injuries (as identified by the AIS) accounts for the change in this distribution. However the assertion of the second point (i.e. the possibility that this observation is due to limitations of coding of Neck/Spine injuries) requires some analysis top verify, this analysis is presented in Table 10. This data examines the Neck/spine injuries recorded for the coroner's file case investigation. The table presents if the type, location or cord involvement were known when a fatally injured occupant experienced some degree of spinal injury. When coding injuries to the spine, using the AIS scale, the observation of an injury is the first requirement (e.g. fracture, dislocation etc). After a spinal injury has been recorded the level of spinal cord involvement often determines the severity ranking of this injury. Table 10 shows that 65% of cases that involved some kind of spinal injury had no information on the level of spinal cord involvement. This means that these 37 cases could not have the severity of observed spinal injuries accurately coded, possibly reducing the number of MAIS Neck/Spine injuries. This is a limitation of the autopsy injury data when considering spinal injuries of road fatalities. The result allows the conclusion that this reduction in Neck/Spine MAIS injuries when compared with coroners COD is probably not a result of less fatal spinal injuries but instead a lack of appropriate injury data for this region of the occupant's body.

Table 10: Neck/Spine injury data, from Autopsy reports

Neck/Spine injury	Known	Unknown	% Unknown
Type	39	18	32%
Location	39	18	32%
Cord involvement	20	37	65%

Finally and to extend the results of the data presented in Table 9 it is interesting to examine what distribution the unknown COD cases follow when the associated Autopsy report injuries are classified by MAIS. This data is summarised in Table 11 where it can be seen that these injuries do not follow the same distribution as either sets of data summarised in Table 9. Table 11 shows that a higher than expected proportion of thorax injuries were recorded as being the MAIS in unknown COD cases. Again this may be due to either an increased proportion of thorax injuries to these occupants or inaccuracies/data limitations of Autopsy reports.

Table 11: Cause of Death Other/Unknown case MAIS classifications

Other	MAIS	
	Count	Percentage
Head	11	33%
Neck/Spine	1	3%
Thorax	12	36%
Abdomen	2	6%
Extremities	0	0%
Other/Unknown	9	27%

Conclusions

This analysis has investigated the suitability of the NCIS as a data source for fatal road accidents. Data from two studies undertaken by the authors for and ARC funded research project has been used in this investigation. One study examined 2005 road crashes, using only the NCIS as a data source, while the other analysed contained rollover crash fatalities, utilising both the NCIS and data from states coroner's case files.

It was found that crash data recorded using only the NCIS resulted in a larger than acceptable number of unknown results for key rollover and non- rollover crash data quality indicators. When the higher level of data available in a coroner's case file was viewed the proportion of unknown results decrease significantly. This was achieved for all data quality indicators with the exception of vehicle speed.

It was also found that the level of injury data available in NCIS and coroner's case autopsy reports limited conclusions on severe/fatal injury frequency when considering Neck/Spine injuries. This was caused by a low level of reporting on the involvement of the spinal cord in the injury process. Autopsy reports were identified to contain a high quality level of injury data for other body regions.

Recommendations

For the identification of the type of crash event the NCIS is a very detailed and valuable resource. The limitations of the NCIS become clear when a higher level of information regarding the occupant, vehicle and/or road environment is sort. In many cases this information is available in the original coroners case from which the NCIS case was built but is not summarised in any data field or case report attached on the NCIS.

A major concern identified when considering occupant injury mechanics is the lack of autopsy report availability on the NCIS, despite the availability of this report on extraction of the coroner's case file. In addition the lack of information on the level of damage to the fatalities spinal cord also limited the coding of Spinal injuries.

Therefore it is recommended that researchers using the NCIS as a data source use its data as a tool for the identification of crash events (i.e. the occurrence of front, side, fixed object impact or rollover). If a more detailed analysis of the mechanisms of injury is required then the original coroner's case file will be required. This will maximise data availability and minimise the occurrence of miscoding crash data.

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