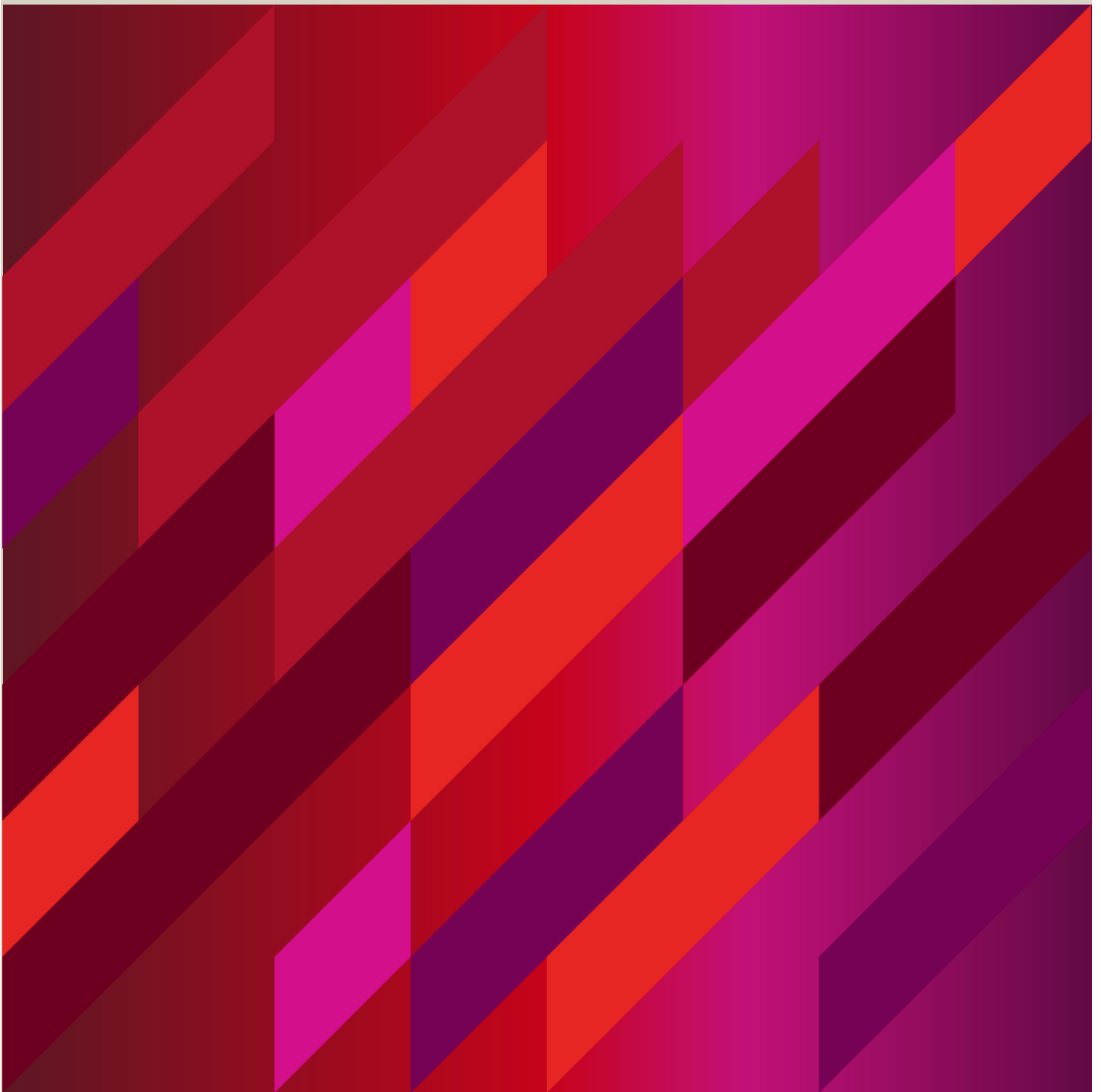# Stocktake of data sources for childhood injury in NSW

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Stocktake of data sources for childhood injury in NSW

Rebecca Mitchell and Luke Testa
Australian Institute of Health Innovation | Macquarie University

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Acknowledgements

Abbreviations

ABS	Australian Bureau of Statistics
ACI	Australian Institute of Criminology
AIHI	Australian Institute of Health Innovation
AIHW	Australian Institute of Health and Welfare
AIS	Abbreviated Injury Scale
APDC	Admitted Patient Data Collection
ARIA	Accessibility/Remoteness Index for Australia
ASGC	Australian Standard Geographical Classification
ASGS RA	Australian Statistical Geographical Standard Remoteness Area
ASSAD	Australian School Students' Alcohol and Drugs survey
BITRE	Bureau of Infrastructure, Transport and Regional Economics
BOSCAR	NSW Bureau of Crime Statistics and Research
CAD	Computer Aided Dispatch
CATI	Computer Assisted Telephone Interviewing
CCMS	Coronial Case Management System
CCOV	Coroner's Court of Victoria
CDRT	Child Death Review Team
CHeReL	Centre for Health Record Linkage
COD-URF	Cause of Death-Unit Record File
COPS	Computerised Operational Policing System
CTP	Compulsory Third Party Insurers
ED	Emergency Department
EDDC	Emergency Department Data Collection
EDWARD	Enterprise Data Warehouse for Analysis, Reporting and Decision Support
EFISS	Evaluation Framework for Injury Surveillance Systems
eMR	Electronic Medical Record
icare	Insurance and Care NSW
ICD-9-CM	International Classification of Diseases version 9, Clinical modification
ICD-10	International Classification of Diseases version 10
ICD-10-AM	International Classification of Diseases version 10, Australian-modification
ICECI	International Classification of External Causes of Injury
ISS	Injury Severity Score
ITIM	Institute of Trauma and Injury Management

KiDS	Key Information and Directory System
LCSA	Lifetime Care and Support Authority
LHD	Local Health District
MAIR	Motor Accidents Insurance Regulation
NCIS	National Coronial Information System
NDI	National Death Index
NHDD	National Health Data Dictionary
NMD	National Mortality Database
OHS	Occupational Health and Safety
PHCR	Patient Health Care Record
PHREDSS	Public Health Real-time Emergency Department Surveillance System
RBDM	Registry of Births Deaths and Marriages
SAPHARI	Secure Analytics for Population Health Research and Intelligence
SIRA	State Insurance Regulatory Authority
SLSA	Surf Life Saving Association
Snomed-CT	Systematized Nomenclature of Medicine - Clinical Terms
TMDS	Trauma Minimum Data Set
TOOCS	Type of Occurrence Classification System
WA	Western Australia
WHO	World Health Organization

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Executive Summary

Information gained from injury surveillance activities is used to provide an estimate of the burden of different types of injuries, describe the circumstances of injury events, monitor temporal injury trends, and to design and evaluate injury prevention strategies. For the most part, population-level information on injuries in New South Wales (NSW) is obtained from multiple administrative data collections that were not designed specifically to conduct injury surveillance. As such, the information obtained is not always ideal for injury surveillance purposes.

The NSW Paediatric Injury + Management Research Forum in August 2014 identified that there was a need to create a registry of data collections able to provide information on childhood injury in NSW. This report provides a stocktake of existing population-based data collections that are capable of providing information on injury mortality or morbidity in NSW involving children and young people aged 25 years or less.

A modified version of the Evaluation Framework for Injury Surveillance Systems (EFISS) was used to guide the collection of information on eight operational and four practical characteristics of each data collection. Information was obtained on each data collection using existing published materials, content knowledge, expert opinion, and through interviews with managers or data custodians.

There were three mortality-specific and 13 injury morbidity and/or mortality population-based data collections in NSW that could report on injuries to children and young people. Three population-based surveys that could report on injury of children and/or young people were also identified and described. None of the data collections examined were ideal to conduct injury surveillance of children and young people in NSW. Each data collection had both strengths and weaknesses across the 12 characteristics reviewed. There was particular variation in their ability to be used to conduct timely data analysis and information dissemination, in their use uniform classification systems for key data variables, and in access to data in the collection for potential data users.

This is the first time that a stocktake of all population-based data collections that record information on injuries involving children and young people in NSW has been conducted. The stocktake has provided key information regarding both the operational and practical characteristics of each of the population-based data collections in NSW to provide information for childhood injury surveillance purposes. It has also provided information that could assist in the development of suite of performance monitoring measures to monitor childhood injury reduction strategies in NSW.

1.   Introduction

Planning for the development and implementation of injury prevention strategies and injury prevention policy relies upon having good quality and timely information available from injury surveillance activities. Injury surveillance involves the ongoing, systematic collection, analysis and interpretation of data essential to the prevention, planning and evaluation of public health practice, with the timely dissemination of these data and their application to prevention and control [1].

Information from injury surveillance activities are routinely used to provide estimates of the burden of injury, to monitor temporal injury trends, detect clusters of events, design and prioritise strategies for injury prevention, develop injury prevention policies and to evaluate their impact[2-4]. In many cases, information on injuries is obtained from data collections that were designed for other administrative purposes, such as hospital separation or emergency department (ED) collections. As a result, not all data collections are able to provide the core information needed to conduct injury surveillance (i.e. the ability to describe what injuries occurred to whom, in which location, when they occurred and why [5, 6]).

In New South Wales (NSW), no one data collection is able to effectively capture all the information related to childhood injury and mortality. Neither is there a data repository where all injury-related data collections are stored. Instead, information on childhood injury in NSW is available using a wide range of both national and NSW-based data sources. In addition, there is no single data collection that records information across the injury continuum (i.e. from the identification of injury risk factors to a description of injury event circumstances to providing information on injury treatment to the assessment of injury outcomes) nor across the injury spectrum (i.e. minor, moderate or severe injury, and/or death).

Guidelines for the conduct of injury surveillance have been developed by the World Health Organization (WHO) [5]. As part of these guidelines, the WHO has recommended core and optional minimum data to be collected for injury surveillance. These core and optional minimum datasets can be boosted by adding supplementary data sets, where additional data can be collected for specific external causes of injury, such as motor vehicle crashes, or particular types of injuries, such as spinal cord injury.

The first NSW Paediatric Injury + Management Research Forum held in August 2014 identified that there was a need to create a registry of data collections that were capable of providing information on childhood injury in NSW. The registry could be used by decision makers,

researchers, clinicians and practitioners to identify relevant data collections that perform injury surveillance. It could also identify the strengths and limitations of different data collections on a range of criteria and this would be useful to aid in interpreting the results obtained using data from different data collections.

The Evaluation Framework for Injury Surveillance Systems (EFISS) [6] was developed to assess the overall ability of a data collection to conduct injury surveillance and can be a useful framework to report on the ability of data collections to undertake injury surveillance. The purpose of this research is to undertake a stocktake of existing population-based data collections that are capable of providing information on injury mortality or morbidity in NSW involving children and young people aged 25 years or less using a modified version of the EFISS.

2.   Method

This section describes how the research was conducted. Section 2.1 describes the components of the EFISS and Section 2.2 outlines the method of information extraction and conduct of the data custodian interviews. Ethical approval for this project was obtained from the Macquarie University Medical Sciences ethics committee (Approval number: 5201500533).

2.1   Evaluation Framework for Injury Surveillance Systems

To conduct the stocktake, a modified version of the EFISS [6] was used to collate information on each data collection. There are three main components of the EFISS and these assess: (i) data quality, (ii) operational ability; and (ii) practical characteristics of a data collection to perform injury surveillance.

Only two EFISS characteristics, operational ability and practical characteristics, were examined for the stocktake. An assessment of the data quality of each data collection was considered to be outside the scope of this research, however where previous data quality assessments have been published, findings from these evaluation studies have been reported.

An assessment of the operational ability of a data collection to perform injury surveillance involved examining eight characteristics, namely the purpose and objectives of the data collection, how the data were collected, the definitions that are used to identify the cohort of interest, the timeliness of reporting of the data, the uniformity of the classification system(s) used to classify data variables, whether any quality control measures are used, data confidentiality, individual privacy, and system security (Table 2.1).

An assessment of the practical characteristics of a data collection assessed four characteristics including data accessibility, how routinely data analyses are performed, the presence and availability of guidance material to aid interpretation of data from the data collection, and usefulness of the data collection to contribute to the identification of potential key areas for injury preventive action in terms of the ability to: (a) identify new and/or emerging injury mechanisms; (b) monitor injury trends over time; and (c) describe key characteristics of the injured population (Table 2.2). The assessment of the practical characteristic of usefulness involved the assessment of the ability to describe key characteristics of the injured population. These key characteristics refer to the WHO's core minimum data set for injury surveillance that includes being able to report on individual demographics (i.e. age, sex), the circumstances of the injury event (i.e. intent, activity, place of occurrence, mechanism of injury), and the injury outcome (i.e. nature of injury).

Both the operational and practical characteristics of each data collection were rated using the EFISS rating system. The EFISS four-level rating scheme was used for the majority of operational and practical characteristics and is composed of I - *very high*, II - *high*, III - *low*, and IV - *very low*. For two operational and practical characteristics a dichotomous scale was used, composed of I - *very high* and IV - *very low*.

2.2   Information on data collections and data custodian interviews

The population-based data collections that are capable of providing information on injury mortality and/or morbidity involving children and young people in NSW were identified from expert knowledge and from available published literature regarding childhood injury in NSW.

Information was obtained on each data collection using existing published materials, content knowledge, expert opinion, and/or through interviews with managers or data custodians. Where interviews were conducted, information was obtained on the operational and practical characteristics of each data collection (Appendix 1). Using the EFISS, the strengths and limitations of each data collection were identified, along with gaps in existing population-based childhood injury surveillance data coverage.

Table 2.1: Definitional and rating criteria for the operational characteristics of the evaluation framework for injury surveillance systems

Operational characteristics	EFISS definition		Rating criteria
Purpose and objectives	The purpose of the injury surveillance system, the reason why the system exists, and objectives of the injury surveillance system, what the information from the system is used for, should be described.	I	If the purpose and/or objectives of the data collection include injury surveillance, it rates as *very high*.
		II	If the purpose and/or objectives of the data collection include monitoring of trends or conducting research, it rates as *high*.
		III	If the purpose and/or objectives of the data collection include other rationales, such as resource allocation or planning, it rates as *low*.
		IV	If the purpose and/or objectives of the data collection are not stated, it rates as *very low*.
Data collection process	The method of data collection for an injury surveillance system and the number of steps involved in data collection should be examined using a data collection flow chart.	I	If the data collection process takes one to three steps to complete, it rates as *very high*.
		II	If the data collection process takes four to six steps to complete, it rates as *high*.
		III	If the data collection process takes seven to nine steps to complete, it rates as *low*.
		IV	If the data collection process takes ten or more steps to complete, it rates as *very low*.
Case definition	The injury case definition adopted by an injury surveillance system to identify cases should be described.	I	If variables in the data collection can identify the injury cases of interest it rates as *very high*.
		IV	If variables in the data collection cannot identify injury cases of interest it rates as *very low*.
Timeliness	Timeliness will refer to the time taken to accomplish each of the three surveillance phases of: (i) data collection; (ii) data analysis and interpretation; and (iii) dissemination.	I	If the time taken to complete data collection, data analysis, interpretation and dissemination is daily to monthly, it rates as *very high*.
		II	If the time taken to complete data collection, data analysis, interpretation and dissemination is annual to biennial, it rates as *high.*
		III	If the time taken to complete data collection, data analysis, interpretation and dissemination is greater than biennial, it rates as *low*
		IV	If data is not either routinely collected, analysed, interpreted or disseminated, it rates as *very low*.
Uniform classification systems	The classification system(s) used to record information in the injury surveillance system for variables in the WHO's core minimum and optimal data sets for injury surveillance should be identified.	I	If standard classification systems are used to record information for 76 to 100% of variables in the core minimum and optional data sets for injury surveillance, it rates as *very high*.
		II	If standard classification systems are used to record information for 51 to 75% of variables in the core minimum and optional data sets for injury surveillance, it rates as *high*.
		III	If standard classification systems are used to record information for 26 to 50% of variables in the core minimum and optional data sets for injury surveillance, it rates as *low*.

Operational characteristics	EFISS definition		Rating criteria
		IV	If standard classification systems are not used or are used to record information for less than 25% of variables in the core minimum and optional data sets for injury surveillance, it rates as *very low*.
Quality control measures	The quality control measures regularly utilised by the agency responsible for the injury surveillance system should be identified.	I	If quality control measures are in place and are conducted, it rates as *very high*.
		IV	If there are no quality control measures in place, it rates as *very low*.
Confidentiality and privacy	The methods by which an individual's information in the injury surveillance system is safe guarded against disclosure should be described.	I	If data users are required to sign a confidentiality and/or data security agreement, it rates as *very high*.
		IV	If data users are not required to sign a confidentiality and/or data security agreement, it rates as *very low*.
System security	The data access requirements (e.g. password protection) that safe guard against the disclosure of confidential information should be described.	I	If there are data access procedures in place (e.g. password protection) to safe guard against the disclosure of confidential information, it rates as *very high*.
		IV	If there are no data access procedures in place to safe guard against the disclosure of confidential information, it rates as *very low*.

Table 2.2: Definitional and rating criteria for the practical characteristics of the evaluation framework for injury surveillance systems

Practical characteristics	EFISS definition		Rating criteria
Data accessibility	The method by which potential data users access data from the injury surveillance system should be reported.	I	If data is accessible for data users in unit record format from an internet-based interface and/or data warehouse (or similar), it rates as *very high*.
		II	If data is accessible for data users in unit record format from a CD-ROM (or other data storage device), it rates as *high*.
		III	If data is accessible for data users in an aggregate format only, it rates as *low*.
		IV	If data is not accessible by data users, it rates as *very low*.
Usefulness	Usefulness will refer to the ability to contribute to the identification of potential key areas for preventive action in terms of the ability to: (a) identify new and/or emerging injury mechanisms; (b) monitor injury trends over time; and (c) describe key characteristics of the injured population (i.e. WHO's core minimum and optimal data sets for injury surveillance).	I	If the data collection contains 76 to 100% of variables in the core minimum and optional data sets for injury surveillance, it rates as *very high*.
		II	If the data collection contains 51 to 75% of variables in the core minimum and optional data sets for injury surveillance, it rates as *high*.
		III	If the data collection contains 26 to 50% of variables in the core minimum and optional data sets for injury surveillance, it rates as *low*.
		IV	If the data collection contains less than 25% of variables in the core minimum and optional data sets for injury surveillance, it rates as *very low*.
Data analysis	The routine data analyses conducted using data from the injury surveillance system by the agency responsible for the surveillance system should be described.	I	If data analysis is conducted daily to monthly or on request and results of this analysis are available for all data users, it rates as *very high*.
		II	If data analysis is conducted annually to biennially and results of this analysis are available for all data users, it rates as *high*.
		III	If data analysis is conducted greater than biennially and results of this analysis are available for all data users, it rates as *low*.
		IV	If data analysis is not conducted, it rates as *very low*.
Guidance material to aid data interpretation	The availability of guidance material on the interpretation of data from the injury surveillance system should be described.	I	If there is an up-to-date data dictionary, manual or data user's guide and routine contact with data users regarding data analysis issues to aid data interpretation, it rates as *very high*.
		II	If there is an up-to-date data dictionary, manual or data user's guide to aid data interpretation, it rates as *high*.
		III	If there is a data dictionary, manual or data user's guide to aid data interpretation, but this documentation in not kept up-to-date, it rates as *low*.
		IV	If there is no documentation or guidance material to aid data interpretation, it rates as *very low*.

3.   Results

The results are reported in three sections. Section 3.1 describes the injury mortality-specific data collections and Section 3.2 describes injury morbidity data collections some of which also record information on mortality. Section 3.3 describes population-based surveys that have previously collected information on childhood injury morbidity.

3.1   Mortality-specific data collections

There are three key mortality-specific data collections that provide information on deaths involving young people in NSW at a population-level. These are the Cause of Death-Unit Record File (COD-URF), the NSW Child Death Review Team Child Deaths Register, and the National Coronial Information System (NCIS). There are several data collections that report on both injury morbidity and mortality in NSW and these are described in Section 3.2.

There are also national mortality data collections that are able to provide information on injury-related deaths in NSW, such as the Australian Institute of Health and Welfare's (AIHW) National Death Index (NDI) and the National Mortality Database (NMD). Access to these two data collections are not provided to external users, although the NDI is able to be accessed by external users through the AIHW for data linkage research. The Bureau of Infrastructure, Transport and Regional Economics (BITRE) has an Australian Road Death Database, which is generated from data obtained from police-reports of fatal road crashes provided by each Australian jurisdiction. The Royal Life Saving Society of Australia has a national fatal drowning database with data obtained from the NCIS, coronial offices and media reports. The Australian Institute of Criminology (AIC) has a national homicide monitoring program where information is obtained from police, coronial records, investigating officers, media and other information reports. The AIC, AIHW, the BITRE and Royal Life Saving Society mortality data collections are largely generated based on data collections that are described in Sections 3.1 or 3.2 of this report and are therefore not described further in this report.

3.1.1   Cause of Death-Unit Record File

3.1.1.1 Operational characteristics of the COD-URF mortality data file

Purpose and objectives of the collection

The purpose of the COD-URF is to record statistical information on the causes of death of individuals in Australia. There are four identified key uses of the COD-URF mortality data:

- to conduct population-based health research and policy development, monitoring or evaluation;
- to investigate potential research questions (i.e. testing hypotheses and pilot studies);
- for follow-up and comparison of different treatment regimens; and
- to investigate morbidities and outcomes of specific diseases [7].

As the purpose and objectives of the COD-URF mortality data file included conducting research, but did not specify the conduct of injury surveillance, the purpose of COD-URF for injury surveillance was rated as II - *high*.

Data collection process

Information for the COD-URF mortality data file is obtained from the Births, Deaths and Marriages Registrar in each state and territory in Australia. Included within the NSW deaths register is information regarding all deaths that occurred and were registered with the Registry of Births Deaths and Marriages in NSW under the Births, Deaths and Marriages Registration Act 1995 No 62 [8].

The process of data collection for NSW deaths for the mortality data file is summarised as follows: from when a death occurs, the data collection process can take up to six steps to complete until the data reaches the Australian Coordinating Registry (i.e. from the certification of the cause of death from the coroner and/or pathologist or medical practitioner, production of the death certificate, registration of the death by the funeral director, recording of the death by the NSW Registrar, to obtaining supplementary data from the ABS and the NCIS, to information being received by the Australian Coordinating Registry). As the data collection process for the COD-URF mortality data file can take between four and six steps to complete, it was rated as II - *high*.

Case definition

The operational case definitions for injury-related fatal injuries in the COD-URF mortality data file are described in Table 3.1. Mortality data from the COD-URF is available post-2006 from the Australian Coordinating Registry for approved users. The Australian Coordinating Registry is based at the Queensland Registry of Births Deaths and Marriages. Mortality data prior to 2006 is available in summary form from the Australian Bureau of Statistics (ABS) or the AIHW.

Injury deaths can be identified in the mortality data file using the International Classification of Diseases version 10 (ICD-10) external cause codes [9]. Both unintentional and intentional deaths

can be identified using the ICD-10 classifications. Injury-related deaths involving children and young people in NSW can be identified using the age at death data variable and the state/territory of registration. As injury-related deaths of children and young people can be identified in the COD-URF data, the case definition was rated as I - *very high*.

Table 3.1: Identification of fatal injury involving children and young people in NSW within the COD-URF mortality data file

	Case definition
Fatal injury	
Operational definition	ICD-10 classification of the cause of death can identify injury-related deaths (ICD-10: V01-Y98). The age at death data variable can identify deaths involving children and young people, and the state/territory of registration can identify deaths registered in NSW.[1]

[1] Note the Australian Coordinating Registry has indicated that if a person who usually resides in NSW died in another Australian jurisdiction, then their mortality record will not be available in the NSW COD-URF file [7].

Timeliness

Data are sent electronically each month from the NSW death register to the ABS, where coding of the causes of death using ICD-10 [9] are largely conducted automatically. However, some external cause deaths are classified by specialist coders [10]. Once data has been collected and the cause of death classified, the data are securely provided to the Australian Coordinating Registry on an annual basis around July of each year.

The Australian Coordinating Registry does not analyse and report on mortality data for NSW. However, other agencies, such as the ABS and the AIHW regularly analyse mortality data from the COD-URF mortality data file and report on cause of death trends for the primary causes of death (including injury) in Australia, usually every 15 months. Overall, for the COD-URF mortality data file, the three surveillance phases of data collection, data analysis, and dissemination take roughly 15 months to complete from the end of each calendar year. As the time taken to complete the three surveillance phases was between one and two years, timeliness was rated as II - *high*.

Uniform classification systems

The WHO core minimum and optional injury surveillance data variables that are collected in the COD-URF mortality data file regarding the deceased individual are classified using a number of standard classification systems. Three data variables from the WHO core minimum data set (i.e. intent, nature of injury/cause of death, injury mechanism) [5] and one data variable in the WHO's core optional data set (i.e. external causes) [5] in the COD-URF mortality data file are classified using either ICD-10 [9] (i.e. intent, nature and mechanism of injury, external cause), the National Health Data Dictionary (NHDD) [11] (i.e. sex, indigenous origin, state/territory of usual residence) and the Australian Statistical Geographical Standard Remoteness Area (ASGS RA) (i.e. Statistical Area Level 2 of usual residence of the deceased) [12]. As standard classification systems were used to record information for all the variables from the WHO's core minimum and optional data set available in the COD-URF mortality data file, uniform classification systems were rated as I - *very high*.

Quality control measures

A number of mechanisms are utilised by the Australian Coordinating Registry to try to ensure that the COD-URF mortality data file contains good quality data. For example, a User's Guide for the COD-URF mortality data file [13] provides descriptive information on the COD-URF minimum data set to assist data analysts in analysing COD-URF mortality data. Information is also available on the quality of external cause data used to classify the cause of death [14].

The data custodians of the COD-URF undertake a number of quality assurance checks on the mortality data before it is supplied to the Australian Coordinating Registry. Supplementary information is obtained from the NCIS (i.e. information on the cause of death) (see Section 3.1.3) and the ABS (i.e. classification of the cause of death using ICD-10) to complete the COD-URF mortality data file and this information is also reviewed. The ABS performs routine classification checks on the cause of death data, which include edit checks of individual unit records, and also edit checks of aggregated data [14]. As quality control measures are undertaken on the COD-URF mortality data, this characteristic was rated as I - *very high*.

For some deaths, the cause of death may not be available at the time of death registration and these deaths may be registered as being due to an 'other accidental or unspecified cause' [10, 14]. From 2006, as coronial investigations of death can remain 'open' for up to three years, three revisions of the annual COD-URF mortality data files are issued. Therefore, for each calendar year of COD-URF mortality data there are three iterations of the mortality dataset: (i) preliminary; (ii)

revised; and (iii) final. The final COD-URF mortality dataset is not available until at least four years after the release of the preliminary dataset.

Confidentiality, privacy, and system security

Only approved users may have access to the COD-URF mortality data file. An '*application for cause of death unit record file for general requests*', an '*application for cause of death unit record file for data linkage*' or an '*application for cause of death unit record file for repeat request and supplementary use*' must be made by potential users to the COD-URF. Applications are accepted at least three times a year by the Australian Coordinating Registry. Approval for use of the COD-URF will only be provided where: (i) the purpose of data access is in the public good, which may include research that benefits the community; and (ii) the data must be managed in such a way as to protect an individual's privacy [7]. During the application processes, a declaration must be signed by the 'principal requester' that specifies the use of the mortality data, the output that will be reported, data security measures, and agreement to pay the cost of being provided with access to the mortality data. Penalties exist for conducting activities that breach any of the declaration requirements, including revoked access to mortality data and/or restricted access to future mortality data. As there is a data security agreement required for the COD-URF data, confidentiality and privacy were rated as I - *very high*.

The COD-URF data is located in the Queensland Department of Justice and Attorney-General and access is restricted to two administrators. The computer network at the Department is routinely audited to ensure that data security and access approvals are adhered to. At the Australian Coordinating Registry only specific users have access to the COD-URF data, with each of the approved users computers being password protected. All COD-URF data is encrypted with a password and there are general business rules in place for the protection of COD-URF data, including that no files are to be saved to desktops or in any other locations within the Registry's systems other than the specific COD-URF drives. As the Australian Coordinating Registry have procedures in place to ensure the security of the COD-URF mortality data, including password protected data access, system security was rated as I - *very high*.

3.1.1.2 Practical characteristics of the COD-URF mortality data file

Data accessibility

The COD-URF mortality data file is distributed to 'approved users' for a nominal fee (currently $2,200 + GST for a general application and $3,500 + GST for a data linkage application). Approved users are individuals or agencies who have been approved by the Australian Coordinating Registry for data access and are often, for example, academics, students or agencies conducting teaching or research. Agencies such as national and state government departments can also apply to access the COD-URF mortality data file. COD-URF data is available to users via email with all files being encrypted using AES 256 bit encryption. Passwords/ phrases to unencrypt a mortality data extract are provided to data users over the telephone. In the future, the Australian Coordinating Registry is moving to both receive and supply the COD-URF data via secure file transfer protocol. As unit record data are accessible to data users via email from an electronic encrypted source data accessibility was rated as II - *high*.

Usefulness

The usefulness of the COD-URF mortality data file to identify key areas for preventive action, in terms of identifying new or emerging injury mechanisms and its ability to monitor injury trends over time, is variable. The mortality data file does not have the capability to easily detect new and/or emerging injury incidents in a timely manner, so it is not particularly useful for this purpose. However, the mortality data file is able to be used to identify injury mortality trends over time by identifying injury mechanisms using the ICD-10 [9] external cause categories.

The usefulness of the mortality data file to describe the key characteristics of fatally injured children and young people is mixed. The COD-URF mortality data file contains six data variables from the WHO's core minimum data set [5], and four data variables from the WHO's core optional data set [5] (Table 3.2). This represents 75.0% of the WHO's core minimum data set, which was rated as I - *very high* and 40.0% of the WHO's core optional data set, which was rated as III - *low*.

Table 3.2: Assessment of the COD-URF mortality data file against the WHO's core minimum and optional data sets for injury surveillance

WHO's core minimum data set	Data present[1]	WHO's core optional data set	Data present[1]
Identifier	Y	Indigenous origin	Y
Age	Y	Date of injury	N
Sex	Y	Time of injury	N
Intent	Y	External cause	Y
Activity	N	Residence	Y
Place of occurrence	N	Alcohol a factor	N
Nature of injury/ cause of death	Y	Other drugs a factor	N
Mechanism of injury	Y	Injury severity	N/A
		Disposition (i.e. patient outcome)	Y
		Incident summary	N

[1] Y= yes; N=no; N/A=not applicable.

Data analysis and guidance material to aid data interpretation

The Australian Coordinating Registry does not analyse and report on mortality data. However, other agencies, such as the ABS, regularly analyse mortality data from the COD-URF mortality data file and report on cause of death trends for the primary causes of death (including injury) in Australia usually every 15 months. Currently, the ABS does not routinely monitor specific patterns of injury-related deaths among children and young people. However, agencies, such as the AIHW and the NSW Ministry of Health, are able to report on injury-related deaths, including those involving children and young people, but these are done on an ad hoc basis and sometimes only for particular injury mechanisms. Therefore, data analysis of injury-related deaths involving children and young people in NSW was rated as III - *low*.

To aid in the interpretation of mortality data from the COD-URF mortality data file, the Australian Coordinating Registry has produced a COD-URF User's Guide [13]. In addition, there is an ABS information paper that outlines issues pertaining to the quality of external cause data [14] and a technical report that describes issues associated with injury deaths in Australia published by the AIHW [15]. On this basis, guidance material to aid data interpretation of mortality data from the COD-URF was rated as I - *very high*.

Data quality assessment

The data quality of the predecessor of the COD-URF mortality data file, the ABS mortality data file, has been examined for injury mortality. In 2003-04 and in 2004-05, it was identified that the ABS mortality data underestimated the number of fatal injuries in Australia, particularly for intentional self-harm, assault-related deaths Australia-wide and for motor vehicle crashes in NSW, and overestimated the number of unintentional injuries by injury mechanisms common among self-harm and homicides, such as hanging and shooting [16, 17]. Harrison et al [18] conducted a review of the identification of intentional self-harm-related deaths in ABS mortality data during 1997 to 2006 and identified upwards of a 16% underestimation of suicide deaths in Australia. The subsequent adoption of the release of three iterations (i.e. preliminary, revised, and final) of the COD-URF mortality data have assisted in reducing the under-enumeration of the different types of fatal injuries in the final version of the COD-URF data.

Where information is not available regarding a cause of death, the ABS will classify the death as ICD-10: R99 (i.e. 'other ill-defined and unspecified causes of mortality). The preliminary COD-URF mortality data extract will have more R99 classifications than the final COD-URF mortality data extract. For example, the 2007 preliminary release of COD-URF morality data had 1,160 coroner-certified deaths classified as R99 and the final release had 283 coroner-certified deaths classified to R99 [15]. Therefore, the final release of the COD-URF mortality data will have less under-enumeration of injury mortality than earlier releases (i.e. the preliminary or revised releases) of the COD-URF mortality data.

3.1.2 Child Death Review Team Child Deaths Register

3.1.2.1 Operational characteristics of the Child Deaths Register

Purpose and objectives of the collection

The stated purpose of the NSW Child Death Review Team (CDRT) Child Death Register is to prevent and reduce the likelihood of child deaths in NSW. There are four main objectives of the Child Death Register which are to:

- act as a register for child deaths in NSW;

- classify deaths according to cause, demographic criteria and other relevant factors, and to identify trends and patterns relating to those deaths;

- enable research that aims to help prevent or reduce the likelihood of child deaths, and to identify areas requiring further research; and

- enable recommendations as to legislation, policies, practices and services for implementation by government and nongovernment agencies and the community to prevent or reduce the likelihood of child deaths [19].

As the purpose and/or objectives of the Child Death Register included to monitor trends and to conduct research, the purpose of the Register to conduct injury surveillance was rated as II - *high*.

Data collection process

The CDRT was established in 1995 and based at the NSW Commission for Children and Young People. One of the functions of the CDRT under the *Commission for Children and Young People Act 1988* (Section 7A since repealed) was to maintain a Child Death Register consisting of deaths of children aged less than 18 years where their death was registered in NSW. The Commission for Children and Young People maintained the Child Death Register from 1996 to 2010. In 2007, the CDRT's functions were extended to also include the deaths of children who usually resided in NSW, but who died interstate. Following Justice Wood's Inquiry into Child Protection Services in 2008, the responsibility of the CDRT was transferred in February 2011 to the NSW Ombudsman under the *Children Legislation Amendment (Child Death Review Team) Act 2011 No 60*.

The Child Death Register obtains information on child deaths in NSW from multiple sources. The NSW Registrar of Births Deaths and Marriages provides a list of all deaths of young people aged 0-17 years at their time of death. Additional information is able to be sought from any NSW government department, statutory body or local authority, from NSW Police, the NSW Coroner, medical practitioners, healthcare professionals, or agencies that provide services to children. As

the number of data sources providing information for the Child Deaths Register can vary for each death with detailed information being collected, the data collection process for the Child Death Register was estimated to take between seven to nine steps to complete and it was rated as III - *low*.

Case definition

The operational case definitions for fatal injuries involving children and young people in the Child Deaths Register are described in Table 3.3. The CDRT considers deaths involving young people aged 0 to 17 years. Injury-related deaths can be identified in the Child Death Register using the International Classification of Diseases version 10 Australian Modification (ICD-10-AM) classifications of the cause of death. Both unintentional and intentional deaths can be identified using the ICD-10-AM classifications. Injury-related deaths involving children and young people in NSW can be identified using the age at death and the state of residence data variables. As injury-related deaths of children and young people can be identified in the Child Death Register, the case definition was rated as I - *very high*.

Table 3.3 Identification of fatal injury involving children and young people within the Child Deaths Register

	Case definition
Fatal injury	
Operational definition	Injury deaths in the Child Death Register are identified using the ICD-10-AM classifications of the cause of death. The age at death can identify deaths involving children and young people aged less than 18 years, and the state of residence can identify deaths of NSW residents.

Timeliness

The timeliness of the three surveillance phases of data collection, data analysis and interpretation, and dissemination for the Child Death Register are variable. For the Child Death Register, NSW mortality data are transferred daily from the NSW Registrar of Births, Deaths and Marriages to the NSW Ombudsman. The NSW Ombudsman may then request additional information on a death from a number of government agencies and/or health professionals. The NSW Ombudsman is required under the *Children Legislation Amendment (Child Death Review Team) Act 2011 No 60* to analyse data from the Child Death Register to identify patterns and trends in deaths of young

people and to provide a report to the NSW Parliament regarding their findings each year. These annual reports consider all deaths of young people, not just those as a result of traumatic injury, and are available from the Office of the NSW Ombudsman's website. As the time taken to complete data collection, analysis, interpretation and dissemination of information regarding injury mortality of children and young people was conducted between annually and biennially, timeliness was rated as II - *high*.

Uniform classification systems

The WHO core minimum and optional data variables that are collected in the Child Death Register regarding the deceased individual are classified using a number of standard classification systems. All of the data variables in WHO's core minimum and core optional data sets [5] are collected by the Child Death Register. Six data variables from the WHO's core minimum and three data variables from the WHO's core optional data sets [5] collected by the Child Death Register are classified using existing classification frameworks, including ICD-10-AM [20] (i.e. intent, nature and mechanism of injury, external cause), the NHDD [11] (i.e. sex, indigenous origin), and the Accessibility/Remoteness Index for Australia (ARIA) [21] (i.e. place of occurrence for transport-related incidents). The classification scheme for 'place of occurrence' varies, depending on the type of incident. For example, ARIA is used for place of occurrence for transport crashes and taxonomies largely based on ICD-10-AM, but containing additional location classifications for specific types of deaths, such as drowning, were used for other injurious incidents. Standard classification systems are used to record 75.0% of the WHO's core minimum and 30.0% of the WHO's core optional data sets by the Child Death Register, therefore, uniform classification systems were rated as II - *high* and III - *low*, respectively.

Quality control measures

Data in the Child Death Register undergoes a number of quality checks and cross-verification checks between multiple data sources to try to ensure that the Register contains good quality data. There is a technical specification for the Child Death Register that contains a minimum data set for the data collection. A Classification Manual is currently been updated for the Child Death Register. As quality control measures are conducted on the Child Death Register, this characteristic was rated as I - *very high*.

Confidentiality, privacy, and system security

Only authorised users who are team-related people (i.e. Child Death Review Team) or who are expert advisors are able to access information from the Child Death Register. These individuals must have signed a confidentiality agreement. As there is a confidentiality agreement required, confidentiality and privacy were rated as I – *very high*.

Individuals who wishes to access data from the Child Deaths Register must first log onto a secure system using individual passwords and have the appropriate access rights. As there is password protected access to the Child Death Register, system security was rated as I - *very high*.

3.1.2.2 Practical characteristics of the Child Deaths Register
Data accessibility

From August 2014 an integrated death register was introduced for the Child Deaths Register. The register sits on a SQL server platform and incorporates data and other information from reviews of deaths of children and young people in NSW and deaths of certain children and people with a disability that are reviewable by the NSW Ombudsman. Data from the Child Death Register can only be accessed by team-related people or expert advisors who have been granted access to the data, through individual user identification and passwords. Unit record data from the Child Death Register is not made available to external agencies, only aggregated data upon request. As unit record data are not accessible to external data users, data accessibility was rated as III - *low*.

Usefulness

The usefulness of data from the Child Death Register to identify key areas for preventive action, in terms of identifying new or emerging injury mechanisms and its ability to monitor injury trends over time, is high. As the CDRT has full and unrestricted access to records relating to the death of a young person, and/or their care arrangements, from a range of government agencies and health professionals, the CDRT has the ability to identify specific risk and contributing factors involved in the fatality. Data from the Child Death Register is able to be used to monitor trends in fatal injury of young people aged less than 18 years in NSW.

All of the data variables from the WHO's core minimum and optional data sets [5], where relevant, are present in the Child Death Register to describe the key characteristics of the injured population (Table 3.4). Therefore, the usefulness of the Child Death Register to describe the key characteristics of the fatally injured population was rated as I - *very high*.

Table 3.4 Assessment of the Child Deaths Register against the WHO's core minimum and optional data sets for injury surveillance

WHO's core minimum data set	Data present[1]	WHO's core optional data set	Data present[1]
Identifier	Y	Indigenous origin	Y
Age	Y	Date of injury	Y
Sex	Y	Time of injury	N, partial
Intent	Y	External cause	Y
Activity	Y, partial	Residence	Y
Place of occurrence	Y	Alcohol a factor	Y
Nature of injury	Y	Other drugs a factor	Y
Mechanism of injury	Y	Injury severity	N/A
		Disposition (i.e. patient outcome)	Y
		Incident summary	Y

[1] Y= yes; N=no, N/A=not applicable, Y, partial=could be available in text descriptions.

Data analysis and guidance material to aid data interpretation

The CDRT analyses mortality data in the Child Deaths Register and reports on trends and patterns in relation to these deaths on an annual basis. The CDRT annual and other reports relating to specific types of injury mechanisms, such as low speed vehicle run overs, are readily available on the NSW Ombudsmen website.

In addition, since 2002 the NSW Ombudsman has been reporting on *reviewable deaths* of young people aged less than 18 years in NSW. These are deaths where a child has died as a result of abuse or neglect, of if their death occurred in suspicious circumstances or, if at the time of the death, the child was in care or detention. As data analysis and reporting was conducted at least annually to biennially, data analysis of injury mortality using the Child Death Register was rated as II - *high*.

To assist with both the analysis and interpretation of data from the Child Death Register, a technical specification for the Register describes the data variables held within the Child Death Register and their coding frames, along with some notes to aid with data interpretation. A Classification Manual for the Child Death Register is currently being enhanced. On this basis, guidance material to aid data interpretation was rated as I – *very high*.

3.1.3 National Coronial Information System

3.1.3.1 Operational characteristics of the NCIS

Purpose and objectives of the collection

The stated purpose of the NCIS is to identify hazards and to act as a research tool for coroners, government agencies, and researchers who have a role or interest in public health and safety, injury surveillance, and policy development. There are four main objectives of the NCIS which are to:

- provide comprehensive and up-to-date data regarding the causes of preventable death;
- provide comprehensive and up-to-date data regarding trends in preventable death;
- identify similar coronial cases to assist coroners in investigating cases currently being held; and
- inform policy makers in the development of strategies to reduce the incidence of preventable death and injury [22].

As the purpose and/or objectives of the NCIS include performing injury surveillance, the purpose of the NCIS to conduct injury surveillance was rated as I - *very high*.

Data collection process

In NSW, information on deaths reportable to a coroner are collected by police. These deaths include: violent, unnatural, sudden deaths in suspicious or unusual circumstances; deaths where the individual was not-attended by a medical practitioner within three months of their death; deaths after receiving anaesthetic or undergoing an operation; and deaths within a year and a day after any incident to which the cause of death may be attributable. Initially, the police provide a notification of death to the coroner within 24 hours of a death being reported. This data is subject to change once further investigative information is received and/or a coronial inquest is either held or dispensed with. In NSW, coronial inquests can sometimes take up to 18 months or longer to be completed.

The data collection process in NSW is conducted in two streams. One stream collects information on the fatal incident and its causal factors and the second stream collects information on the cause of death and related factors. In stream one, from when the death occurs, it can take up to four steps for the data to reach the NCIS (i.e. from identification of a reportable death, notification of death to the coroner by police, collection of witness statements and other reports, entry into the NSW Coronial Case Management System (CCMS) to information being received by the NCIS). In stream two, following receipt of the deceased's body for post-mortem, there are three steps to

complete before the data reaches the NCIS (i.e. from receipt of the deceased's body, collection of the pathology and toxicology reports, to this information being sent to the NCIS). As the data collection process for the NCIS took between four and six steps to complete, it was rated as II - *high*.

In addition, the ABS provides information to the NCIS regarding the ICD-10 [9] external cause classifications for the causes of death for each closed coronial case. The Australian Standard Geographical Classification (ASGC) [23] codes are used to indicate the geographic location of both the deceased's usual residence and the address of the fatal incident. Currently, the geocoded data is classified in annual batches every 2 to 3 years, so ASGC classifications are not immediately available.

Case definition

The operational case definitions for fatal injuries involving children and young people in the NCIS are described in Table 3.5. Injury-related deaths can be identified in the NCIS using the case type at completion identifier and/or the ICD-10 classifications of the cause of death. Both unintentional and intentional deaths can be identified using the intent at case completion data variable and/or the ICD-10 classifications. Injury-related deaths involving children and young people in NSW can be identified using the age at death and the residential address (state) data variables. As injury-related deaths of children and young people can be identified in the NCIS data, the case definition was rated as I - *very high*.

Table 3.5 Identification of fatal injury involving children and young people in NSW within the NCIS

	Case definition
Fatal injury	
Operational definition	Injury deaths in the NCIS are identified using the case type at completion variable, where a death is identified as due to external causes (i.e. '2') and/or the ICD-10 classified cause of death. The age at death data variable can identify deaths involving children and young people, and the residential address (state) can identify deaths of NSW residents.

Timeliness

The timeliness of the three surveillance phases of data collection, data analysis and interpretation, and dissemination for the NCIS are mixed. For the NCIS, NSW mortality data are transferred on a nightly basis from the CCMS regarding new coronial cases (i.e. open cases). However, until a coronial case is closed – i.e. the case has been investigated, reviewed by the coroner and an inquest conducted or dispensed with – detailed information regarding the coronial case may not be available in the NCIS. Once a coronal case is closed information regarding the case is able to be accessed by approved users.

As at May 2015, the proportion of closed coronial cases for NSW varied by year [24]. The average proportion of closed cases for 2000 to 2015 was 89.0%, with a range from 99.2% in 2000 to 16.2% in 2015 [24]. There are also a range of attached text documents for records in the NCIS that can provide additional information regarding the circumstances of the injury incident (e.g. police report of death), however these are not always attached. In NSW, the proportion of text documents attached for NSW varied by year during 2000 to 2015 [25], with an average of 70% of autopsies (range 55% to 88%), 60% toxicological reports (range 20% to 89%), 64% of police reports (range 6% to 89%), and 69% of coronial findings (range 20% to 89%) attached [25]. Routine dissemination of descriptive injury mortality reports are not conducted. As there was no routine dissemination of information regarding injury mortality, timeliness was currently rated as IV - *very low*. However, NCIS staff do disseminate ad hoc injury-related data reports generated from external data requests.

Uniform classification systems

The WHO core minimum and optional data items that are collected in the NCIS regarding the deceased person are classified using a number of standard classification systems. Five data variables in WHO's core minimum and three data variables in WHO's core optional data sets [5] collected by the NCIS are classified using either the International Classification of External Causes of Injury (ICECI) [26] (i.e. activity, intent, place of occurrence, injury mechanism), ICD-10 [9] (i.e. external cause), the NHDD [11] (i.e. sex, indigenous origin) or the NCIS Data Dictionary [27] (i.e. place of occurrence). Standard classification systems were used to record 62.5% of the WHO's core minimum and 30.0% of the WHO's core optional data sets by the NCIS, therefore, uniform classification systems were rated as II - *high* and III - *low*, respectively.

Quality control measures

A number of mechanisms are employed to ensure that the NCIS contains good quality data. An NCIS Data Dictionary [27] contains descriptive information on the minimum data set for the collection, including information on case classification rules. There is also a Coding Manual and User Guide [22] that contains general information regarding the NCIS, conceptual definitions, coding guidelines and rules, coding tips, case studies, and example coding for particular types of injury mechanisms. The NCIS quality assurance team conducts regular data quality checks of all closed coronial cases to identify various data coding anomalies. This involves the examination of the use of invalid codes, missing data, use of extreme values, or identification of unusual data patterns.

To assist users of the NCIS to appropriately query and search the NCIS for particular causes of death (e.g. poisoning deaths), an NCIS Search Manual [28] has been developed. Training sessions have also been conducted with users of the NCIS regarding case selection methods, query design, and case searching techniques. On an ad hoc basis, an NCIS newsletter is distributed electronically to users of the NCIS. The newsletter discusses various coding tips, provides information on any enhancements to the NCIS, and changes in coding guidelines. As the NCIS conducts quality control measures, this characteristic was rated as I - *very high*.

Confidentiality, privacy, and system security

Only authorised users who have entered into an NCIS Access Agreement have password protected access to NCIS via a secure internet site. This agreement covers issues such as disclosure or publication of information, privacy concerns, data linkage, NCIS acknowledgement, copyright and intellectual property, and sets out a process for suspension or termination of data access following breaches of any of the terms of the Access Agreement.

Authorised NCIS users are also asked to comply with an NCIS privacy protocol, contained within the NCIS Access Agreement, that outlines the NCIS terms for data access, data security, use and disclosure of data, and data archiving. As there is an NCIS Access Agreement, the NCIS has data security procedures in place and access is password protected, confidentiality and privacy, and system security characteristics were both rated as I - *very high*.

3.1.3.2   Practical characteristics of the NCIS

Data accessibility

Data in the NCIS is accessed by the majority of NCIS users over a password protected on-line internet site. Once accessed, unit record data are available for download and analysis. Either level one (i.e. all data on open and closed coronial cases and attached documents on closed cases) or level two (i.e. non-identifying data on closed cases) access is provided to NCIS users.

Potential users of the NCIS are required to obtain ethical approval for their research from the Victorian Department of Justice Research Ethics Committee and also their institution's ethics committee. Each application is also reviewed by the NCIS Research Committee. Users are also required to pay an annual subscription fee to the NCIS (currently $2,750 for universities and research institutions). If level one information is required on deaths registered in Western Australia (WA) (e.g. a NSW resident fatally injured in WA), then an additional ethics application must also be submitted and approved by the WA Coronial Ethics Committee, before access is granted to coronial data in WA. To examine deaths of NSW residents that occurred in Victoria, the Coroner's Court of Victoria (CCOV) research committee will review an application and approve access to Victorian mortality data. As unit record data are accessible to data users from an internet-based interface, data accessibility was rated as I - *very high*.

Usefulness

The usefulness of data from the NCIS to identify key areas for preventive action, in terms of identifying new or emerging injury mechanisms and its ability to monitor injury trends over time, is limited. The NCIS does not have a mechanism for detecting emerging issues. However, all NCIS users are able to report an 'issue of concern', if they become aware of any trends or patterns of injury mortality that should be brought to the attention of the Australian coroners.

In the long term, the NCIS is able to be used to identify injury mortality trends over time, once coronial cases are closed. However, due to the variability in the length of some coronial inquests, the time till case closure varies and mortality data on all cases in a given year may not be available to accurately examine annual injury mortality trends. Driscoll et al [29] stated that if mortality data were extracted from the NCIS roughly 18 months after the end of calendar year then data from the NCIS could be used to describe population-based injury mortality for a calendar year.

The usefulness of the NCIS mortality data to describe the key characteristics of the fatally injured population was rated as I - *very high*. All of the data variables from the WHO's core minimum

and optional data sets [5], where relevant, are present in the NCIS to describe the key characteristics of the injured population (Table 3.6).

Table 3.6 Assessment of the NCIS against the WHO's core minimum and optional data sets for injury surveillance

WHO's core minimum data set	Data present[1]	WHO's core optional data set	Data present[1]
Identifier	Y	Indigenous origin	Y
Age	Y	Date of injury	Y
Sex	Y	Time of injury	Y
Intent	Y	External cause	Y
Activity	Y	Residence	Y
Place of occurrence	Y	Alcohol a factor	Y
Nature of injury	Y	Other drugs a factor	Y
Mechanism of injury	Y	Injury severity	N/A
		Disposition (i.e. patient outcome)	Y
		Incident summary	Y

[1] Y= yes; N=no, N/A=not applicable.

Data analysis and guidance material to aid data interpretation

The NCIS staff currently analyse mortality data from the NCIS to provide information on particular types of injury deaths on request (e.g. product-related deaths) and these reports are listed on the NCIS website and are readily available. These ad hoc data requests could include particular types of injury-related deaths of children and young people but are not conducted on a routine annual basis. Therefore, data analysis of injury mortality of children and young people in NSW using data from the NCIS was rated as III - *low*.

To assist with both the analysis and interpretation of data from the NCIS, NCIS staff have developed a Manual [28] that describes the process of querying and searching the NCIS and have also conducted workshops for users of the data. Information is provided on the NCIS website regarding the proportion of closed and open coronial cases in the NCIS, and also on the proportion of attached additional documents, for each Australian state and territory to aid the determination of the availability of information regarding coronial cases in the NCIS. On this basis, guidance material to aid data interpretation was rated as I - *very high*.

3.2   Injury morbidity and mortality data collections

There are 13 injury-related data collections that can provide population-based information on non-fatal and fatal injuries involving children and young people in NSW. These data collections range from patient injury and treatment data recorded though the use of ambulance services or medical services at hospitals in NSW, through to data recorded from compensation claims, such as for motor vehicle crash or work-related injuries, through to being injured on a NSW beach and having an injury treated by a surf life saver.

There are also national injury morbidity data collections that are able to provide information on injury-related hospitalisations and ED presentations in NSW, such as the AIHW's National Morbidity Data Base and the National Non-admitted Patient ED Care Database, with these data collections obtaining information on hospitalised injuries and ED presentations in NSW from the data collections described in Section 3.2.

3.2.1 Ambulance data collections

3.2.1.1 Operational characteristics of the Ambulance clinical records

Purpose and objectives of the collection

The purpose of the paper-based Patient Health Care Record (PHCR) and electronic medical record (eMR) are to form the official patient record for NSW Ambulance. The term clinical record will be used in this report to include the PHCR and the eMR. The clinical record captures information on each patient, their clinical history and out-of-hospital treatment. The information is used for a number of purposes, including:

- clinical governance;

- service planning;

- clinical research;

- funding submissions;

- legal activities; and

- workforce planning [30].

As the purpose and/or the objectives of the clinical record included the conduct of research, but did not specifically mention injury surveillance, the purpose of the clinical record to conduct injury surveillance was rated as II - *high*.

Data collection process

NSW Ambulance data collections contain operational information from the Computer Aided Dispatch (CAD) system, and information recorded by a paramedic in either a paper-based or electronic clinical record. A clinical record is required to be completed in all cases where a paramedic has been assigned to the case and has arrived at the scene. This encompasses instances where a patient is assessed and/or treated even if the patient is not transported to hospital; for all acute care cases, including admissions to hospital from a medical practitioner's premises; for inter-hospital facility transfers; for all casualty cases; for all standing-by at any incidents/events; where a paramedic assists to load/ unload a patient, even if no treatment has been administered; for all cases where the paramedics have arrived at the correct destination but the patient cannot be found or has left the scene; and for all cases where a patient is already deceased prior to the paramedics' arrival [30].

In terms of injury treatment, the clinical record captures information for episodes of care for injured patients who were either transported to a hospital, who remained at the scene following clinician assessment, or who died at the scene. From when the paramedic attends an injured individual, the data collection process for the electronic clinical record can take up to three steps to complete (i.e. from to data entry via a laptop computer to synchronisation to the eMR database, with completed cases sent to the state wide clinical data warehouse). For the paper-based clinical record, data collection can take up to three steps to complete (i.e. hard copy clinical record completed, data entry of clinical record and inclusion in a PHCR state wide database). As the data collection process for the clinical record takes between one to three steps to complete, it was rated as I – *very high*.

Case definition

The operational case definitions for an injury-related event involving children and young people in the clinical record are described in Table 3.7. Injury-related events can be identified in the clinical record using a number of data fields: if the main condition is indicated as 'major trauma' or 'trauma', if the subcategory is indicated as 'MVA single vehicle' (i.e. motor vehicle accident), if transport by-pass is indicated to be 'trauma', if the patient medical condition is indicated as an injury (e.g. fracture, laceration, contusion, burn), if there is incident information recorded regarding a vehicle collision and any vehicle deformity, if there was a care exclusion because of a head injury, or if the patient incident history text description contained information regarding an injury and/or the mechanism of injury. Injury-related events involving children and young people

in NSW can be identified using the patient's age or date of birth and the state of residence data variables, provided that these variables are recorded. As injury-related events of children and young people can be identified in the clinical record, the case definition was rated as I - *very high*. Using the disposition variable, deaths of children and young people can also be identified.

Table 3.7 Identification of fatal and non-fatal injury involving children and young people within the Ambulance clinical record

	Case definition
Injury	Injury-related events can be identified using a search of a combination of data variables described in the case definition section and/or the incident text description. The age of the patient data variable can be used to identify events involving children and young people, and the state of residence data variable can identify hospitalisations of NSW residents.
Operational definition	
Fatal injury	
Operational definition	Injury-related events can be identified using a search of a combination of data variables described in the case definition section and/or the incident text description. The age of the patient data variable can be used to identify events involving children and young people, and the state of residence data variable can identify hospitalisations of NSW residents. The disposition data variable can be used to identify deaths of individuals at the scene or on arrival at the ED.

Timeliness

The timeliness of the three surveillance phases of data collection, data analysis and interpretation, and dissemination for the clinical record can be variable. The clinical record is required to be completed on the same date that the injury treatment was provided, as close to the time of event as possible. For the paper-based clinical records the office copy of the form is sent for data entry and processing to NSW Ambulance state headquarters or one of three divisional administration offices. For the electronic clinical record, these are automatically provided to the state wide database as the data collection instrument (i.e. laptop computer) is synchronisation with the state wide database on a daily basis.

State wide data are able to be analysed by NSW Ambulance on an as needs basis, with NSW Ambulance disseminating information as required. As the time taken to complete the three surveillance phases could potentially be daily to monthly, timeliness was rated as I – *very high*.

Uniform classification systems

The WHO recommended core minimum and optional data variables that are collected in the clinical record are classified according to a non-standard classification system used by NSW Ambulance. For this reason, this characteristic was rated as IV - *very low*.

Quality control measures

Where the data provided in the clinical record are incomplete, the clinical record is meant to be returned to the attending paramedics for completion. Some data quality checks are conducted by NSW Ambulance on the clinical record database. There are field limiters for some data variables to only allow information to be entered that is within certain ranges. Standard terminology is used throughout the clinical record and some data fields are automatically populated from the CAD system from the original triple zero emergency telephone call. As NSW Ambulance conducts some quality control measures, this characteristic was rated as I - *very high*.

Confidentiality, privacy, and system security

All information collected in the clinical record is governed by the NSW Health Records and Information Privacy Act (HRIP Act) 2002. Paramedics are advised that care must be taken at all times to maintain security of the clinical record and, prior to accessing data, staff are required to sign a data request form that specifies their obligations under the HRIP Act. Authorised users are provided with password protected access to unit record data from the clinical record collections and access corresponds with work duties. Individual paramedics have access only to their own clinical record data, whereas station managers and staff, depending on their role, are able to access the state wide data collection.

Information from the clinical record and CAD has been made available for data linkage studies. However, the data variables used for data linkage purposes (such as name, address, date of birth) are not always entered and/or correct in the clinical record. For this reason, an initial linkage of the clinical record to the ED data collection (see Section 3.2.3) is recommended to try to verify individual identifying information, prior to linkage to other data collections with the aim of improving linkage rates between data collections.

There is a requirement for external users of linked NSW Ambulance data to sign a confidentiality undertaking before they are provided with data access. The confidentiality undertaking covers issues such as appropriate use of the data; data and information release procedures; privacy and

security procedures; NSW Ambulance acknowledgement; and data storage security. As there is a confidentiality undertaking for data users and the NSW Ambulance has password protected access to data from the clinical record, the characteristics of confidentiality and privacy, and system security were both rated as I - *very high*.

3.2.1.2 Practical characteristics of the Ambulance clinical record

Data accessibility

The data are stored within state wide databases. Information on injury can be accessed through a web portal, which is a secure website available only to authorised users within NSW Ambulance. External users can apply to access and analyse injury data from NSW Ambulance and these requests would be assessed on a case-by-case basis. As unit record data are accessible to data users from an internet-based interface, data accessibility was rated as I - *very high*.

Usefulness

The usefulness of the clinical record to identify key areas for preventive action, in terms of identifying new or emerging injury mechanisms and its ability to monitor injury trends over time, is limited. There is no specific mechanism in place to identify new or emerging injury mechanisms from the clinical record. The usefulness of the clinical record data to describe the key characteristics of injured children and young people is limited. Seven data variables from WHO's core minimum and five data variables from the WHO's core optional data sets [5] are present in the clinical record to describe the key characteristics of the injured population (Table 3.8). This represents 75.0% of the WHO's core minimum data set, which was rated as II - *high*, and 60.0% of the WHO's core optional data set, which was rated as II - *high*. Information regarding a patient's vital signs and their initial treatment are able to be recorded in the clinical record.

Table 3.8 Assessment of the Ambulance clinical record against the WHO's core minimum and optional data sets for injury surveillance

WHO's core minimum data set	Data present[1]	WHO's core optional data set	Data present[1]
Identifier	Y	Indigenous origin	Y
Age	Y	Date of injury	Y
Sex	Y	Time of injury	Y
Intent	N	External cause	N
Activity	N	Residence	Y
Place of occurrence	Y	Alcohol a factor	N
Nature of injury	Y	Other drugs a factor	N
Mechanism of injury	Y	Injury severity	N
		Disposition (i.e. patient outcome)	Y
		Incident summary	Y

[1] Y= yes; N=no.

Data analysis and guidance material to aid data interpretation

NSW Ambulance analyses data from the clinical record and reports information on an as needs basis, which could be daily, weekly or monthly to identify the number of injuries treated by paramedics. As information on injuries involving children and young people is not conducted on a routine annual basis, the analysis of injury data was rated as III – *low*.

To aid in the analysis and interpretation of data from the clinical record, NSW Ambulance has produced clinical record Standard Operating Procedures [30]. The Standard Operating Procedures provide information on each data variable collected and their classification and provides notes to aid with data interpretation. On this basis, guidance material to aid data interpretation was rated as I - *very high*.

3.2.2 Admitted Patient Data Collection

3.2.2.1 Operational characteristics of the APDC

Purpose and objectives of the collection

The stated purpose of the Admitted Patient Data Collection (APDC), also known as the NSW Combined Admitted Patient Epidemiology Data, is to record admitted patient activity in order to plan health services, track indicators of health status, and provide statistical information to monitor the utilisation of hospital services in NSW. There are nine main objectives for the collection of inpatient statistics in NSW which are to:

- monitor health and health service trends;

- allocate resources fairly across the state;

- monitor the performance of hospitals against benchmarks;

- plan for specialty services;

- review demand for services by population groups and location;

- determine the appropriate distribution of services within an area;

- monitor hospital utilisation;

- conduct medical and epidemiological research; and

- provide data to the national minimum data set [31].

As the purpose and/or the objectives of the APDC included the conduct of research and the monitoring of trends, but did not specifically mention injury surveillance, the purpose of the APDC to conduct injury surveillance was rated as II - *high*.

Data collection process

In NSW, if a person is injured, and requires hospitalised medical treatment, they could be transported to a hospital, triaged and treated in an ED and then released, or treated and admitted to hospital, known as an emergency admission. An injured person may also, following a visit to their local general practitioner or medical specialist, be referred to a hospital for medical treatment, known as a booked admission.

Once a person has been admitted to hospital, their details are entered into a patient administration system. The data from the administration system are then provided by each hospital to the Enterprise Data Warehouse for Analysis, Reporting and Decision support (EDWARD) by secure electronic data transfer at least once a week, but some Local Health Districts (LHDs) transfer data daily.

Data on patient admissions from EDWARD are transferred to the NSW Ministry of Health and standard data formats are applied and the hospitalisation data loaded into SAPHARI - Secure Analytics for Population Health Research and Intelligence - the NSW Ministry of Health's data warehouse that contains data collections relevant to population health. From when the hospital admission occurs, the data collection process can take up to four steps to complete until the data reaches the APDC (i.e. from admission, entry into the patient administrative system, transfer of data to EDWARD, transfer of data to the NSW Ministry of Health, to information being available on SAPHARI). As the data collection process for the APDC takes between four and six steps to complete, it was rated as II - *high*.

Case definition

The operational case definitions for injury-related hospitalisations involving children and young people in the APDC are described in Table 3.9. Injury-related hospitalisations can be identified in the APDC using injury diagnosis and/or external cause codes that are classified using the ICD-10-AM [20] from 1997-98. Both unintentional and intentional injuries can be identified using the ICD-10-AM classifications. Injury-related hospitalisations involving children and young people in NSW can be identified using the age at admission and the state of residence data variables. As injury-related hospitalisations of children and young people can be identified in the APDC, the case definition was rated as I - *very high*. Using the separation mode variable, in-hospital deaths of children and young people can be identified.

Table 3.9 Identification of fatal and non-fatal injury involving children and young people in the APDC

	Case definition
Injury	
Operational definition	Injury-related hospitalisations can be identified using ICD-10-AM injury diagnosis and/or external cause classifications. The age at admission variable can identify hospitalisations involving children and young people, and the state of residence data variable can identify hospitalisations of NSW residents.
In-hospital mortality	
Operational definition	Injury-related hospitalisations where the individual died in-hospital can be identified using ICD-10-AM injury diagnosis and/or external cause classifications. The age at admission variable can identify hospitalisations involving children and young people, the state of residence data variable can identify hospitalisations of NSW residents, and the mode of separation data variable can identify in-hospital deaths.

Timeliness

The timeliness of the three surveillance phases of data collection, data analysis and interpretation, and dissemination for the APDC can be variable. Hospital admission data is transferred on an annual basis from the NSW Ministry of Health's EDWARD to SAPHARI. However, it can be around a six month time lag following the end of a financial year before all of the patient admission data from both public and private facilities are received by the NSW Ministry of Health. There is a two year time lag for the inclusion of information in the APDC of NSW residents who were hospitalised interstate in Australia. Information on hospital admissions is made available for data linkage studies, where hospitalisation data is available quarterly (excluding interstate hospital admissions of NSW residents). Therefore, the timeliness of access to hospitalisation data can be variable.

The NSW Ministry of Health disseminates information from the APDC using HealthStats NSW - www.healthstats.nsw.gov.au. HealthStats NSW is an interactive, web-based application that allows individuals to query summary data from the APDC and tailor and download spreadsheets of the summary data and/or graphics. Injury is one of the topics that can be examined using HealthStats NSW. However, only some injury mechanisms are currently examined by age group. As the time taken to complete the three surveillance phases was between one and two years, timeliness was rated as II - *high*.

Uniform classification systems

The WHO recommended core minimum and optional data variables that are collected in the APDC regarding an injured child or young person are classified using a number of standard classification systems. Six data variables from the WHO's core minimum and four data variables from the WHO's core optional data sets [5] in the APDC are classified using the ICD-10-AM [20] (i.e. intent, activity, place of occurrence, nature and mechanism of injury, external cause, alcohol), the NHDD [11] (i.e. sex, indigenous origin, disposition) and the ASGS RA [12] (i.e. usual residence of the injured individual). As standard classification systems are used to record information for all the variables from the WHO's core minimum and optional data set collected by the APDC, uniform classification systems were rated as I - *very high*.

Quality control measures

The NSW Ministry of Health has a number of mechanisms in place to attempt to ensure that the APDC contains good quality data. There is a policy directive for the APDC [32] that details the

information that is to be collected by each hospital. Over 500 data quality checks are conducted, including checks for missing or invalid values for the hospital admission data. Following identification of any errors, hospitals and facilities are required to make corrections to their data, and the amended data is re-extracted and re-transmitted to the NSW Ministry of Health [32]. As the NSW Ministry of Health conducts quality control measures, this characteristic was rated as I - *very high*.

Confidentiality, privacy, and system security

Only authorised users who are performing work for the NSW Ministry of Health and who have signed a confidentiality agreement may be provided with password protected access to non-identifying (e.g. no first or last name, date of birth, or residential address) unit record hospitalisation data from the APDC. The hospitalisation data can also be made available for data linkage studies and there is a requirement for individuals to sign a confidentiality undertaking before they are provided with data access.

The confidentiality undertaking covers issues such as appropriate use of the data; data and information release procedures; privacy and security procedures; NSW Ministry of Health acknowledgement; and data storage security. As there is a confidentiality undertaking for data users and the NSW Ministry of Health has password protected access to data from the APDC, the characteristics of confidentiality and privacy, and system security were both rated as I - *very high*.

3.2.2.2   Practical characteristics of the APDC

Data accessibility

The hospital admission data in NSW are stored by the NSW Ministry of Health in SAPHARI. The software platform upon which SAPHARI operates is SAS-based [33]. Data in the APDC can be accessed by approved external users via SAPHARI. To access data from the APDC, a secure electronic password protected connection is established with the SAPHARI server and users sign into SAPHARI with a user-specific password made up of a random combination of alphanumeric characters. Once accessed, unit record data is available for data analysis on SAPHARI using SAS Enterprise Guide. For individuals who do not have access to SAPHARI, an application can be made to the NSW Chief Health Officer to obtain a subset of data from the APDC. As unit record data are accessible to data users from a data warehouse, data accessibility was rated as I - *very high*.

Usefulness

The usefulness of the APDC to identify key areas for preventive action, in terms of identifying new or emerging injury mechanisms and its ability to monitor injury trends over time, is variable. There is no specific mechanism in place to identify new or emerging injury mechanisms for injury-related incidents from the APDC. However, it is possible to identify hospitalised injury trends over time for injury-related admissions according to ICD-10-AM injury and external cause categories, respectively.

The usefulness of the hospitalised injury data to describe the key characteristics of injured children and young people is mixed. All eight data variables from WHO's core minimum and five data variables from the WHO's core optional data sets [5] are present in the APDC to describe the key characteristics of the injured population (Table 3.10). This represents 87.5% of the WHO's core minimum data set, which was rated as I - *very high,* and 50.0% of the WHO's core optional data set, which was rated as III - *low.*

Table 3.10 Assessment of the APDC against the WHO's core minimum and optional data sets for injury surveillance

WHO's core minimum data set	Data present[1]	WHO's core optional data set	Data present[1]
Identifier	Y	Indigenous origin	Y
Age	Y	Date of injury	N
Sex	Y	Time of injury	N
Intent	Y	External cause	Y
Activity	Y	Residence	Y
Place of occurrence	Y	Alcohol a factor	Y, partial
Nature of injury	Y	Other drugs a factor	N
Mechanism of injury	Y	Injury severity	N
		Disposition (i.e. patient outcome)	Y
		Incident summary	N

[1] Y= yes; N=no; Y, partial=this information can be included in free-text descriptions.

While alcohol can be identified as a factor in hospitalised injuries using the ICD-10-AM supplementary factors related to the causes of morbidity and mortality, its identification is

variable. Although the severity of the injury is not recorded directly in the APDC, the application of diagnosis-based injury severity scaling would allow an injury severity score to be calculated[34].

Data analysis and guidance material to aid data interpretation

The NSW Ministry of Health analyses data from the APDC and reports on hospitalised injury morbidity trends for several common injury mechanisms in NSW and information is readily available from HealthStats NSW. As the APDC dataset is finalised for a financial year, the annual hospitalisation data are included in the hospitalised injury morbidity trends available on HealthStats NSW. Therefore, data analysis of hospitalised injury of children and young people in NSW was rated as II – *high*.

To aid in the analysis and interpretation of data from the APDC, the NSW Ministry of Health has produced a data dictionary for the APDC which is available on the Centre for Health Record Linkage (CHeReL) website. The data dictionary provides information describing some of the key data variables held within the APDC and their coding frames, along with notes to aid with data interpretation. On this basis, guidance material to aid data interpretation was rated as I – *very high*.

Data quality assessment

An assessment of the data quality of hospitalisation records is not always assessed and, when it has been assessed in Australia, some discrepancies have been identified. In a stratified random sample of hospitalisation records across 50 hospitals in four Australian states (including NSW) that had an injury-related principal diagnosis and at least one external cause classification during 2002-03 to 2003-04, McKenzie et al [35] found disagreement between the original coders and auditors on the external cause classification for 32.4% of hospitalisation records. She also found disagreement on the place of occurrence by 24.5% and for the activity conducted at the time of injury by 31.9% [35].

Information on injury in health records can also be hampered by missing data and the use of classifications that are not specific, such as 'other specified' and 'unspecified'. McKenzie et al[36], using national hospital separation records in 2002-03, identified that for some injury mechanisms, such as falls, specificity of the type of fall was particularly lacking. Nineteen percent of falls were classified as 'other specified' and 25% as 'unspecified'. This compares to 1.1% of 'other specified' and 0.5% of 'unspecified' for type of transport incidents (e.g. pedestrian, motor vehicle crash, motorcycle crash). The lack of specificity of information on the circumstances of fall injury-

related hospitalisations restricts information available to guide injury prevention efforts. Clinical coders have reported that poor quality hospital discharge summaries were one of the contributors to a lack of specificity for injury external cause classifications [37].

3.2.3 Emergency Department Data Collection

3.2.3.1 Operational characteristics of the EDDC

Purpose and objectives of the collection

The primary purpose of the emergency department data collection (EDDC) is to:

- assist clinicians in the management of patients; and

- enable comparisons of performance in respect to access to services, quality clinical outcomes, patient management, customer satisfaction and cost-effectiveness [38].

As the purpose of the EDDC included patient management and resourcing rather than injury surveillance or research, the purpose of the EDDC to conduct injury surveillance was rated as III – *low*.

Data collection process

There are around 150 ED's in NSW and all the larger public hospital ED's provide data to the EDDC. The number of EDs providing data to the EDDC has changed over time, from around 46 EDs in 1996 to around 90 in 2015. If a person is injured and presents to an ED at a public hospital in NSW, their details are entered into a patient administration system. The data from the administration system are then provided by each public hospital to EDWARD by secure electronic data transfer at least once a week, with some LHDs transferring data daily. Data on patient admissions from EDWARD have standard data formats applied at the NSW Ministry of Health and the data are loaded into SAPHARI (i.e. a data warehouse that contains data collections relevant to population health). From when the ED presentation occurs, the data collection process can take up to four steps to complete until the data reaches the EDDC (i.e. from ED presentation, entry into the patient administrative system, transfer of data to the EDWARD, transfer of data to the NSW Ministry of Health, to information being available on SAPHARI). As the data collection process for the EDDC takes between four and six steps to complete, it was rated as II - *high*.

Case definition

The operational case definitions for injury-related ED presentations involving children and young people are described in Table 3.11. Injury-related ED presentations can be identified in the EDDC using injury diagnosis and/or external cause codes that are classified using either the International Classification of Diseases version 9 Clinical modification (ICD-9-CM) [39], ICD-10 [9], ICD-10-

AM [20] or the Systematized Nomenclature of Medicine - Clinical Terms (Snomed-CT) [40] classifications systems. There is two data variables where a preliminary diagnosis can be supplied. The preliminary diagnoses are usually reported either as the injury diagnosis (e.g. head injury) or an external cause code (e.g. fall from a height) in the EDDC.

Injury-related presentations involving children and young people in NSW can be identified using the age at presentation and the state of residence data variables. As injury-related hospitalisations of children and young people can be identified in the EDDC, the case definition was rated as I - *very high*. Using the mode of separation data variable, deaths of children and young people in the ED can be identified.

Table 3.11 Identification of fatal and non-fatal injury involving children and young people within the EDDC

	Case definition
Injury	
Operational definition	Injury-related ED presentations can be identified using ICD-9-CM, ICD-10, ICD-10-AM injury diagnosis and/or external cause classifications, or Snomed-CT classifications. Age at presentation can identify ED presentations involving children and young people, and the state of residence data variable can identify presentations of NSW residents.
In-hospital mortality	
Operational definition	Injury-related ED presentations can be identified using ICD-9-CM, ICD-10, ICD-10-AM injury diagnosis and/or external cause classifications, or Snomed-CT classifications. Age at presentation can identify ED presentations involving children and young people, the state of residence data variable can identify presentations of NSW residents, and the mode of separation data variable can identify deaths in the ED.

Timeliness

The timeliness of the three surveillance phases of data collection, data analysis and interpretation, and dissemination for the EDDC can be variable. ED presentation data is uploaded on a weekly basis to SAPHARI. The NSW Ministry of Health does not routinely analyse and disseminate information from the EDDC. Analysis of the EDDC is conducted on an ad hoc basis as the need arises. Information regarding ED presentations is also available using the Public Health Real-time Emergency Department Surveillance System (PHREDSS) (see Section 3.2.8). As the time taken to complete the three surveillance phases using the EDDC could potentially be daily to monthly, timeliness was rated as I – *very high*.

Uniform classification systems

The WHO recommended core minimum and optional data variables that are collected in the EDDC regarding an injured child or young person are classified using a number of standard classification systems. Four data variables from the WHO's core minimum and four data variables of the WHO's core optional data sets [5] collected by the EDDC are classified using either ICD-9-CM [39], ICD-10 [9], ICD-10-AM [20] or Snomed-CT [40] (i.e. intent, nature and mechanism of injury, external cause), the NHDD [11] (i.e. sex, indigenous origin, disposition) or the ASGS RA [12] (i.e. usual residence). As standard classification systems were used to record information for all the variables from the WHO's core minimum and optional data set collected by the EDDC, uniform classification systems were rated as I - *very high*.

Quality control measures

The NSW Ministry of Health conducts data quality checks on the EDDC, including checks for missing or invalid values. Following identification of an error, hospitals and facilities are required to make corrections to their data, and the amended data is re-transmitted to the NSW Ministry of Health. As the NSW Ministry of Health conducts quality control measures, this characteristic was rated as I - *very high*.

Confidentiality, privacy, and system security

Only authorised users who are performing work for the NSW Ministry of Health and who have signed a confidentiality agreement may be provided with password protected access to non-identifying (e.g. no first or last name, date of birth, or residential address) unit record ED presentation data. The ED presentation data can be made available for data linkage studies (from 2005 onwards due to no or limited information on patient first and last names that are used for linkage prior to that year) and there is also a requirement for individuals to sign a confidentiality undertaking before they are provided with data access.

The confidentiality undertaking covers issues such as appropriate use of the data; data and information release procedures; privacy and security procedures; NSW Ministry of Health acknowledgement; and data storage security. As there is a confidentiality undertaking for data users and the NSW Ministry of Health has password protected access to data from the EDDC, the characteristics of confidentiality and privacy, and system security were both rated as I - *very high*.

3.2.3.2 Practical characteristics of the EDDC

Data accessibility

The ED presentation data in NSW are stored by the NSW Ministry of Health in SAPHARI. The software platform upon which SAPHARI operates is SAS-based [33]. Data in the EDDC can be accessed by approved external users via SAPHARI. To access data from the EDDC, a secure electronic password protected connection is established with the SAPHARI server and users sign into SAPHARI with a user-specific password made up of a random combination of alphanumeric characters. Once accessed, unit record data is available for data analysis on SAPHARI using SAS Enterprise Guide. For individuals who do not have access to SAPHARI, an application can be made to the NSW Chief Health Officer to obtain a subset of data from the EDDC. As unit record data are accessible to data users from a data warehouse, data accessibility was rated as I - *very high*.

Usefulness

The usefulness of data from the EDDC to identify key areas for preventive action, in terms of identifying new or emerging injury mechanisms and the EDDC's ability to monitor injury trends over time, is limited. There is no specific mechanism in place to identify new or emerging injury mechanisms for injury-related ED presentations in the EDDC. The identification of the nature of the injury, intent, and mechanism of injury are hampered by the entry of either the injury diagnosis or the external cause in the preliminary diagnosis data variables, so only either the type of injury or the mechanism of injury are identified, not both.

The usefulness of the ED presentation data to describe the key characteristics of injured children and young people is mixed. Six data variables from WHO's core minimum and four data variables from the WHO's core optional data sets [5] are present in the EDDC to describe the key characteristics of the injured population (Table 3.12). This represents 75.0% of the WHO's core minimum data set, which was rated as II - *high,* and 40.0% of the WHO's core optional data set, which was rated as III - *low*.

Table 3.12 Assessment of the EDDC against the WHO's core minimum and optional data sets for injury surveillance

WHO's core minimum data set		WHO's core optional data set	
	Data present[1]		Data present[1]
Identifier	Y	Indigenous origin	Y
Age	Y	Date of injury	N
Sex	Y	Time of injury	N
Intent	Y, partial	External cause	Y, partial
Activity	N	Residence	Y
Place of occurrence	N	Alcohol a factor	N
Nature of injury	Y, partial	Other drugs a factor	N
Mechanism of injury	Y, partial	Injury severity	N
		Disposition (i.e. patient outcome)	Y
		Incident summary	N

[1] Y= yes; N=no; Y, partial=this information can be included in free-text descriptions.

Data analysis and guidance material to aid data interpretation

The NSW Ministry of Health analyses ED presentation data from the EDDC on an as needs basis, which could be daily, weekly or monthly to determine the number of injuries and/or injury mechanisms presenting to EDs. As the data analyses of injuries involving children and young people are not conducted on a routine annual basis, data analysis of injury-related ED presentations of children and young people in NSW was rated as III - *low*.

To aid in the analysis and interpretation of data from the EDDC, the NSW Ministry of Health has produced a data dictionary for the EDDC [38] which is available on the CHeReL website. The data dictionary provides information describing some of the key data variables held within the EDDC and specific information regarding the quality of coding of some data variables, such as diagnosis classifications, to aid with case identification and/or data interpretation. On this basis, guidance material to aid data interpretation was rated as I – *very high*.

3.2.4 Families and Community Services Key Information and Directory System

3.2.4.1 Operational characteristics of KiDS

Purpose and objectives of the collection

The purpose of the Key Information and Directory System (KiDS) is to record client information. The KiDS provides support for Family and Community Services staff for their day-to-day work activities and is used to support Child Protection and Out of Home care services within NSW. The KiDS data collection facilitates information needs of staff and records client contact and relationships [41]. The KiDS data collection is not designed for injury surveillance, rather it is used to record information on clients to manage and monitor service delivery, for legislative reporting and for research and evaluation, therefore as KiDS was stated to be used for research the purpose of the KiDS to conduct injury surveillance was rated as II - *high*.

Data collection process

Information entered into the KiDS can be obtained from a number of sources under the *Children and Young Persons (Care and Protection) Act 1998* under both mandatory and non-mandatory reporting circumstances. In terms of the Act, a child is considered to be a person aged less than 16 years and a young person is someone aged 16 to 18 years. Individuals who, in the course of their employment as individuals working in health care, welfare, education, children's services, residential services or law enforcement, believe that a child or young person is '*at risk of significant harm*' (see Case definition) have a mandatory duty to report the name, or a description of the child/ young person, and the grounds for suspecting that the child is at risk of significant harm to NSW Families and Community Services. Non-mandatory reporting of concerns relating to child protection can be made to NSW Families and Community Services by any individual. Reports can be made from a single state wide centralised reporting system, the Child Protection Helpline, with reports of concern received via telephone, fax or electronic reporting (eReporting). Once a concern report is made to NSW Families and Community Services, caseworkers then enter information from these reports into the KiDS. Information is collected via a Siebel client management system available to Families and Community Services caseworkers and managers across NSW. Information is collected from non-government agencies via a client portal. The KiDS is the single repository of information on child protection issues and out-of-home care that is accessible state wide. As the data collection process for the KiDS takes between one to three steps to complete following receipt of the initial concern report, it was rated as I – *very high*.

Case definition

The KiDS data collection contains information on children who have been reported as suspected of experiencing child protection issues. Information on a child or young person is recorded in the KiDS if the child or young person was reported to be at risk of significant harm in terms of their safety, welfare or well-being. The following circumstances are outlined in the *Children and Young Persons (Care and Protection) Act 1998* and are considered to pose a risk of significant harm:

"(a) the child's or young person's basic physical or psychological needs are not being met or are at risk of not being met;

(b) the parents or other caregivers have not arranged and are unable or unwilling to arrange for the child or young person to receive necessary medical care;

(b1) in the case of a child or young person who is required to attend school in accordance with the Education Act 1990—the parents or other caregivers have not arranged and are unable or unwilling to arrange for the child or young person to receive an education in accordance with that Act;

(c) the child or young person has been, or is at risk of being, physically or sexually abused or ill-treated;

(d) the child or young person is living in a household where there have been incidents of domestic violence and, as a consequence, the child or young person is at risk of serious physical or psychological harm;

(e) a parent or other caregiver has behaved in such a way towards the child or young person that the child or young person has suffered or is at risk of suffering serious psychological harm; and

(f) the child was the subject of a pre-natal report under section 25 and the birth mother of the child did not engage successfully with support services to eliminate, or minimise to the lowest level reasonably practical, the risk factors that gave rise to the report [42]".

The operational case definitions for injuries involving children and young people in KiDS are described in Table 3.13. Some physical injury mechanisms involving children or young people are able to be identified in the KiDS data collection, including: being hit, kicked or struck; poisoning; shaken baby/child; strangulation/ suffocation; thrown baby/ child; and physical: other [43]. As some injury mechanisms involving children and young people can be identified in the KiDS, the case definition was rated as I - *very high*.

Table 3.13 Identification of injuries involving children and young people within the KiDS

	Case definition
Injury	
Operational definition	Some physical injury mechanisms involving children or young people are able to be identified in the KiDS data collection, including: being hit, kicked or struck; poisoning; shaken baby/child; strangulation/ suffocation; thrown baby/ child; and physical: other. Children and young people can be identified using the age data variable and incidents involving NSW residents can be identified using the postcode of residence.
Fatal injury	
Operational definition	Some physical injury mechanisms involving children or young people are able to be identified in the KiDS data collection, including: being hit, kicked or struck; poisoning; shaken baby/child; strangulation/ suffocation; thrown baby/ child; and physical: other. Children and young people can be identified using the age data variable and incidents involving NSW residents can be identified using the postcode of residence. A death of a child/ young person can be identified in KiDS.

Timeliness

The timeliness of the three surveillance phases of data collection, data analysis and interpretation, and dissemination for information from the KiDS can be variable. Information is entered into the KiDS on the day that a report is received. Once information has been entered into the KiDS it can be extracted for further analysis, potentially on a daily basis. Quarterly and annual statistical reports are publically available regarding the number and circumstances of children who were reported to NSW Families and Community Services to be at significant risk of harm. As the time taken to complete the three surveillance phases could potentially be daily to monthly, timeliness was rated as I - *very high*.

Uniform classification systems

The WHO recommended core minimum and optional data variables that are collected in the KiDS regarding an injured child or young person are classified using a non-standard injury classification system used by NSW Families and Community Services. Child protection information, however, is reported using AIHW child protection data standards. For this reason, as standard classification systems are not used, this characteristic was rated as IV - *very low*.

Quality control measures

NSW Families and Community Services do undertake some quality assurance processes for data in the KiDS. There are field limiters in place to ensure that the data collected is within the expected values. NSW Families and Community Services have also developed guidelines for data entry in the KiDS to try to ensure that information entered is consistent and reliable. As there are some quality control measures in place, quality control was rated as I - *very high*.

Confidentiality, privacy, and system security

Access to the KiDS is provided for authorised users only and accessed is password protected. KiDS is ISO 27001 (Information security management) certified and is audited on a regular basis. All users undergo training prior to being provided with access to the system and staff also sign a confidentiality agreement regarding access and use of client information. As there is a privacy undertaking required for data users and the KiDS has password protected access, the characteristics of confidentiality and privacy, and system security were both rated as I - *very high*.

3.2.4.2 Practical characteristics of KiDS
Data accessibility

Access to non-standard statistical tabulated information (i.e. information not provided in reports produced by NSW Families and Community Services) from the KiDS for internal staff requires the submission of a *request for data from information management branch form* (Form A). Staff must provide information regarding what type of data is required, how the information will be used and to whom the information will be disclosed.

Access to data in the KiDS for external users is assessed on a case-by-case basis. Potential data users must fill in a *request for statistical information from Community Services form* (Form B) and provide information on the type of information that is required, what the information will be used for, and to whom the information will be disclosed. NSW Families and Community Services would only provide statistical information where there was no possibility that an individual could be identified from the information. NSW Families and Community Services is likely to consider providing unit record data, but information is currently provided in tabulated form. As data are accessible to data users in an aggregate form the KiDS was rated as III - *low*.

Usefulness

The usefulness of data from the KiDS to identify key areas for preventive action, in terms of identifying new or emerging injury mechanisms and its ability to monitor injury trends over time, is variable. There is no specific mechanism in place to identify new or emerging injury mechanisms from the KiDS. The usefulness of the KiDS data to describe the key characteristics of injured children and young people is limited. All data variables from WHO's core minimum and seven data variables from the WHO's core optional data sets [5] are potentially present in the KiDS to describe the key characteristics of the injured population (Table 3.14). This represents 100% of the WHO's core minimum data set, which was rated as I - *very high*, and 60.0% of the WHO's core optional data set, which was rated as II - *high*.

Table 3.14 Assessment of the KiDS against the WHO's core minimum and optional data sets for injury surveillance

WHO's core minimum data set		WHO's core optional data set	
	Data present[1]		Data present[1]
Identifier	Y	**Indigenous origin**	Y
Age	Y	**Date of injury**	N
Sex	Y	**Time of injury**	N
Intent	Y, partial	**External cause**	Y, partial
Activity	Y, partial	**Residence**	Y
Place of occurrence	Y, partial	**Alcohol a factor**	Y, partial
Nature of injury	Y	**Other drugs a factor**	Y, partial
Mechanism of injury	Y, partial	**Injury severity**	Y, partial
		Disposition (i.e. patient outcome)	N
		Incident summary	Y

[1] Y= yes; N=no; Y, partial=this information can be included in free-text descriptions.

Data analysis and guidance material to aid data interpretation

Statistical monitoring of the number of concern reports of children at risk of significant harm received by NSW Families and Community Services is conducted each quarter. These quarterly reports describe the number of concern reports of risk of significant harm by the agency who provided the report, the response taken, the response priority, and the type of primary reported

issue (including physical abuse/ injury). Annual statistical reports that describe child protection assessment outcomes, early intervention, out-of-home care placements and other services provided are also prepared by NSW Families and Community Services. Both the quarterly and annual reports are publically available via the NSW Families and Community Services website. As information from the KiDS as analysed on a quarterly basis, data analysis was rated as II – *high*.

NSW Families and Community Services have developed guidelines for data entry for staff who enter information into the KiDS to try to ensure that the data provided is entered consistently. These guidelines could also be used to aid data interpretation of information in the KiDS, therefore the availability of guidance material was rated as II - *high*.

3.2.5 Lifetime Care and Support Authority Claims Database

3.2.5.1 Operational characteristics of the Lifetime Care Claims Database

Purpose and objectives of the collection

The Lifetime Care and Support Authority (LCSA), under the Motor Accidents (Lifetime Care and Support) Act 2006, is responsible for monitoring "the operation of the Scheme under this Act, and in particular to conduct (or arrange for other persons to conduct) research into and to collect statistics in relation to the operation of the Scheme" and also for publicising and disseminating information regarding the Scheme. As one of the stated main purposes of the Lifetime Care Claims database is for data to be used to conduct research, the purpose of the Lifetime Care Claims database to conduct injury surveillance was rated as II - *high*.

Data collection process

The LCSA through the Lifetime Care and Support Scheme provides treatment, rehabilitation and ongoing care services to individuals who have been severely injured in motor vehicle crashes in NSW, regardless of who may be at-fault in the crash. The Lifetime Care and Support Scheme began in NSW on 1 October 2006 for individuals aged 16 years or less and on 1 October 2007 for individuals, regardless of age. Individuals begin as interim participants in the scheme and after two years can be considered for assessment as lifetime participants of the scheme. Children do not apply for lifetime eligibility until they are at least five years old [44]. From 1 September 2015, the State Insurance and Care Governance Act 2015 commenced and the LCSA became part of a new governmental organisation called Insurance and Care NSW (icare).

From when a vehicle crash occurs, the data collection process can take up to three steps to complete until the data reaches the Lifetime Care Claims database (i.e. from the LCSA being notified of a severely injured individual who is likely to be eligible for the scheme by hospital staff using the Severe Injury Advice Form or via an insurer, to the lodgement of an interim application with assistance from a Lifetime Care coordinator, and entry of the claim into the database). As the data collection process for the Lifetime Care Claims database took between one and three steps to complete, it was rated as I - *very high*.

Case definition

The operational case definitions for vehicle crash-related severe injuries in the Lifetime Care Claims database involving children and young people are described in Table 3.15. Severe injuries are defined as traumatic brain injury, spinal cord injury, multiple amputations, severe burns (i.e.

full thickness greater than 40% of total body surface area or greater than 30% of total body surface area in children less than 16 years) and permanent blindness. Vehicle crashes that severely injure vehicle occupants, motorcyclists, pedal cyclists or pedestrians are able to be identified using the 'role in accident' data variable. Children and young people can be identified by subtracting the date of birth from the crash date. As vehicle crashes that resulted in severe injury of children and young people in NSW could be identified in the Lifetime Care Claims database from October 2007, the case definition was rated as I - *very high*. However, vehicle crashes involving cars are not able to be distinguished from other types of vehicles, such as those involving trucks.

Table 3.15 Identification of severe injury involving children and young people in the Lifetime Care Claims database

	Case definition
Severe injury	
Operational definition	A person severely injured (i.e. traumatic brain injury, spinal cord injury, multiple amputations, burns and permanent blindness) in a vehicle crash as a driver, passenger, pedestrian, pedal cyclist or motor cyclist, and the claim was lodged and accepted. The 'role in accident' variable is able to be used to identify vehicle drivers or passengers, motorcycle riders or pillion passengers, pedestrians and pedal cyclists. The date of birth and crash date data variables can be used to calculate age to identify crashes involving children and young people. The address of the claimant can be used to identify NSW residents.

Timeliness

For the LCSA, the three surveillance phases of data collection, data analysis and dissemination of information from the Lifetime Care Claims database can take up to one year to complete. In a few cases, disputes regarding eligibility for the scheme can arise (for example, in 2013-14 there were 11 disputes regarding eligibility [44]). The LCSA disseminates basic demographic information regarding the participants (e.g. age group, road user type, region of residence) in the scheme and payments made from the scheme for each financial year in an annual report. As the time taken to complete the three surveillance phases for inclusion of information in the LCSA annual report was conducted between annually to biennially, timeliness was rated as III - *low*.

Uniform classification systems

The WHO recommended core minimum and optional data variables that are collected in the Lifetime Care Claims database are classified according to a non-standard classification system used by the LCSA. As a standard classification system is not used, this characteristic was rated as IV - *very low*.

Quality control measures

A number of mechanisms are used to try to ensure that the Lifetime Care Claims database contains good quality data. A list of data variables and their definitions is available from the LCSA for the Lifetime Care Claims database. Regular examinations of the quality of the data are conducted by the agency. As the agency conducts quality control measures, this characteristic was rated as I - *very high*.

Confidentiality, privacy, and system security

Only authorised users are able to access data from the Lifetime Care Claims database. The LCSA does not routinely provide access to their claims database to external users, but would assess access on a case-by-case basis. Currently, the LCSA does not require external users to sign a confidentiality agreement to access de-identified injury data. On this basis, confidentiality and privacy were rated as IV - *very low*. As the LCSA has password protected access to the Lifetime Care Claims database, system security was rated as I - *very high*.

3.2.5.2 Practical characteristics of the Lifetime Care Claims Database
Data accessibility

Data from the Lifetime Care Claims database can be accessed by LCSA staff who have been provided with access to the data through individual user identification and passwords. Data from the Lifetime Care Claims database is not routinely made available to external users, but unit record data has been made available on occasion via a CD-ROM. As unit record data from the Lifetime Care Claims database are made accessible to data users via a CD-ROM, data accessibility was rated as II - *high*.

Usefulness

The usefulness of the claims data from the LCSA to identify key areas for preventive action, in terms of identifying any new or emerging vehicle crash-related injuries and its ability to monitor

injury trends over time, is limited. The Lifetime Care Claims database does not have the capability to easily detect new and/or emerging serious vehicle crash-related injuries. However, it would be possible to use the database to examine serious injury annual temporal trends for the specific types of injuries that are included in the database.

The usefulness of the data in the Lifetime Care Claims database to describe the key characteristics of injured children and young people is mixed. Six data variables from WHO's core minimum and four data variables from WHO's core optional data sets [5] are present in the register to describe the key characteristics of the injured population (Table 3.16). This represents 75.0% of the WHO's core minimum data set, which was rated as II - *high*, and 40.0% of the WHO's core optional data set, which was rated as III - *low*.

Table 3.16 Assessment of the Lifetime Care Claims database against the WHO's core minimum and optional data sets for injury surveillance

WHO's core minimum data set		WHO's core optional data set	
	Data present[1]		Data present[1]
Identifier	Y	Indigenous origin	N
Age	Y	Date of injury	Y
Sex	Y	Time of injury	N
Intent	N	External cause	N
Activity	N	Residence	Y
Place of occurrence	Y	Alcohol a factor	N
Nature of injury	Y	Other drugs a factor	N
Mechanism of injury	Y, partial	Injury severity	Y
		Disposition (i.e. patient outcome)	Y
		Incident summary	N

[1] Y= yes; N=no; Y, partial= while pedestrian and motor cyclists and pedal cyclists could be identified, the type of motor vehicle (e.g. car, truck, bus) could not be identified.

Data analysis and guidance material to aid data interpretation

The LCSA analyses data from their Lifetime Care Claims database and reports on the number of serious injuries per year and basic demographic characteristics of the scheme participants in an annual report. Therefore, as the results of data analyses are made available between annually to biennially, the data analysis of serious vehicle crash-related injury was rated as II - *high*.

To assist with interpretation of the data in the Lifetime Care Claims database, the LCSA has developed a list of data variables collected and their coding frame. As the current guidance material to aid data interpretation is available for the Lifetime Care Claims database, it was rated as II - *high*.

3.2.6 Motor Accidents Insurance Regulation Personal Injury Register

3.2.6.1   Operational characteristics of the Personal Injury Register

Purpose and objectives of the collection

The stated main purposes of the Personal Injury Register are to serve as a fraud detection and deterrence tool, and to allow the conduct of research [45]. The Personal Injury Register has four main objectives and these are to:

- monitor the progress of the scheme;
- calculate the premiums and evaluate potential premium rating factors;
- help insurers investigate the occurrence of fraud; and
- assist in decisions to fund initiatives for preventing and minimising the effects of road crashes [45].

As the purpose and/or objectives of the Personal Injury Register included conducting research, the purpose of the Register to conduct injury surveillance was rated as II - *high*.

Data collection process

From 1 September 2015, the State Insurance and Care Governance Act 2015 commenced and the State Insurance Regulatory Authority (SIRA) replaced the Motor Accidents Authority of NSW. The SIRA includes the regulatory body for third party motor vehicle insurance and retains the data collection of all personal injury insurance claims in a Personal Injury Register. If a vehicle crash occurs that resulted in the death or injury of an individual not-at-fault in a crash, then a claim for medical treatment and rehabilitation expenses, any permanent impairment incurred and loss of income can be made by the injured individual or their relatives. If the injured individual was considered partially at-fault for their injuries (e.g. not wearing a seat belt or a helmet), the individual can still make a claim. However, the financial compensation received may not be as high as if the individual was completely not-at-fault.

From when a vehicle crash occurs, the data collection process can take up to four steps to complete until the data reaches the Register (i.e. from the police being notified of the crash, to an accident notification and/or personal injury claim form being lodged with an insurer, to the insurer sending information regarding the claim to the regulatory body, and entry of the claim into the Register). As the data collection process for the Personal Injury Register took between four and six steps to complete, it was rated as II - *high*.

Case definition

The operational case definitions for vehicle crash-related injuries and deaths in the Personal Injury Register involving children and young people are described in Table 3.17. Vehicle crashes that fatally or non-fatally injure vehicle occupants, motorcyclists, pedal cyclists or pedestrians are able to be identified using the 'role of the injured party' data variable. Children and young people can be identified by subtracting the date of birth from the crash date. Crashes that occurred in NSW can be identified using the 'NSW Accident' data variable. As vehicle crashes that resulted in fatal and non-fatal injury of children and young people in NSW could be identified in the Personal Injury Register, the case definition was rated as I - *very high*. However, car occupants are not easily able to be distinguished from other vehicle occupants, such as trucks or vans.

Table 3.17 Identification of fatal and non-fatal injury involving children and young people in the Personal Injury Register

	Case definition
Injury	
Operational definition	A person non-fatally injured in a vehicle crash as a driver, passenger, pedestrian, pedal cyclist or motor cyclist where the other driver or owner of a motor vehicle was partially or completely at-fault and the vehicle at-fault was registered in NSW, and the claim was lodged and accepted. Injuries are identified using the 'fatality variable' where the person is identified as non-fatally injured (i.e. 'N'). The 'role of the injured party' variable is able to be used to identify vehicle drivers or passengers (i.e. '1' or '2'), motorcycle riders or pillion passengers (i.e. '3' or '4'), pedestrians (i.e. '5') and pedal cyclists (i.e. '6'). The date of birth and crash date data variables can be used to calculate age to identify crashes involving children and young people. The 'NSW Accident' (i.e. 'Y') data variable can be used to identify crashes that occurred in NSW.
Fatal injury	
Operational definition	A person fatally injured in a vehicle crash as a driver, passenger, pedestrian, pedal cyclist or motor cyclist where the other driver or owner of a motor vehicle was partially or completely at-fault and the vehicle at-fault was registered in NSW, and the claim was lodged and accepted. Fatal injuries are identified using the 'fatality variable' where the person is identified as fatally injured (i.e. 'Y'). The 'role of the injured party' variable is able to be used to identify vehicle drivers or passengers (i.e. '1' or '2'), motorcycle riders or pillion passengers (i.e. '3' or '4'), pedestrians (i.e. '5') and pedal cyclists (i.e. '6'). The date of birth and crash date data variables can be used to calculate age to identify crashes involving children and young people. The 'NSW Accident' (i.e. 'Y') data variable can be used to identify crashes that occurred in NSW.

Timeliness

For the Personal Injury Register, the three surveillance phases of data collection, data analysis and dissemination of information can take several years to complete. For instance, it can take up to six or seven years after the end of a calendar year for all third party claims to be lodged and settled. Injured individuals have six months in which to lodge a personal injury claim and, while information on claims are sent to the regulatory body each month from Compulsory Third Party (CTP) insurers, determination of which driver is 'at fault' and the amount of compensation to be awarded can be a lengthy process. The regulatory body does disseminate information regarding the premiums collected, the claims that have been received, and payments made from the scheme for each financial year in an annual report. As the time taken to complete the three surveillance phases for inclusion of information in their annual report was conducted greater than biennially, timeliness was rated as III - *low*.

Uniform classification systems

The WHO recommended core minimum and optional data variables that are collected in the Personal Injury Register are classified according to a classification system developed by the regulatory body, specified in a Coding Manual [45]. As a standard classification system is not currently used to classify data in the Personal Injury Register, this characteristic was rated as IV - *very low*.

Quality control measures

A number of mechanisms are used to try to ensure that the Personal Injury Register contains good quality data. A Coding Manual [45] exists that contains the minimum data set for the data collection, including a description of each data variable and its associated classification rules. Regular examinations of the quality of the data in the Personal Injury Register are also conducted by the regulatory body. These involve the examination of the use of default codes, missing data, invalid codes, use of extreme values, and the examination of unusual data patterns. The regulatory body provides reports to insurers regarding the quality of specific data items reported to the Personal Injury Register. Lastly, the regulatory body conducts an annual audit of the nature of injury variable to assess the accuracy of its coding [45]. As the regulatory body conducts quality control measures, this characteristic was rated as I - *very high*.

Confidentiality, privacy, and system security

Only authorised users are able to access data from the Personal Injury Register. The regulatory body does not routinely provide access to their injury register to external users, but would assess access on a case-by-case basis. Currently, the regulatory body does not require external users to sign a confidentiality agreement to access the injury data. On this basis, confidentiality and privacy were rated as IV - *very low*.

When claim information is obtained by the regulatory body though electronic transmission from insurers, the data security measures in place include encryption of the information during transmission via an internet connection. Individuals who wish to transmit data from an insurer to the regulatory body must first log onto a secure system using individual passwords, and have the appropriate access rights in order to be able to commence a data transmission. As the regulatory body has password protected access to the Personal Injury Register, system security was rated as I - *very high*.

3.2.6.2   Practical characteristics of the Personal Injury Register
Data accessibility

Data from the Personal Injury Register can be accessed by staff of the regulatory body who have been granted access to the data, as required by their position, through individual user identification and passwords. Data from the Personal Injury Register is not routinely made available to external users, but unit record data has been made available on occasion via a CD-ROM.

The regulatory body is mindful of data accessibility concerns. Only a claimant, or their legal representative, can apply for access to their own claim information. However, in some instances, certain government agencies have the legal authority to access information on individuals. As unit record data are currently accessible to external data users via a CD-ROM, data accessibility was rated as II - *high*.

Usefulness

The usefulness of the claims data from the regulatory body to identify key areas for preventive action, in terms of identifying any new or emerging vehicle crash-related injuries and its ability to monitor injury trends over time, is limited. The Personal Injury Register does not have the capability to easily detect new and/or emerging fatal or non-fatal vehicle crash-related injuries. It

would be possible, using data from the Personal Injury Register to identify fatal and non-fatal vehicle crash-related compensated trends over time. However, due to the nature of the data, the time lag to make a claim (i.e. six months) and the time lag between the reporting of the claim and the finalisation of the claims process (i.e. six to seven years) would need to be taken into account and would preclude the generation of timely temporal claims trend data.

The usefulness of the data in the Personal Injury Register to describe the key characteristics of the injured children and young people is mixed. Six data variables from WHO's core minimum and five data variables from WHO's core optional data sets [5] are present in the Register to describe the key characteristics of the injured population (Table 3.18). This represents 75.0% of the WHO's core minimum data set, which was rated as II - *high*, and 50.0% of the WHO's core optional data set, which was rated as III - *low*.

Table 3.18 Assessment of the Personal Injury Register against the WHO's core minimum and optional data sets for injury surveillance

WHO's core minimum data set		WHO's core optional data set	
	Data present[1]		Data present[1]
Identifier	Y	Indigenous origin	N
Age	Y	Date of injury	Y
Sex	Y	Time of injury	Y
Intent	N	External cause	N
Activity	N	Residence	Y
Place of occurrence	Y	Alcohol a factor	N
Nature of injury	Y	Other drugs a factor	N
Mechanism of injury	Y, partial	Injury severity	Y
		Disposition (i.e. patient outcome)	Y
		Incident summary	N

[1] Y= yes; N=no; Y, partial= while pedestrian and motor cyclists and pedal cyclists could be identified, the type of motor vehicle (e.g. car, truck, bus) could not be identified.

Data analysis and guidance material to aid data interpretation

Data in the Personal Injury Register is known as 'long-tail data' because it usually takes a long time for all the claims for a particular year to be lodged and settled. Generally, about 95% of claims arising during a year will be finalised in the next six to seven years after the end of the calendar

year in which the crash occurred. Therefore, as the results of data analyses of injured claimants are available greater than biennially, data analysis of vehicle crash-related fatal and non-fatal injury was rated as III - *low*.

To assist with interpretation of the data in the Personal Injury Register, a Coding Manual was developed [45]. This Manual contains a minimum data set for the claims data and describes each data variable collected. As the current guidance material to aid data interpretation is available for the Personal Injury Register, it was rated as II - *high*.

3.2.7 NSW Police Computerised Operational Policing System

3.2.7.1 Operational characteristics of COPS

Purpose and objectives of the collection

The Computerised Operational Policing System (COPS) is an operational database that contains information on all incidents reported, or that become known to, NSW Police which would require police action, including for investigative and intelligence purposes. The purpose of the COPS is to record information relevant to all victims, offenders and incidents that require police action. The COPS database is not designed for injury surveillance, but for recording and reporting of incidents requiring police attention, therefore the purpose of the COPS to conduct injury surveillance was rated as III - *low*.

Data collection process

Information that is entered into the COPS can be obtained from police officers, via the Police Assistance Telephone Line (i.e. 131 444) and from specialist police officers. Police officers can record information regarding incidents in their official notebook, with this information later being entered into COPS, ideally before the end of a work shift. Police vehicles have mobile data terminals and mobile tablet computers that allow direct entry of incident information into the COPS. NSW Police are currently conducting a Mobility Project, whereby police officers can directly enter information into the COPS from mobile phones, including event narratives, photographs and geographical location coordinates. In the future, it is likely that mobile phone technology will be progressively rolled out to police officers in NSW to record incident information. As the data collection process for the COPS takes between one and three steps to complete, it was rated as I - *very high*.

Case definition

With the exception of the majority of motor vehicle crashes, the COPS database mainly contains information on intentional injuries, such as assaults or homicides. Where a person has been injured and the incident was notified to the police, within the COPS a status of 'trauma' is able to be indicated. Further broad details can be provided regarding the type of injury, such as 'bleeding' or 'bruising'. Incidents that involve a fatality can also be identified in the COPS.

The operational case definitions for injuries involving children and young people in the COPS are described in Table 3.19. Injuries involving children and young people can be identified using the

age data variable and incidents involving NSW residents can be identified using the postcode of residence, where reported. As injuries involving children and young people can be identified in the COPS, the case definition was rated as I - *very high*.

Table 3.19 Identification of fatal and non-fatal injury involving children and young people within the COPS

	Case definition
Injury	
Operational definition	Injurious incidents can be identified through the status of 'trauma' indicator. Injuries involving children and young people can be identified using the age data variable and incidents involving NSW residents can be identified using the postcode of residence, where reported.
Fatal injury	
Operational definition	Fatalities can be identified through a fatality indicator in COPS. Fatal injuries involving children and young people can be identified using the age data variable and incidents involving NSW residents can be identified using the postcode of residence, where reported.

Timeliness

The timeliness of the three surveillance phases of data collection, data analysis and interpretation, and dissemination for information from the COPS can be variable. Information is entered into the COPS in the majority of instances on the day that it is received. Once the information has been entered into the COPS it can then be exported into a data warehouse within NSW Police for routine analyses to be conducted. Using the data warehouse, information is able to be analysed using Microsoft analytic tools to produce pivot tables. There are other NSW government agencies who regularly analyse injury-related information from the COPS, with information disseminated as required. For example, the NSW Bureau of Crime Statistics and Research (BOSCAR) analyse information and report on homicides and Transport for NSW compile daily statistics on road traffic crashes (see Section 3.2.11). As the time taken to complete the three surveillance phases could potentially be daily to monthly, timeliness was rated as I - *very high*.

Uniform classification systems

The WHO recommended core minimum and optional data variables that are collected in the COPS regarding an injured child or young person are classified using a non-standard classification system developed specifically for police. For this reason, as standard classification systems are not used, this characteristic was rated as IV - *very low*.

Quality control measures

Overall, the data validity of the information in the COPS has not been assessed. However, when reports are generated reviews can be retrospectively conducted of information that appears unlikely to be accurate. External agencies that use information from the COPS, such as BOSCAR, Transport for NSW and the CDRT, also check data accuracy of information extracted from the COPS. As there are some quality control measures in place, quality control was rated as I - *very high*.

Confidentiality, privacy, and system security

Access to the COPS is only provided for authorised users and accessed is password protected. Spot checks are conducted to audit access to records held on the COPS and all staff are required to abide by a Code of Best Practice for Information Management. As there is a privacy undertaking required for data users and the COPS has password protected access, the characteristics of confidentiality and privacy, and system security were both rated as I - *very high*.

3.2.7.2 Practical characteristics of COPS

Data accessibility

Initially, the COPS was a text-based data entry and retrieval system. In 2011, a web-based interface, WebCOPS, was incorporated onto the system which allowed for increased search capabilities, the generation and viewing of multimedia files and integration with other systems. The information on incidents involving fatal and non-fatal injury in the COPS can be exported for analysis, including to a data warehouse within NSW Police or external files. The COPS database can be accessed via secure mechanisms, such as via computer, mobile data terminals, mobile tablet computers and mobile phones issued to police.

Both BOSCAR and Transport for NSW receive information via secure mechanisms on homicides and road transport crashes, respectively, from data exported from the COPS. The NSW Ombudsman has direct access to the COPS and information from the COPS records is provided to the ABS and other agencies for the compilation of crime statistics. Data from the COPS, in the form of police reports of death can also be available in the NCIS (see Section 3.1.3). As unit record data are accessible to data users from an internet-based interface, data accessibility was rated as I - *very high*.

Usefulness

The usefulness of data from the COPS to identify key areas for preventive action, in terms of identifying new or emerging injury mechanisms and its ability to monitor injury trends over time, is variable. The number of some types of injuries, such as road trauma, are monitored on a daily basis by Transport for NSW, but the routine analysis of data from the COPS is not usually conducted to identify new or emerging injury mechanisms. It is possible to identify temporal trends of some type of injuries, such as road trauma or homicides, through using information originally obtained from the COPS, but these data analyses are usually conducted by other government agencies.

The usefulness of the information from the COPS to describe the key characteristics of injured children and young people is mixed. All the data variables from WHO's core minimum and nine data variables from the WHO's core optional data sets [5] are collected in the COPS and can be used to describe the key characteristics of the injured population (Table 3.20). This represents all of the WHO's core minimum data set, which was rated as I - *very high,* and 90.0% of the WHO's core optional data set, which was also rated as I - *very high*. While drugs can be identified as a contributing factor in the COPS, it is thought that the identification of drug use was variable within the COPS.

Table 3.20 Assessment of the COPS against the WHO's core minimum and optional data sets for injury surveillance

WHO's core minimum data set	Data present[1]	WHO's core optional data set	Data present[1]
Identifier	Y	Indigenous origin	Y
Age	Y	Date of injury	Y
Sex	Y	Time of injury	Y
Intent	Y	External cause	Y
Activity	Y, partial	Residence	Y
Place of occurrence	Y	Alcohol a factor	Y
Nature of injury	Y	Other drugs a factor	Y
Mechanism of injury	Y	Injury severity	N
		Disposition (i.e. patient outcome)	Y
		Incident summary	Y

[1] Y= yes; N=no; Y, partial=this information can be included in free-text descriptions.

Data analysis and guidance material to aid data interpretation

Information on specific types of injuries, such as road traffic crashes, assaults resulting in injury, and homicides, are reported by other government agencies using information obtained from the COPS. Information on fatal road traffic crashes are reported daily and information on all crashes are reported on an annual basis (see Section 3.2.11). Reporting on assaults and homicides are conducted on an as needs basis and information on child injury-related deaths are reported by the NSW CDRT (see Section 3.1.2). As information from the COPS was analysed on a daily basis, data analysis was rated as I – *very high*.

To assist with interpretation of information in the COPS, the NSW Police have developed some guidelines to aid in data interpretation, but the current guidelines could be updated. As guidance material was available to aid data interpretation for the COPS but that these guidelines could be updated, this characteristic was rated as III - *low*.

3.2.8 Public Health Real-time Emergency Department Data Collection

3.2.8.1 Operational characteristics of the PHREDSS

Purpose and objectives of the collection

The purpose of the PHREDSS is to perform comprehensive, sustainable and rapid population health monitoring and surveillance. The PHREDSS enables near real-time monitoring of population disease and injury trends using information that is routinely recorded in ED patient management information systems in public hospitals in NSW. The aims of PHREDSS are to provide early warning, rapid intelligence and situational awareness of public health problems that result in ED visits, including:

- bioterrorism;

- influenza, including pandemic influenza; and

- acute conditions and injuries for which alternative rapid information is otherwise unavailable, such as illicit drug problems [46].

As the purpose and/or the aims of the PHREDSS included conducting surveillance, the purpose of the PHREDSS to conduct injury surveillance was rated as I - *very high*.

Data collection process

If a person is injured and seeks treatment at a hospital ED in NSW information about the patient presentation in the majority of public hospital EDs is collect using an ED patient management information system and clinical data collection system. The PHREDSS incorporates patient presentation characteristics with free-text messaging of the presenting problem (e.g. fractured pelvis) and the triage nurse assessment. Information from the patient management system is then conveyed by LHD to the NSW Ministry of Health electronically. Data is collected in the PHREDSS by either real-time electronic messaging or through data extraction every 4 to 6 hours and batch file transfer from LHDs. On arrival the free-text information is automatically cleaned and classified into syndrome categories using naïve Bayesian classifiers [47].

Data collection for the PHREDSS began on 1 September 2003 at 12 public hospital EDs in the Sydney metropolitan region. From 2006 there were 38 EDs providing data to the PHREDSS and in 2012 there were 59 EDs providing data to the PHREDSS. The public hospitals that provide data to the PHREDSS represent around 84% of all ED services in NSW. Hospitals in Sydney, South Western Sydney and Western Sydney LHDs changed their ED information system in either 2007 or 2008 and it was not possible to collect data from these hospitals for the PHREDSS for an

extended period of time [48]. In 2008, emergency telephone call (i.e. 000) and despatch data were also incorporated in the database and are also analysed with the ED data.

From when the ED presentation occurs, the data collection process can take around three steps to complete until the data reaches the PHREDSS (i.e. from presentation, entry into the patient administrative system, to transfer of data to the NSW Ministry of Health). As the data collection process for the PHREDSS takes between one and three steps to complete, it was rated as I - *very high*.

Case definition

The operational case definitions for injury-related ED presentations involving children and young people in the PHREDSS are described in Table 3.21. Injury-related ED presentations can be identified in the PHREDSS using a combination of injury diagnosis and/or external cause codes that are classified using either the ICD-9-CM [39], ICD-10 [9], ICD-10-AM [20] or Snomed-CT [40] classifications systems or through free-text searching of the presenting problem or the triage nurse assessment.

In some cases, unintentional and intentional injuries can be identified using the external cause classifications. Injury-related presentations involving children and young people in NSW can be identified using the age at presentation and the state of residence data variables. As injury-related presentations of children and young people can be identified in the PHREDSS, the case definition was rated as I - *very high*. Using the departure status variable, deaths of children and young people in the ED can also be identified.

Table 3.21 Identification of fatal and on-fatal injury involving children and young people in the PHREDSS

	Case definition
Injury	
Operational definition	Injury-related ED presentations can be identified using ICD-9-CM, ICD-10, ICD-10-AM injury diagnosis and/or external cause classifications, Snomed-CT classifications and/or searching free-text presenting problem or triage nurse assessments. The age at presentation variable can identify presentations involving children and young people and the state of residence data variable can identify presentations of NSW residents.
In-hospital mortality	
Operational definition	Injury-related ED presentations can be identified using ICD-9-CM, ICD-10, ICD-10-AM injury diagnosis and/or external cause classifications, Snomed-CT classifications and/or searching free-text presenting problem or triage nurse assessments. The age at presentation variable can identify presentations involving children and young people, the state of residence data variable can identify presentations of NSW residents, and the departure status data variable can identify deaths that occurred in the ED.

Timeliness

The timeliness of the three surveillance phases of data collection, data analysis and interpretation, and dissemination for the PHREDSS are very high. ED presentation data is transferred daily from each ED to the NSW Ministry of Health. Automated cumulative sum techniques are used to assess the statistical significance and amplitude of a range of disease or injury incidence on a daily basis [47]. Comparisons of the number of presentations for each syndrome each day are made to the same day in the previous 12 months, standardised for level and variability of the overall incidence of the syndrome. Weekly counts of each syndrome are available and are shown against weekly counts of each syndrome for the same time period in previous years.

Injury is one of the syndromes that can be reviewed on a daily basis using the PHREDSS. However, examination of specific injury mechanism (e.g. vehicle crashes) or types of injuries requires additional case identification and analysis steps. However, certain types of injuries are examined for planned surveillance of mass crowd gatherings including head injury, burns, and open wounds and ambulance call outs for drowning/ near-drowning, assault, gunshot/ stabbing/ piercing, and traumatic injuries. Statistical summaries of ED presentations for a range of health syndromes are monitored daily by the NSW Ministry of Health. Information regarding ED presentations is also available using the EDDC (see Section 3.2.3). As the time taken to complete the three surveillance phases was between daily and monthly, timeliness was rated as I - *very high*.

Uniform classification systems

The WHO recommended core minimum and optional data variables that are collected in the PHREDSS regarding an injured child or young person are classified using a number of standard classification systems. Four data variables from the WHO's core minimum and three data variables of the WHO's core optional data sets [5] collected by the PHREDSS are classified using either ICD-9-CM [39], ICD-10 [9], ICD-10-AM [20] or Snomed-CT [40] (i.e. intent, nature and mechanism of injury, external cause) and the NHDD [11] (i.e. sex, indigenous origin, disposition). As standard classification systems were used to record information for the data variables from the WHO's core minimum and optional data set collected by the PHREDSS, uniform classification systems were rated as I - *very high*.

Quality control measures

The ED preliminary diagnoses that are used for monitoring and surveillance in the PHREDSS are only indicative of the patient's condition. They may not be an accurate final diagnosis, particularly if further diagnostic tests are required. The PHREDSS team use some data cleaning scripts to clean diagnosis codes. For example, the team has scripts that are able to clean and/or identify the E-codes and V-codes (i.e. external cause and supplementary classification of factors influencing health status codes) that are used in ICD-9-CM so that these classifications do not become confused with ICD-10-AM classifications. The PHREDSS team also use data cleaning scripts in order to harmonize classifications used by different hospitals, such as M or F, versus 1 or 2, to identify males and females, respectively. As the PHREDSS team conducts quality control measures, this characteristic was rated as I - *very high*.

Confidentiality, privacy, and system security

Only authorised users who have signed a confidentiality and privacy agreement may be provided with access to view the PHREDSS reports and/or access to non-individually identifying (e.g. no first or last name, date of birth, or residential address) unit record ED presentation data from the PHREDSS. The confidentiality undertaking covers issues such as appropriate use of the data; data and information release procedures; privacy and security procedures; NSW Ministry of Health acknowledgement; and data storage security. As there is a confidentiality undertaking for data users and the NSW Ministry of Health has password protected access to data from the PHREDSS, the characteristics of confidentiality and privacy, and system security were both rated as I - *very high*.

3.2.8.2 Practical characteristics of the PHREDSS

Data accessibility

The PHREDSS data are accessed by staff at the NSW Ministry of Health with responsibility for biosurveillance activities. The PHREDSS daily reports are automatically generated. However, if further data analysis is required, unit record data can be accessed via SAPHARI - the NSW Ministry of Health's data warehouse that contains data collections relevant to population health.

To access data from the PHREDSS, a secure electronic password protection connection is established with the SAPHARI server and users sign into SAPHARI with a user-specific password made up of a random combination of alphanumeric characters. Once accessed, unit record data is available for data analysis on SAPHARI using SAS Enterprise Guide. Data in the PHREDSS can also be accessed by approved external users who obtain ethics approval and sign a confidentiality agreement. As unit record data are accessible to data users from an internet-based interface, data accessibility was rated as I - *very high.*

Usefulness

The usefulness of the PHREDSS to identify key areas for preventive action, in terms of identifying new or emerging injury mechanisms and its ability to monitor injury trends over time, is variable. While the number of injury-related ED presentations can be monitored on a daily basis, the routine analysis of data from the PHREDSS is not conducted to identify new or emerging injury mechanisms. However, if there was a spike in the number of injury presentations on a particular day, these would be identified, but further investigation would need to be conducted to identify the type of injury mechanism and/or injuries. It is possible to identify temporal trends of injury-related ED presentations using data from the PHREDSS.

The usefulness of information from the PHREDSS to describe the key characteristics of injured children and young people is mixed. Five data variables from WHO's core minimum and seven data variables from the WHO's core optional data sets [5] are present in the PHREDSS to describe the key characteristics of the injured population (Table 3.22). This represents 62.5% of the WHO's core minimum data set, which was rated as II - *high,* and 70.0% of the WHO's core optional data set, which was also rated as II - *high.* While alcohol and drugs can be identified as a factor in ED presentations using the free-text descriptions, the identification of these features is variable.

Table 3.22 Assessment of the PHREDSS against the WHO's core minimum and optional data sets for injury surveillance

WHO's core minimum data set		WHO's core optional data set	
	Data present[1]		Data present[1]
Identifier	N	Indigenous origin	Y
Age	Y	Date of injury	N
Sex	Y	Time of injury	N
Intent	Y, partial	External cause	Y, partial
Activity	N	Residence	Y
Place of occurrence	N	Alcohol a factor	Y, partial
Nature of injury	Y, partial	Other drugs a factor	Y, partial
Mechanism of injury	Y, partial	Injury severity	N
		Disposition (i.e. patient outcome)	Y
		Incident summary	Y, partial

[1] Y= yes; N=no; Y, partial= this information can be included in free-text descriptions. For nature and mechanism of injury it can also potentially be contained within classified data.

Data analysis and guidance material to aid data interpretation

Data from the PHREDSS are analysed and examined daily by staff at the NSW Ministry of Health. Where necessary, the NSW Ministry of Health produces a PHREDSS situation report to notify LHDs and local Public Health Units of any unusual increase in health syndromes that may be of concern. Therefore, as information from the PHREDSS was analysed on a daily basis, data analysis was rated as I - *very high*.

Interpretation of syndromic data from the PHREDSS is assisted by a surveillance Manual [46]. The Manual contains information regarding the procedures for checking and reviewing daily reports from the PHREDSS and what to do if further review is required for certain health syndromes either by the PHREDSS team and/or whether a PHREDSS situation report should be prepared. On this basis, guidance material to aid data interpretation was rated as I - *very high*.

3.2.9 Sporting Injuries Insurance Scheme Claims Data

3.2.9.1 Operational characteristics of the Sporting Injuries Claims data

Purpose and objectives of the collection

Initially in NSW, a NSW Sporting Injuries Committee was established under the Sporting Injuries Insurance Act 1978 and was responsible for the "compilation and maintenance of such statistics with respect to the incidence of injuries resulting from sporting or athletic activities as the Committee considers would assist in in the performance of the functions given to it under the Act or any other Act". In 2014, the functions of the NSW Sporting Injuries Committee were taken over by WorkCover NSW administrators. As one of the stated main purposes of the Sporting Injuries Claims data was for data to be used to conduct statistical reporting, the purpose of the Sporting Injuries Claims data to conduct injury surveillance was rated as II - *high*.

Data collection process

The Sporting Injuries Insurance Scheme was established in 1978 and provides compensation to individuals who are seriously injured, or their beneficiaries if their injuries result in death, while participating in authorised sporting activities, including during competitions, trials or training within or outside of NSW. The Scheme provides personal injury cover for registered members of sporting organisations that have joined the Scheme. This can include both players or officials (i.e. coaches, referees, umpires, judges, marshals, timekeepers) of the sporting organisation. There are around 150 sporting organisations that are members, representing 65 sports. There is also a Supplementary Sporting Injuries Benefit Scheme that was established in 1983 that covers serious injury or death of NSW school students (both government and private schools) who are injured while playing authorised school sporting activities, including during physical education classes, school lessons, sports carnivals, and competitions or training. The Supplementary Scheme also includes participants who are injured in a sporting activity of NSW Sport and Recreation. The Sporting Injuries Insurance Scheme and the Supplementary Scheme will both be referred to as the Sporting Injuries Insurance Scheme in this report. From 1 September 2015, the State Insurance and Care Governance Act 2015 commenced and the Sporting Injuries Insurance Scheme became part of a new government agency called icare.

In terms of the data collection process for the Scheme, an initial injury advice form is completed for all cases where an injury is serious or could result in a claim and this form is submitted to the NSW Sporting Injuries Insurance Scheme. If a claim is to be made, a notice of serious injury or death benefit application form is then completed within 12 months of the date of injury and

provided to the NSW Sporting Injuries Insurance Scheme, along with medical reports, an organisational confirmation statement of the incident and any witness statements. The degree of permanent loss is assessed by an independent medical panel, once injury treatment and rehabilitation has been completed. As the data collection process for the Sporting Injuries Claims data takes between one and three steps to complete, it was rated as I - *very high*.

Case definition

The operational case definitions for sports-related injuries involving children and young people in the Sporting Injuries Claims data are described in Table 3.23. Only serious injuries are included in the Claims data, such as permanent loss of the use of arms including hands, legs, sight, hearing, kidney or spleen damage or mental capacity. Minor injuries, such as fractures or sprains are not included, nor are dental injuries. Different types of injuries are able to be identified, along with different types of sports that the injured individual was participating in at the time of the injury. Sporting injuries involving children and young people in NSW can be identified using the date of birth of the individual and the state of residence data variables. As injuries of children and young people can be identified in the Sporting Injuries Claims data, the case definition was rated as I - *very high*.

Timeliness

The three surveillance phases of data collection, data analysis and interpretation, and dissemination for the Sporting Injuries Claims data can take several years to complete. An injured person has up to 12 months from the date of the injury to submit a claim to the Scheme. It then can take a variable amount of time for the claim to be finalised as all treatment and rehabilitation need to be completed for an injury to stabilise to a point where the degree of permanent loss is able to be assessed by an independent medical panel. In some cases it can take up to five years after the end of a calendar year for all claims to be finalised. The NSW Sporting Injuries Insurance Scheme does disseminate information regarding the number of claims that have been received and payments made from the scheme for each financial year in an annual report. As the time taken to complete the three surveillance phases for inclusion of information in the annual report for the Scheme was conducted between annually and biennially, timeliness was rated as III - *low*.

Table 3.23 Identification of fatal and non-fatal injury involving children and young people within the Sporting Injuries Claims data

	Case definition
Injury	
Operational definition	A person who sustains a serious injury, such as permanent loss of the use of arms including hands, legs, sight, hearing, kidney or spleen damage or mental capacity, while participating in authorised sporting activities of member sporting organisations or during authorised school sporting activities or who are injured during a sporting activity of NSW Sport and Recreation. The date of birth and injury date data variables can be used to calculate age to identify incidents involving children and young people. The address of the claimant can be used to identify NSW residents.
Fatal injury	
Operational definition	A person who sustains a fatal injury while participating in authorised sporting activities of member sporting organisations or during authorised school sporting activities or who are fatally injured during a sporting activity of NSW Sport and Recreation. Fatal injuries can be identified using a fatal injury indicator. The date of birth and injury date data variables can be used to calculate age to identify incidents involving children and young people. The address of the claimant can be used to identify NSW residents.

Uniform classification systems

At this stage, the WHO recommended core minimum and optional data variables that are collected in the Sporting Injuries Claim data are entered directly into a spreadsheet. Information in data variables largely appears as text descriptions. In the near future, a new electronic database will be created for the Sporting Injuries Claim data, with information recorded in the database classified according to a classification system that will be developed by the Sporting Injuries Insurance Scheme. As a standard classification system is not currently used to code the Sporting Injuries Claim data, this characteristic was rated as IV - *very low*.

Quality control measures

There are only a very small number of claims made each year (i.e. around 20 claims) to the Sporting Injuries Insurance Scheme and currently these are entered into an on-line spreadsheet from paper-based records. A Procedural Manual specifies what information should be obtained in relation to each claim and how payments should be processed. However, data validity for the small number of records is not routinely assessed. In the future, the new Sporting Injuries Claim

database will have the functionality to restrict the entry of data that is outside the range expected for a particular data variable. As there are no quality control measures currently in place, quality control is currently rated as IV – *very low.*

Confidentiality, privacy, and system security

Only authorised users in the claims team are able to access the spreadsheets that contain the Sporting Injuries Claims data. The Scheme does not routinely provide access to their claims data to external users, but would assess access on a case-by-case basis after a formal request. Currently, the Scheme does not require users to sign a confidentiality agreement to access their injury data. On this basis, confidentiality and privacy were rated as IV - *very low.*

Claims to the Sporting Injuries Insurance Scheme are made directly to the Scheme using hardcopy application forms. Information regarding each claim is then entered into spreadsheets by claims support staff. Access to the Sports Injury Claims data is only available to the claims team, who first must log onto a secure network using individual passwords. As the Sporting Injuries Claims data is password protected, system security was rated as I - *very high.*

3.2.9.2 Practical characteristics of the Sporting Injuries Claims data
Data accessibility

Information from the Sporting Injuries Insurance Scheme can be accessed by claims staff through individual user identification and passwords. Information from the Sporting Injuries Insurance Scheme on sporting injuries is not routinely made available to external users, and data access would be assessed on a case-by-case basis after a formal request. As unit record data are not currently accessible to external data users, data accessibility was rated as IV – *very low.*

Usefulness

The usefulness of the Sporting Injuries Claim data to identify key areas for preventive action, in terms of identifying new or emerging injury mechanisms and its ability to monitor injury trends over time, is limited. There are only a small number of claims that are made each year. However, the circumstances regarding each claim are reviewed. The Sporting Injuries Claim data does not have the capability to easily detect new and/or emerging serious sporting injuries, nor to examine trends over time, due to the relatively low number of claims that are made each year.

The usefulness of the data in the Sporting Injuries Insurance Scheme to describe the key characteristics of injured children and young people was high. Seven data variables from WHO's core minimum and six data variables from WHO's core optional data sets [5] are present in the claims data to describe the key characteristics of the injured population (Table 3.24). This represents 87.5% of the WHO's core minimum data set, which was rated as I – *very high*, and 60.0% of the WHO's core optional data set, which was rated as II - *high*.

Table 3.24 Assessment of the Sporting Injuries Claims data against the WHO's core minimum and optional data sets for injury surveillance

WHO's core minimum data set	Data present[1]	WHO's core optional data set	Data present[1]
Identifier	Y	Indigenous origin	N
Age	Y	Date of injury	Y
Sex	Y	Time of injury	N
Intent	N	External cause	Y, partial
Activity	Y	Residence	Y
Place of occurrence	Y, partial	Alcohol a factor	N
Nature of injury	Y	Other drugs a factor	N*
Mechanism of injury	Y, partial	Injury severity	Y
		Disposition (i.e. patient outcome)	Y
		Incident summary	Y

[1] Y= yes; N=no; Y, partial=could be available in text descriptions.

*For deaths, toxicology information is obtained from autopsy findings.

Data analysis and guidance material to aid data interpretation

Currently, data from the Sporting Injuries Insurance Scheme is analysed on an ad hoc basis internally and information on claim experience is provided publically in annual reports of the Scheme. Therefore, as data analysis was conducted annually to biennially with the results being made available to the public, data analysis was currently rated as III - *low*.

A Procedure Manual has been developed that specifies what information should be obtained in relation to each claim and how payments should be processed. However, it is likely that this Manual will be updated with the development of the new electronic database for the Sporting

Injuries Insurance Scheme. As there is some current guidance material to aid data interpretation available for the Sporting Injuries Insurance Scheme, it was rated as II - *high*.

3.2.10 Surf Life Saving Australia SurfGuard Database

3.2.10.1 Operational characteristics of the SurfGuard Database

Purpose and objectives of the collection

Surf Life Saving Australia's (SLSA) SurfGuard Database is an internet-based application that enables SLSA and its various clubs, branches, state offices and the SLSA national office to access various membership and club administration information. One component of the SurfGuard Database is the Incident Reporting Database that contains information on injuries and incidents. The purpose of the Incident Reporting Database is to electronically record and enable reports to be produced based on the data captured on an incident report form (see Case definition for the types of incidents reported). As one of the stated main purposes of the SurfGuard database was for data to be used to conduct statistical reporting, the purpose of the SurfGuard data to conduct injury surveillance was rated as II - *high*.

Data collection process

Nationally, SLSA has over 158,000 members and 310 affiliated surf lifesaving clubs [49]. All injuries (i.e. whether minor, moderate or major) and incidents (i.e. first aid, major rescue, resuscitation, search and rescue, drowning) that involve Club members and/or members of the public are recorded in the SurfGuard Database. If an injury or an incident occurs, then an incident report is completed. All incident forms are then entered into the SurfGuard Database using the SurfGuard web portal by an approved Club officer. As the data collection process for the SurfGuard Database takes between one and three steps to complete, it was rated as I - *very high*.

Case definition

SLSA's SurfGuard database includes information recorded by SLSA staff and volunteers on incidents that involve: (i) major first aid (i.e. an incident where a person has been treated and will need further follow up medical treatment); (ii) minor first aid (i.e. an incident where a person has been treated for low level first aid such as cuts, abrasions or blisters); (iii) major rescue (i.e. a rescue where a person who required assistance was returned to shore, or place of safety, and who, without assistance would have drowned or become injured); (iv) search and rescue; (v) drowning; and (vi) any injuries that have occurred during a surf club competition, a surf patrol, training for competition, carnivals, or during other SLSA endorsed activities.

Where a young person has sustained an injury, these incidents can be identified through a number of specific SLSA incident types, including major or minor first aid, drowning or any injuries, or through a nature of injury data variable. If information is required on injuries sustained during a particular type of activity or an injury that occurred during a particular type of event, such as during a surf boat race, text searching of incident and/or activity type data variables are required.

The operational case definitions for injuries involving children and young people in the SurfGuard Database are described in Table 3.25. Injuries involving children and young people can be identified using the age data variable and incidents involving NSW residents can be identified using the postcode of residence, where reported. As injuries involving children and young people can be identified in the SurfGuard Database, the case definition was rated as I - *very high*. Using the condition of patient when transported variable, deaths of children and young people at the scene can also be identified.

Table 3.25 Identification of fatal and non-fatal injury involving children and young people within SurfGuard

	Case definition
Injury	
Operational definition	Injurious incidents can be identified through the incident types of major or minor first aid, drowning or any injuries, or through a nature of injury data variable. Injuries involving children and young people can be identified using the age data variable and incidents involving NSW residents can be identified using the postcode of residence, where reported.
Fatal injury	
Operational definition	Injurious incidents can be identified through the incident types of major or minor first aid, drowning or any injuries, or through a nature of injury data variable. Injuries involving children and young people can be identified using the age data variable and incidents involving NSW residents can be identified using the postcode of residence, where reported. Fatal injuries at the scene can be identified in SurfGuard using the condition of patient when transported data variable.

Timeliness

The timeliness of the three surveillance phases of data collection, data analysis and interpretation, and dissemination of information from the SurfGuard Database can be variable. Information is entered into an incident report log and then incident forms are entered into the SurfGuard Database using the SurfGuard web portal as near as possible in time to the occurrence of the incident. National and state wide data are then analysed by SLSA, with SLSA disseminating

information on the characteristics of injuries as required. As the time taken to complete the three surveillance phases could potentially be daily to monthly, timeliness was rated as I – *very high*.

Uniform classification systems

The WHO recommended core minimum and optional data variables that are collected in the SurfGuard Database regarding an injured child or young person are classified using a classification system developed by SLSA. As a standard classification system is not used to code information in SurfGuard, this characteristic was rated as IV - *very low*.

Quality control measures

The data validity and the reliability of the SurfGuard Database has not been assessed. SLSA does advise staff and volunteers to check all data for accuracy before it is entered into the Database. As there are no quality control measures in place, quality control was rated as IV – *very low*.

Confidentiality, privacy, and system security

Injury and incident information in the SurfGuard Database is available to authorised users within SLSA. Authorised users must have a user account set up and a personalised user name and password to login to the SurfGuard Database. This involves completion of an *IT Systems User Account Application Form 049*, with the individual agreeing that all information within the SurfGuard Database should be handled in accordance with the SLSA privacy policy. Users can be provided with full access or read-only access to different components of the SurfGuard Database and access can be restricted to the club, branch or state-level. As there is a privacy undertaking required for data users and SLSA has password protected access to data from the SurfGuard Database, the characteristics of confidentiality and privacy, and system security were both rated as I - *very high*.

3.2.10.2 Practical characteristics of the SurfGuard Database

Data accessibility

The injury data are stored within the Incident Reporting Database, a MySQL relational database, integrated with the SurfGuard Database. Injury data can be accessed via the SurfGuard web portal. This is a secure website available only to authorised users within SLSA. External users can apply to SLSA to analyse injury data from the SurfGuard database and these requests are assessed on a case-by-case basis. As unit record data are accessible to data users from an internet-based interface, data accessibility was rated as I - *very high*.

Usefulness

An assessment of the usefulness of injury data in the SurfGuard Database to describe the key characteristics of the injured population show that six data variables from WHO's core minimum and five data variables from the WHO's core optional data sets [5] are present in the SurfGuard Database to describe the key characteristics of the injured population (Table 3.26). This represents 75.0% of the WHO's core minimum data set, which was rated as II - *high* and 50.0% of the WHO's core optional data set, which was rated as III - *low*.

The SurfGuard Database does contain additional information on some surf-specific conditions, such as wind, weather, sea, water surface, wave and rip type. The Database is also able to record information on the first aid and cardiopulmonary resuscitation conducted, and whether oxygen was provided. There are some limitations of the Database in that it is not possible to accurately identify which incidents occurred when the individual was in the water versus on the beach. The data collectors often recorded the type of the surf event (e.g. Bronze Medallion), rather than the activity being conducted at the time of the incident (e.g. swimming), so in some cases specific information on the activity performed at the time of the injury is absent. The data quality and data completeness can be variable, with many of the data variables provided as text or reported as multiple responses in a number of data variables [50].

Table 3.26 Assessment of SurfGuard against the WHO's core minimum and optional data sets for injury surveillance

WHO's core minimum data set	Data present[1]	WHO's core optional data set	Data present[1]
Identifier	Y	Indigenous origin	N
Age	Y	Date of injury	Y
Sex	Y	Time of injury	Y
Intent	N	External cause	N
Activity	Y	Residence	Y
Place of occurrence	Y	Alcohol a factor	N
Nature of injury	Y	Other drugs a factor	N
Mechanism of injury	N	Injury severity	N
		Disposition (i.e. patient outcome)	Y
		Incident summary	Y

[1] Y= yes; N=no.

Data analysis and guidance material to aid data interpretation

SLSA analyse data from the SurfGuard Database on an as needs basis, which could be daily, weekly or monthly to determine the number of injuries and incidents occurring, along with the characteristics of the circumstances of these events. As information on injuries of children and young people were not conducted on a routine annual basis, the data analysis of injuries of children and young people using data from the SurfGuard Database was rated as III - *low*.

There is a SurfGuard User Guide [51] that provides information on the functionality of the Database, how to enter, record and process different types of information from new member requests to recording different types of equipment available at each Club. The User Guide contains a chapter on patrol logs that specifies how information on any rescues conducted should be recorded and a chapter describing incident reporting. Each different type of incident (e.g. major versus minor first aid, major rescue) has been defined by SLSA and a flow chart has been developed to describe the incident reporting and follow-up practices for the reporting of any injuries and incidents by SLSA staff and volunteers. On this basis, guidance material to aid data interpretation was rated as II - *high*.

3.2.11 Transport for NSW CrashLink

3.2.11.1 Operational characteristics of CrashLink

Purpose and objectives of the collection

The purpose of CrashLink is to be the official source of vehicle crash statistics in NSW. There are three main objectives for the collection of vehicle crash information for Transport for NSW. These are:

- monitoring and research;
- strategic planning; and
- production of routine reports and analyses [52].

As the purpose and/or objectives of CrashLink included conducting research and monitoring vehicle crash trends, the purpose of CrashLink to conduct injury surveillance was rated as II - *high*.

Data collection process

Within NSW, Transport for NSW obtains information on vehicle crashes from information collected and entered into the COPS by NSW Police. Information is currently collected on unintentional vehicle crashes that occurred on a road open to the public, involved at least one moving road vehicle, and involved a death, injury or at least one motor vehicle being towed away[53].

From when a vehicle crash occurs, the data collection process can take up to four steps to complete until the data reaches CrashLink (i.e. from the police either attending the crash or receiving information about the crash, to the crash data being entered into the COPS, to information being obtained by Transport for NSW, and subsequent entry into CrashLink). As the data collection process for CrashLink took between four and six steps to complete, it was rated as II - *high*.

Case definition

The operational case definitions for vehicle crash-related fatal and non-fatal injuries in CrashLink are described in Table 3.27. Vehicle crashes that fatally or non-fatally injured car occupants, motorcyclists, pedal cyclists or pedestrians are able to be identified in CrashLink using the 'class of road user' data variable. Children and young people can be identified using the age of the injured person. Crashes that involved NSW residents can be identified using the 'state of residence' data variable. As vehicle crashes that resulted in fatal and non-fatal injury of children and young people in NSW can be identified in CrashLink, the case definition was rated as I - *very high*.

Table 3.27 Identification of fatal and non-fatal injury involving children and young people in CrashLink

	Case definition
Injury	
Operational definition	A person unintentionally non-fatally injured in a vehicle crash in NSW on a public road, where the injury is reported to NSW police and the incident is entered into COPS. Non-fatal injuries are identified using the 'degree of casualty' variable, where the person is identified as injured (i.e. '2'). The 'class of road user' variable is able to be used to identify car occupants (i.e. '1'), motorcyclists (i.e. '8'), pedal cyclists (i.e. '9') or pedestrians (i.e. '11'). Children and young people can be identified using the age of the injured person and crashes that involved NSW residents can be identified using the 'state of residence' data variable.
Fatal injury	
Operational definition	A person unintentionally fatally injured in a vehicle crash in NSW on a public road, where the death is reported to the NSW police and the incident is entered into COPS. Fatal injuries are identified using the 'degree of casualty' variable, where the person is identified as fatally injured (i.e. '1'). The 'class of road user' variable is able to be used to identify car occupants (i.e. '1'), motorcyclists (i.e. '8'), pedal cyclists (i.e. '9') or pedestrians (i.e. '11'). Children and young people can be identified using the age of the injured person and crashes that involved NSW residents can be identified using the 'state of residence' data variable.

Timeliness

For Transport for NSW, the three surveillance phases of data collection, data analysis and dissemination of information from CrashLink take roughly nine months to complete from the end of each calendar year. Data on vehicle crashes are electronically provided each week from the COPS to Transport for NSW, where a coding and data entry service check and enter additional information into CrashLink. If the vehicle crash involves a fatality, the police immediately send a preliminary report to Transport for NSW. This allows Transport for NSW to release daily and monthly reports on the NSW road toll. Roughly nine months after the end of a calendar year, Transport for NSW produce a statistical summary report describing the profile and temporal trends of vehicle crashes in NSW. As the time taken to complete the three surveillance phases was daily to monthly, timeliness was rated as I - *very high*.

Uniform classification systems

The WHO recommended core minimum and optional data variables that are collected in CrashLink are classified using a standard classification system. Six data variables of the WHO's

core minimum and optional data sets [5] collected by CrashLink are classified using national guidelines for reporting vehicle crashes [54] (i.e. sex, place of occurrence, injury mechanism, residence, alcohol use, disposition). As a standard classification system was used to record information for all the variables from the WHO's core minimum and optional data set collected by CrashLink, uniform classification systems were rated as I - *very high*.

Quality control measures

A number of mechanisms are used to try to ensure that CrashLink contains good quality data. Transport for NSW created the CrashLink Data Manual [55] that contains a minimum data set for the data collection, including a description of each data variable and associated classification rules. The Data Manual also contains information regarding any changes that were made to particular data variables over time.

Following data entry, CrashLink data undergoes computer-based cross-checking to identify logic and consistency errors. Data checks are also conducted quarterly to identify errors, such as crashes that do not meet the case definitions, or to identify and exclude any duplicate entries. As Transport for NSW conducts quality control measures, this characteristic was rated as I - *very high*.

Confidentiality, privacy, and system security

Transport for NSW is required to satisfy privacy conditions with respect to the unit record data in CrashLink. Reporting of any unit record data must insure that a person cannot be identified (e.g. using surnames, registration numbers, licence numbers, or addresses). Staff of Transport for NSW who have access to CrashLink data, do so via individual passwords, and are expected to perform their duties in accordance with the conditions of the NSW Privacy Act [56].

Outside consultants and contractors who undertake work on behalf of Transport for NSW are required to sign a contract which specifies confidentiality requirements. Additionally, any staff contracted by Transport for NSW who have access to CrashLink data are informed of their responsibilities with regard to data confidentiality and must sign a confidentiality agreement. As data confidentiality requirements exist for data users and Transport for NSW require password protected access to data in CrashLink, the characteristics of confidentiality and privacy, and system security were both rated as I - *very high*.

3.2.11.2 Practical characteristics of CrashLink

Data accessibility

CrashLink data is stored in an Oracle database. Transport for NSW staff must obtain approval from their Manager to access data from CrashLink and, once granted, may access a centralised version of CrashLink. Data from CrashLink are not routinely made available to external users, but unit record data has been made available to external users via a CD-ROM in the past. As unit record data are accessible to external data users via a CD-ROM, data accessibility was rated as II - *high*.

Usefulness

The usefulness of CrashLink to identify key areas for preventive action, in terms of identifying new or emerging vehicle crash-related fatal or non-fatal injuries and its ability to monitor injury trends over time, are reasonable. Data from CrashLink are able to be used to identify 'black spot' locations where multiple vehicle crashes have occurred, which can signal that road improvements or other road safety measures are required. Data from CrashLink are also able to identify fatal and non-fatal vehicle crash-related injury temporal trends.

An assessment of the usefulness of fatal and/or non-fatal vehicle crash-related injury data in CrashLink to describe the key characteristics of the injured population show that five data variables from WHO's core minimum and six data variables from the WHO's core optional data sets [5] are present in CrashLink to describe the key characteristics of the injured population (Table 3.28). This represents 62.5% of the WHO's core minimum data set and 60.0% of the WHO's core optional data set, which were both rated as II - *high*.

Data analysis and guidance material to aid data interpretation

Information on fatalities from CrashLink are analysed and reported by Transport for NSW daily by type of vehicle crash for the preceding day (i.e. the daily road toll) and monthly in Monthly Bulletins. The Bulletins describe monthly crash trends, the type and location of vehicle crashes and describe factors that may have been involved in the crash, such as fatigue, vehicle speed, or alcohol consumption. Transport for NSW produce annual summaries of all vehicle crashes in NSW, nine months after the end of a calendar year. These summaries provide information on the profile and temporal trends of vehicle crashes in NSW. Transport for NSW have developed interactive crash statistics to examine fatal crash trends over time that can be viewed for different age groups. All of these reports and the interactive crash statistics are available in the public

domain through the Transport for NSW website. Therefore, data analysis of vehicle crash-related fatal and non-fatal injury in CrashLink was rated as I - *very high*.

Interpretation of the data from CrashLink is assisted by a Data Manual [55]. The Manual contains a summary description of each variable and information describing the coding classifications for different types of vehicle crashes. On this basis, guidance material to aid data interpretation was rated as II - *high*.

Table 3.28 Assessment of CrashLink against the WHO's core minimum and optional data sets for injury surveillance

WHO's core minimum data set	Data present[1]	WHO's core optional data set	Data present[1]
Identifier	Y	Indigenous origin	N
Age	Y	Date of injury	Y
Sex	Y	Time of injury	Y
Intent	N	External cause	N
Activity	N	Residence	Y
Place of occurrence	Y	Alcohol a factor	Y
Nature of injury	N	Other drugs a factor	Y
Mechanism of injury	Y	Injury severity	N
		Disposition (i.e. patient outcome)	Y
		Incident summary	Y (Fatal MVC only)

[1] Y= yes; N=no.

3.2.12 Trauma Registry

3.2.12.1 Operational characteristics of the Trauma Registry

Purpose and objectives of the collection

The purpose of the NSW Trauma Registry is to collect data about moderate to critically injured people admitted to trauma services in NSW. There are five main objectives for the collection of injury data. These are:

- monitoring the effectiveness of the trauma system response to the most seriously injured patients;
- providing insight into the nature and cause of injuries sustained by patients in the Registry;
- providing advice and feedback to clinicians and other stakeholders;
- enabling research into service demand patterns, staffing and clinical practice; and
- supporting benchmarking and performance improvement activities [57].

As one of the objectives of the Trauma Registry is to examine the nature and cause of injuries, the purpose and/or objectives of the Registry to conduct injury surveillance were rated as I - *high*.

Data collection process

There are seven adult major trauma services, three paediatric major trauma services and ten regional trauma services in NSW that currently provide injury data to the NSW Institute of Trauma and Injury Management (ITIM) in accordance with the NSW Trauma Minimum Data Set (TMDS). The number of trauma services providing data has varied over time, with initially ten trauma services providing data to the Registry when it commenced in 2002.

The TMDS contains information about the injured person, the nature and location of the incident resulting in the injury, the main injuries sustained, and details of treatments and services provided. From when the hospital admission occurs, the data collection process can take between one to three steps to complete until the data reaches the TMDS (i.e. from patient admission, to manual data entry from each participating trauma service directly via NSW Collector using a secure web portal to the data being available in the TMDS). As the data collection process for the Trauma Registry takes between one and three steps to complete, it was rated as I - *very high*.

Case definition

The following criteria are used for inclusion of injury data in the Trauma Registry: admission to a trauma service in NSW within 14 days of injury; an Injury Severity Score (ISS)>12; death in hospital (regardless of ISS), with the exception of patients with an isolated fractured neck of femur (from a standing height). The operational case definitions for injuries involving children and young people in the Trauma Registry are described in Table 3.29. Injuries involving children and young people can be identified using the age data variable. As injury-related hospitalisations of children and young people can be identified in the Trauma Registry, the case definition was rated as I - *very high.* Using the outcome variable, in-hospital deaths of children and young people can be identified.

Table 3.29 Identification of fatal and non-fatal injury involving children and young people in the Trauma Registry

	Case definition
Injury	
Operational definition	Injury-related hospitalisations are recorded in the Trauma Registry if the injury admission was to one of the participating trauma services in NSW within 14 days of injury, the individual had an ISS>12, the individual died in hospital (regardless of ISS), excluding patients with an isolated fractured neck of femur (from a standing height). The age at admission variable can identify hospitalisations involving children and young people and the residential postcode can identify NSW residents.
In-hospital mortality	
Operational definition	Injury-related hospitalisations are recorded in the Trauma Registry if the injury admission was to one of the participating trauma services in NSW within 14 days of injury, the individual had an ISS>12, the individual died in hospital (regardless of ISS), excluding patients with an isolated fractured neck of femur (from a standing height). The age at admission variable can identify hospitalisations involving children and young people, the residential postcode can identify NSW residents, and the discharge outcome data variable can identify in-hospital deaths.

Timeliness

The timeliness of the three surveillance phases of data collection, data analysis and interpretation, and dissemination for the Trauma Registry can be variable. The timing of data entry into the Trauma Registry by each trauma service can vary. For example, some trauma centres enter data on a daily basis and one trauma centre enters patient data within five days of admission and then updates the patient record with diagnosis and discharge information after the patient leaves

hospital. Each calendar year of data in the Trauma Registry is finalised around six months following the end of the calendar year. Data are then analysed by NSW ITIM, with NSW ITIM disseminating information on the characteristics of major trauma in NSW from the Trauma Registry in an annual report or in *Trauma Snips* which provide snapshots of serious to critical injury (ISS>15) in NSW. As the time taken to complete the three surveillance phases was between one and two years, timeliness was rated as II - *high*.

Uniform classification systems

The WHO recommended core minimum and optional data variables that are collected in the Trauma Registry regarding an injured child or young person are classified using a number of standard classification systems. Six data variables from the WHO's core minimum and three data variables of the WHO's core optional data sets [5] collected by the Trauma Registry are classified using top-level hierarchical categories of the ICD-10-AM [20] (i.e. intent, activity, place of occurrence, nature and mechanism of injury, external cause), the NHDD [11] (i.e. sex, disposition), the Abbreviated Injury Scale (AIS) and the Injury Severity Scale (ISS) (i.e. injury severity). As standard classification systems were used to record information for 75.0% of the variables from the WHO's core minimum and 30% from the optional data set collected by the Trauma Registry, uniform classification systems were rated as II - *high* and III - *low*, respectively.

Quality control measures

Data submitted to the Trauma Registry from participating trauma services is reviewed prior to inclusion in the Registry, but no data validation checks are conducted. In some cases, missing or invalid data are flagged by NSW ITIM and returned to the trauma service for completion. As an individual can be transferred between hospitals to receive treatment, multiple records can exist for the same person for the same injurious incident in different hospitals and these records are currently not linked or flagged as belonging to the same person in the Trauma Registry. As the NSW ITIM conducts some quality control measures, this characteristic was rated as I - *very high*.

Confidentiality, privacy, and system security

The Trauma Registry data is stored securely within NSW ITIM and is available for analysis by authorised users within the NSW Ministry of Health network. Authorised users are provided with password protected access to unit record data. However, trauma staff at each trauma service can only view and edit trauma data for their own facility. Non-identifying unit record data can be made available for analysis and there is a requirement for individuals to sign a confidentiality undertaking before they are provided with data access. As there is a confidentiality undertaking for data users and the NSW ITIM has password protected access to data from the Trauma Registry, the characteristics of confidentiality and privacy, and system security were both rated as I - *very high*.

3.2.12.2 Practical characteristics of the Trauma Registry

Data accessibility

The Trauma Registry data are stored and accessed by NSW ITIM. Trauma data can be accessed via the NSW Collector web portal, which is a secure website available only to trauma services staff within the NSW Ministry of Health. It allows users to prepare data for download to the Remote Refresh Report Writer. The Remote Refresh Report Writer is a data reporting application that enables trauma Registry staff to interrogate data and produce datasheets, reports and charts. Only trauma data from the trauma service's own data set is available for analysis at each trauma service, with only staff at NSW ITIM being able to access the state wide Trauma Registry data on a regular basis. As unit record data are accessible to data users from an internet-based interface, data accessibility was rated as I - *very high*.

Usefulness

An assessment of the usefulness of the injury data in the Trauma Registry to describe the key characteristics of the injured population show that all data variables from WHO's core minimum and six data variables from the WHO's core optional data sets [5] are present in the Trauma Registry to describe the key characteristics of the injured population (Table 3.30). This represents 100% of the WHO's core minimum data set, which was rated as I - *very high* and 60.0% of the WHO's core optional data set, which was rated as II - *high*.

Table 3.30 Assessment of the Trauma Registry against the WHO's core minimum and optional data sets for injury surveillance

WHO's core minimum data set	Data present[1]	WHO's core optional data set	Data present[1]
Identifier	Y	Indigenous origin	N
Age	Y	Date of injury	Y
Sex	Y	Time of injury	Y
Intent	Y	External cause	Y
Activity	Y	Residence	Y
Place of occurrence	Y	Alcohol a factor	N
Nature of injury	Y	Other drugs a factor	N
Mechanism of injury	Y	Injury severity	Y
		Disposition (i.e. patient outcome)	Y
		Incident summary	N

[1] Y= yes; N=no.

Data analysis and guidance material to aid data interpretation

NSW ITIM analyse data from the Trauma Registry each quarter to examine basic trends in the number and incidence of major trauma in NSW and trauma-related deaths, along with the characteristics of traumatically injured individuals (e.g. age group and injury mechanism). These trauma snapshots are made available via the NSW ITIM website. As data analyses of trauma data were analysed and reported quarterly, the analysis of trauma data was rated as II - *high*.

NSW ITIM regularly publishes reports on the range of trauma in NSW and the trauma system response to injured patients. Trauma Registry annual reports and quarterly snapshots are available on the NSW ITIM website. Reports on annual statistics, general snapshot statistics, mortality statistics and trauma service statistics (i.e. by adult, paediatric and regional trauma services) are also available on the NSW ITIM website. There is a data dictionary that provides information describing all of the data variables held within the Trauma Registry and their coding frames and notes to aid with data interpretation [58]. On this basis, guidance material to aid data interpretation was rated as I - *very high*.

3.2.13   Workers' Compensation Claims data

3.2.13.1 Operational characteristics of the workers' compensation data

Purpose and objectives of the collection

The purpose of the NSW workers' compensation claims data is to capture information from workers' compensation claim submission files that are submitted by workers' compensation insurance agents. There are three main objectives for the collection of workers' compensation claims data in NSW which are to:

- manage and report on the performance of the NSW workers' compensation scheme;

- detect and investigate non-compliance, such as under-insurance; and

- improve occupational health and safety (OHS) in the workplace through analysing data to identify high risk industries where prevention programs could be targeted [59].

As the purpose and/or objectives of the workers' compensation claims data included the ability to analyse data and monitor trends in high risk industries, the purpose of the claims data to conduct injury surveillance was rated as II - *high*.

Data collection process

From 1 September 2015, the State Insurance and Care Governance Act 2015 commenced and the regulatory and insurance functions of WorkCover NSW were assumed by three new government organisations: SIRA for workers' compensation regulation, SafeWork NSW for occupational health and safety regulation and icare for workers' compensation insurance. Information on individual workers' compensation claims (excluding Treasury Managed Fund claims under the NSW Self Insurance Corporation) are within SIRA. If a worker is injured in the course of their work and their employment can be demonstrated to be a contributing factor, then a claim for medical treatment, rehabilitation expenses, and loss of income can be made by the injured individual or relatives on their behalf for workers' compensation. Upon receiving initial notification that an injury has occurred, a workers' compensation insurer investigates and gathers medical information from the treating doctor to verify that the injury is work-related.

In NSW, workers' compensation insurance is provided annually to employers by insurers. Employers can also apply to the regulatory body for a licence to self-insure (i.e. the employer carries their own underwriting risk and administers their own workers' compensation claims). There are also agencies which are licenced as specialised insurers (i.e. the employer has a

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restricted licence to underwrite workers' compensation risks specific to a particular industry or class of business) and group self-insurers. Work-related compensation claims of self-insurers, such as self-employed workers, are included in the workers' compensation claims data in NSW.

From when the work-related injury occurs, the data collection process can take between two to three steps before the data reach the regulatory body. Either the employer directly notifies the regulatory body, if the injury is serious, or if the injury is not immediately life threatening, the insurer provides information to the regulatory body regarding the incident. As the data collection process for the workers' compensation claims data takes between one and three steps to complete, it was rated as I - *very high*.

Case definition

The operational case definitions for work-related fatal and non-fatal injury in the workers' compensation claims data collection are described in Table 3.31. Compensated work-related fatal and non-fatal injury are able to be identified using a combination of data variables: the 'nature of injury/disease' data variable to identify an injury, the 'result of injury' data variable to identify whether the injury was fatal or non-fatal, and the 'duty status' data variable to indicate if the individual was working. The age of the injured individual can be identified by subtracting the date of birth from the date of injury to identify young people. As work-related fatal and non-fatal injuries of young people in NSW could be identified in the workers' compensation claims data collection, the case definition was rated as I - *very high*.

Timeliness

The regulatory body is reliant upon insurers and/or employers providing timely information regarding the compensable injury and the injury event in order to generate the workers' compensation claims data collection. Information on claims are provided monthly from insurers to the regulatory body and, as additional information comes to hand on each claim, it is automatically included and sent with the next monthly data transfer. The workers' compensation claims data collection is finalised three months after the end of a financial year. However, data analysis, data interpretation and dissemination of information from the collection can then take several additional months to complete. As the time taken to complete the three surveillance phases was between one and two years, timeliness was rated as II - *high*.

Table 3.31 Identification of fatal and non-fatal injury involving young people within the workers' compensation claims data

	Case definition
Injury	
Operational definition	All work-related non-fatal injuries arising out of or in the course of employment of a worker employed in NSW where a claim for workers' compensation was successfully made to the NSW Workers' Compensation Scheme. The 'nature of injury/disease' variable identifies an injury (i.e. '10-190', excluding '170' artificial aids), the 'result of injury' variable identifies that the injury was non-fatal (i.e. '2' to '4') and a 'duty status' variable identifies that the worker was working (i.e. '1' to '4' or '6'). The date of birth and injury date data variables can be used to calculate age to identify work-related injuries involving young people. The address of the claimant can be used to identify NSW residents.
Fatal injury	
Operational definition	All work-related traumatic deaths arising out of or in the course of employment of a worker employed in NSW where a claim for workers' compensation was successfully made to the NSW Workers' Compensation Scheme. The 'nature of injury/disease' variable identifies an injury (i.e. '10-190', excluding '170' artificial aids), the 'result of injury' variable identifies that the injury was fatal (i.e. '1') and a 'duty status' variable identifies that the worker was working (i.e. '1' to '4'or '6'). The date of birth and injury date data variables can be used to calculate age to identify work-related injuries involving young people. The address of the claimant can be used to identify NSW residents.

Uniform classification systems

The WHO recommended core minimum and optional data variables that are collected in the workers' compensation claims data collection are classified using a standard classification system. Four data variables of the WHO's core minimum and optional data sets [5] collected by the workers' compensation claims data collection are classified using the Type of Occurrence Classification System (TOOCS) [60] (i.e. sex, nature of injury, injury mechanism, disposition). As a standard classification system was used to record information from all of the data variables from the WHO's core minimum and optional data set collected by the workers' compensation claims data collection (except place of occurrence and residence), uniform classification systems were rated as I - *very high.*

Quality control measures

There are two main methods adopted to ensure that the workers' compensation claims data collection contains good quality data. There is a Claims Manual [59] that outlines the claims data to be collected to try to ensure that comparable information is obtained from each insurer. The Manual also contains information regarding any changes that were made to particular data variables over time.

The claims data submitted from insurers is checked for data quality purposes. The quality checks involve the examination of the use of invalid codes, missing data and the use of extreme values. Errors identified in claim submissions are reported back to each insurer who is then requested to correct the error in the original claim and resubmit an amended claim. As quality control measures are conducted on the workers' compensation data collection, this characteristic was rated as I - *very high*.

Confidentiality, privacy, and system security

Only authorised users are granted password access to the workers' compensation claims data. For employees of the regulatory body, there is a Code of Conduct which staff must abide by when accessing and reporting on information from the claims data. As there is a Code of Conduct agreement for data users and the data is password protected, confidentiality and privacy, and system security were both rated as I - *very high*.

3.2.13.2 Practical characteristics of the workers' compensation data

Data accessibility

Staff of the regulatory body access claims data if they have been granted access to the collection by their manager, as required by their position, through individual user identification and passwords. Upon application, workers' compensation claims data may be released for research purposes to external users, if Executive level approval is granted. If approval is received, a subset of de-identified unit record claims data are generated for provision to an external user on CD-ROM, this data set is then peer-reviewed prior to release, and, if the data set is in order, the data is approved for release. As unit record data are accessible to data users via a CD-ROM, data accessibility was rated as II - *high*.

Usefulness

The usefulness of the workers' compensation claims data to identify key areas for preventive action, in terms of identifying new or emerging injury mechanisms and its ability to monitor injury trends over time, is mixed. The workers' compensation claims data collection does not have the capability to easily detect new and/or emerging work-related fatal or non-fatal injury mechanisms. However, the data collection is able to examine work-related fatal and non-fatal compensated injury temporal trends based on TOOCS [60] injury mechanism categories.

The usefulness of the work-related fatal or non-fatal injury data to describe the key characteristics of the injured population is variable. Six data variables from WHO's core minimum and five data variables from WHO's core optional data sets [5] are present in the collection to describe the key characteristics of the injured population (Table 3.32). This represents 75.0% of the WHO's core minimum data set, which was rated as II - *high*, and 50.0% of the WHO's core optional data set, which was rated as III - *low*.

Table 3.32 Assessment of the workers' compensation claims data collection against the WHO's core minimum and optional data sets for injury surveillance

WHO's core minimum data set	Data present[1]	WHO's core optional data set	Data present[1]
Identifier	Y	Indigenous origin	N
Age	Y	Date of injury	Y
Sex	Y	Time of injury	Y
Intent	N	External cause	N
Activity	N	Residence	Y
Place of occurrence	Y	Alcohol a factor	N
Nature of injury	Y	Other drugs a factor	N
Mechanism of injury	Y	Injury severity	N
		Disposition (i.e. patient outcome)	Y
		Incident summary	Y

[1] Y= yes; N=no.

Data analysis and guidance material to aid data interpretation

The workers' compensation claims data is usually finalised three months after the end of a financial year. The regulatory body then analyses the claims data and reports on compensated work-related fatal and non-fatal injury for each financial year. Therefore, data analysis of compensated work-related injury mortality and morbidity in NSW was rated as II - *high*.

Interpretation of the data from the collection is assisted by a Claims Manual [59]. The Manual contains a description of each variable and classification rules for information recorded in the data collection. On this basis, guidance material to aid data interpretation was rated as I - *very high*.

3.3 Population-based survey data collections

3.3.1 Australian Health Survey

The Australian Health Survey, previously the National Health Survey, is conducted by the ABS. This is an occasional survey that has been conducted more recently approximately every three years. To date, the survey has been conducted in 1989-90, 1995, 2001, 2004-05, 2007-08 and 2011-12. A national sample of around 16,000 individuals are surveyed, with households sampled by state and territory, and capital city and regional areas based on Census Collection Districts. Around 2,800 respondents are surveyed from NSW. Within a household, individuals are randomly selected as survey respondents, with individuals 18 years and older asked to provide proxy responses for children and young people aged 17 years or less. Information is collected through face-to-face interviews by trained ABS interviewers. Up to five return visits or call backs are made to reach each individual [61].

The survey question modules relate to different aspects of an individual's health (e.g. asthma, cancer, arthritis, injury), self-assessed general health status, health behaviours (e.g. exercise, smoking) and health service use. Questions have previously been included on injury experience and the location of where an injury occurred (e.g. school/ study, motor vehicle crash, exercise or sport) [61].

The ABS produce occasional reports regarding self-reported injury experience using data obtained from the Australian Health Survey [62, 63]. The ABS also produce occasional reports on work-related injuries in Australia every four years, with 2013-14 the latest report using information collected during the ABS's Multipurpose Household Survey [64]. Information is recorded on work-related injuries experienced by individuals aged 15 years and older. Proxy respondents are used for individuals aged 15-17 years. These occasional reports do not specifically report on injuries involving children or young people or to residents of NSW, but often include information on injuries by age group.

3.3.2 Child Population Health Survey

The Child Population Health Survey is conducted by the NSW Ministry of Health. It is a continuous survey of the health of individuals residing in NSW and has been conducted since 2001. Around 15,000 individuals are surveyed, with households randomly selected within LHDs using a computer-generated list of telephone numbers. From 2012, mobile phone users were also included within the sampling frame [65].

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This survey is conducted using computer-assisted telephone interviewing (CATI). Interviews are conducted by trained Health Survey Program CATI interviewers during February to December each year. The survey questions are translated into: Arabic, Chinese, Greek, Italian, and Vietnamese [65]. Up to seven call backs are made to establish initial contact with a household and up to five call backs are made to contact a selected respondent.

The survey contains question modules relating to different aspects of health (e.g. nutrition, oral health), health status, and health behaviours (e.g. sun protection, immunisation). Question modules can be included on child injury and injury prevention, with parents and/or caregivers answering questions relating to their child/children. Specific questions relating to child injury and child safety have altered over time and have included topics such as: drowning and sports injury (2001), drowning (2003-2004), safe play areas on farms (2007-2008), and participation in a fire education program in schools (2009-2010).

During analysis, data are stratified by LHD and a sampling weight is applied to adjust for differences in the probabilities of selection among respondents. These differences arise due to the varying number of people living in each household, the number of residential telephone connections for the household, and the varying sampling fraction in each LHD. The survey response data is weighted to be representative of the population of NSW.

3.3.3 School Students Health Behaviours Survey

The School Students Health Behaviour Survey is administered by the NSW Ministry of Health every three years as part of the Australian School Students' Alcohol and Drugs (ASSAD) survey. Students who are surveyed are in secondary schools in years 7 to 12 in NSW and between 5,500 and 8,000 students are sampled. Around 126 schools are sampled using a two-stage probability sampling frame. Initially, schools are randomly selected from each of the three school sectors: government, Catholic and independent schools. Junior secondary students (up to year 10) and senior secondary students (years 11 and 12) are randomly sampled using the school attendance roll. Parental consent is obtained from each selected student. Schools with fewer than 100 students are not included in the survey [66].

The survey is usually conducted on school premises, with students anonymously answering a questionnaire. There is a core module of questions regarding use of health behaviours, including alcohol, tobacco, substance use, nutrition, sun protection, and physical activity. In 2002 and 2005 there were two supplementary modules (of which a student was asked to complete one). Supplementary module B included questions on injury, such as had the student hurt or injured

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themselves in the past six months where they had to see a doctor, physiotherapist or other professional, where they were when they were injured, the activity performed at time of injury, and the type of injury. In 2008 and 2011 questions on injury were included in the core module and included similar questions to those asked in the supplementary modules in earlier years, with three additional questions asking if the student had consumed alcohol in the six hours before they were injured and had they taken any drugs in the six hours before they were injured in 2008 and type of dental injury in 2011 [66].

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4.   Conclusion

This stocktake has identified three mortality-specific and 13 morbidity and/or mortality population-based data collections that are able to provide information on injuries involving children and young people in NSW. It has summarised the operational (Tables 4.1 and 4.2) and practical (Tables 4.3 and 4.4) characteristics of each of these data collections to perform injury surveillance using the EFISS.

Of all the data collections, only two (12.5%) of the collections (i.e. the NCIS and the PHREDSS) had as one of the purposes or an objectives of the data collection to conduct injury surveillance, rated as I - *very high*. The remaining data collections were largely designed to fulfil administrative functions, such as service monitoring or resource allocation, rather than injury surveillance, which was often a by-product, but not one of the core purposes of the collection. For 11 (68.8%) data collections, at least one of the objectives of the collection related to either conducting research or temporal trend monitoring, rated as II - *high*. This means that 81.3% of the agencies responsible for the data collections considered that these collections could contribute towards the surveillance of health conditions (including injury), conducting research or monitoring temporal trends of health conditions using information from the data collection.

In terms of the number of steps involved in the data collection process, the process to collect data was rated as I - *very high* (i.e. between one to three steps to collect data) (56.3%) or II - *high* (i.e. between four to six steps to collect data) (37.5%) for the majority of data collections. For one data collection, the Child Deaths Register, the data collection process was lengthened as it could involve multiple agencies providing information regarding a death. Obtaining information from multiple agencies adds to the complexity and time involved in data collection, therefore the data collection process for the Child Deaths Register was rated as III - *low*. However, while the data collection process was time consuming for the Child Deaths Register, the depth of information able to be obtained from various stakeholders was an asset of the Register.

All of the data collections were able to identify at least certain types of injury mechanisms and/or types of injuries involving children and young people within the collection, but the use of uniform classification systems to record information for the data variables specified in the WHO's core minimum and optimal data sets for injury surveillance varied. Six (37.5%) of the data collections used standard classification systems to record information for between 76 to 100% of the specified core minimum and optimal data variables (i.e. I - *very high*) and seven (42.8%) data collections used standard classification systems to record information for less than 25% of the specified core minimum and optimal data variables (i.e. IV - *very low*). The use of standard classification

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systems to record information on injury means that the results of analyses of injury data variables can be more easily used to conduct comparisons of the number, circumstances and outcomes of injury events using different data collections, including interstate and international data collections.

The timeliness of conducting the three injury surveillance phases of data collection, data analysis and interpretation, and dissemination of information varied between the data collections. They ranged from routine daily reporting from some data collections, such as reporting the daily road toll, to annual reporting of injuries, to limited analysis of injuries of children and young people. For the majority of data collections, information was usually available a number of months after the end of the financial or calendar year of collection, ranging from three months from the end of a financial year for the workers' compensation claims data to around 15 months from the end of each calendar year for the COD-URF mortality data. Potentially, the NCIS could produce daily information on injury mortality, as coronial information is transferred daily in NSW to the NCIS. However, the absence of additional text records (such as police reports, autopsy and toxicology findings) for some deaths and the time taken for an inquest to be conducted or dispensed with in NSW (i.e. closure of a coronial case) hampers access to timely mortality data from the NCIS. Driscoll et al [29] has recommended waiting 18 months following the end of a calendar year to conduct a population-based study of injury mortality using data from the NCIS to allow for the results of coronial inquests to be completed.

All, bar two data collections (i.e. the Sporting Injuries Claims Data and the SurfGuard database), currently conducted at least some routine data quality control measures of information recorded in their data collection. Some agencies conducted more detailed quality control measures than others. Where quality control measures were conducted, these usually included the examination of logical and consistency errors, such as invalid codes, use of extreme values, and a review of missing data. Obtaining quality information from injury surveillance to inform policy development and evaluation relies on the completeness and accuracy of the information recorded in a data collection [2].

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Table 4.1 Summary of rating for EFISS operational characteristics for injury mortality-specific data collections

Data collection	Purpose and objectives	Data collection process	Case definition	Timeliness	Uniform classification systems	Quality control measures	Confidentiality and privacy	System security
COD-URF	II - High	II - High	I - Very high	II - High	MDS – I -Very high ODS – I -Very high	I - Very high	I - Very high	I -Very high
Child Deaths Register	II - High	III - Low	I - Very high	II - High	MDS – II - High ODS – III - Low	I - Very high	I - Very high	I - Very high
NCIS	I - Very high	II - High	I - Very high	IV - Very low	MDS – II - High ODS – III - Low	I - Very high	I - Very high	I - Very high

[1] MDS – WHO core minimum data set; ODS – WHO optional data set.

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Table 4.2 Summary of rating for EFISS operational characteristics for injury morbidity and mortality data collections

Data collection	Purpose and objectives	Data collection process	Case definition	Timeliness	Uniform classification systems	Quality control measures	Confidentiality and privacy	System security
Ambulance clinical record	II - High	I - Very high	I - Very high	I - Very high	MDS – IV - Very low ODS – IV - Very low	I - Very high	I - Very high	I - Very high
APDC	II - High	II - High	I - Very high	II - High	MDS – I - Very high ODS – I - Very high	I - Very high	I - Very high	I - Very high
EDDC	III - Low	II - High	I - Very high	I - Very high	MDS – I - Very high ODS – I - Very high	I - Very high	I - Very high	I - Very high
Families and Community Services	II - High	I - Very high	I - Very high	I - Very high	MDS – IV - Very low ODS – IV - Very low	I - Very high	I - Very high	I - Very high
Lifetime Care Claims Database	II - High	I - Very high	I - Very high	III - Low	MDS – IV - Very low ODS – IV - Very low	I - Very high	IV - Very low	I - Very high
Personal Injury Register	II - High	II - High	I - Very high	III - Low	MDS – IV - Very low ODS – IV - Very low	I - Very high	IV - Very low	I - Very high
COPS	III - Low	I - Very high	I - Very high	I - Very high	MDS – IV - Very low ODS – IV - Very low	I - Very high	I - Very high	I - Very high
PHREDSS	I - Very high	I - Very high	I - Very high	I - Very high	MDS – I - Very high ODS – I - Very high	I - Very high	I - Very high	I - Very high
Sporting Injuries Claims data	II - High	I - Very high	I - Very high	III - Low	MDS – IV - Very low ODS – IV - Very low	IV – Very low	I – Very high	I - Very high
SurfGuard Database	II - High	I - Very high	I - Very high	I - Very high	MDS – IV - Very low ODS – IV - Very low	IV – Very low	I - Very high	I - Very high
CrashLink	II - High	II - High	I - Very high	I - Very high	MDS – I - Very high ODS – I - Very high	I - Very high	I - Very high	I - Very high
Trauma Registry	II - High	I - Very high	I - Very high	II - High	MDS – II - High ODS – III - Low	I - Very high	I - Very high	I - Very high
Workers' compensation data	II - High	I - Very high	I - Very high	II - High	MDS – I - Very high ODS – I - Very high	I - Very high	I - Very high	I - Very high

[1] MDS – WHO core minimum data set; ODS – WHO optional data set.

Table 4.3 Summary of rating for EFISS practical characteristics for injury mortality-specific data collections

Data collection	Data accessibility	Usefulness[1]	Data analysis	Guidance material to aid data interpretation
COD-URF	II - High	MDS – I - Very high ODS – III - Low	III - Low	I - Very high
Child Deaths Register	III - Low	MDS – I - Very high ODS – I - Very high	II - High	I - Very high
NCIS	I - Very high	MDS – I - Very high ODS – I - Very high	III - Low	I - Very high

[1] MDS – WHO core minimum data set; ODS – WHO optional data set.

Table 4.4 Summary of rating for EFISS practical characteristics for injury morbidity and mortality data collections

Data collection	Data accessibility	Usefulness[1]	Data analysis	Guidance material to aid data interpretation
Ambulance clinical record	I - Very high	MDS – II - High ODS – II - High	III - Low	I - Very high
APDC	I - Very high	MDS – I - Very high ODS – III - Low	II - High	I - Very high
EDDC	I - Very high	MDS – II - High ODS – III - Low	III - Low	I - Very high
Families and Community Services	III - Low	MDS – I - Very high ODS – II - High	II - High	II - High
Lifetime Care Claims Database	II - High	MDS – II - High ODS – III - Low	II - High	II - High
Personal Injury Register	II - High	MDS – II - High ODS – III - Low	III - Low	II - High
COPS	I - Very high	MDS – I - Very high ODS – I - Very high	I - Very high	III - Low
PHREDSS	I - Very high	MDS – II - High ODS – II - High	I - Very high	I - Very high
Sporting Injuries Claims data	IV – Very low	MDS – I - Very high ODS – II - High	III - Low	II - High
SurfGuard Database	I - Very high	MDS – II - High ODS – III - Low	III - Low	II - High
CrashLink	II - High	MDS – II - High ODS – II - High	I - Very high	II - High
Trauma Registry	I - Very high	MDS – I - Very high ODS – II - High	II - High	I - Very high
Workers' compensation data	II - High	MDS – II - High ODS – III - Low	II - High	I - Very high

[1] MDS – WHO core minimum data set; ODS – WHO optional data set.

System security, in terms of the use of safe guards and password protection to guard against potential disclosure of confidential information, was rated as I - *very high* for all data collections. Each agency had in place security procedures that prevented unauthorised access, use and disclosure of data held within a data collection. For 14 (87.5%) of the data collections confidentially and privacy was rated as I - *very high*, indicating that data users were required to either sign a confidentiality or a data security agreement prior to being provided with access to information from the data collection.

Data accessibility, in terms of how potential data users access information from data collections, was rated as I - *very high* for eight (50.0%) of the data collections. For these eight data collections, information was able to be accessed using an internet-based interface or a data warehouse. Five (31.3%) data collections provided potential data users with information from their data collection via CD-ROM, or other similar data storage device, rated as II - *high*. Having a mechanism to enable access to unit record data through data warehousing or via a secure internet connection (such as used by the NCIS) would make data from these collections more straightforward to access for external users for injury surveillance and/or research purposes [2].

The usefulness of each of the data collections to contribute to the identification of potential key areas for preventive action in terms of the ability to identify new and/or emerging injury mechanisms, to monitor injury trends over time, and to describe key characteristics of the injured population using the WHO's core minimum and optimal data sets for injury surveillance was mixed. The ratings ranged from I - *very high* to III - *low*. None of the data collections had the ability to identify and flag new and/or emerging injury mechanisms. The PHREDSS had the most potential to be able to flag new or emerging injury mechanisms as PHREDSS data is automatically analysed on a daily basis. Analysis of PHREDSS data is able to highlight if the number of injury ED presentations was higher than previously expected (by comparison to the same time period in the previous year), however further analysis would still be required to pinpoint a new or unexpected injury mechanism. In effect, data analysts would need to know what they were searching for in PHREDSS.

One specific gap was identified within the existing population-based injury surveillance coverage for children and young people. There does not appear within any of the data collections that there is a formal mechanism whereby new products that are associated with injuries to children and young people can easily be identified. Reporting of injuries, such as those involving aluminium scooters [67] were able to be identified using PHREDSS during the Sydney Olympics in 2000. However, injuries to children and young people using child quad bikes [68] and poisoning via gamma-hydroxybutyrate found to be contained in Bindeez beads [69] have all required the initial

reporting vigilance of ED clinicians, rather than systemic identification of these injury incidents through injury surveillance mechanisms.

Routine data analysis was conducted of each of the data collections examined. Daily to monthly data analyses were conducted for three (18.8%) data collections, rated as I - *very high,* annual to biennial data analyse were conducted for six (37.5%) data collections, rated as II - *high*, with data being analysed for seven (43.8%) data collections greater than biennially, rated as III - *low*. Some authors have argued that if information from surveillance activities is available at least on an annual basis then this is timely enough to inform policy development aimed at prevention activities [70]. However, annual analysis of data may not be timely enough to identify emerging injury types, such as the Bindeez beads poisoning example.

All of the agencies responsible for each of the data collections produced written documentation describing the data variables in their collection, in the form of a data dictionary, coding manual or guidance notes to aid the interpretation of data from the collection. However, for some data collections this material was in the process of being revised and updated. Having up-to-date guidance material on a data collection aids data analysts and in planning and conducting data analyses and in interpreting data.

Three population-based surveys that have previously reported on injuries of children and/or young people were also identified and described in this report. Information on childhood injury from these surveys could be accessed and further analysed regarding particular injury mechanisms and/or type of injuries. In addition, there would be potential for inclusion of specific injury question modules on different injury mechanisms in future surveys, particularly in the NSW Child Population Health Survey.

None of the data collections examined were ultimately ideal to conduct injury surveillance of children and young people in NSW. Each data collection had both strengths and weaknesses across the 12 operational and practical characteristics reviewed. There was particular variation in their ability to be used to conduct timely data analysis and information dissemination, in their use uniform classification systems for key data variables, and in access to data in the collection for potential data users.

Information from injury surveillance activities is regularly used to inform the development of injury prevention strategies and to evaluate the impact of these strategies on the population. It is essential that the best available information is used to inform and evaluate injury prevention policies [2]. In some cases, there is potential to add value to the information that is available for both injury surveillance and for research activities by linking together data collections that record information on different stages of the injury continuum (i.e. from the identification of injury risk

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factors to a description of injury event circumstances to providing information on injury treatment to an assessment of injury outcomes) [71]. By linking together information from multiple cross-sectoral data collections that record information on the same injury event, a potentially rich data source could be created that could be used for injury surveillance and research activities focusing on injuries involving children and young people.

This is the first time that a stocktake of all population-based data collections that record information on injuries involving children and young people in NSW has been conducted. The stocktake has provided key information regarding both the operational and practical characteristics of each of the population-based data collections in NSW to provide information on childhood injury for injury surveillance purposes. The results of the stocktake are applicable to decision makers, researchers, clinicians and practitioners and will assist these groups to identify the scope and strengths and limitations of each data collection to report information on injuries involving children and young people in NSW. The stocktake results have also provided information that could assist in the selection of data collections from which a suite of performance monitoring measures to monitor childhood injury reduction strategies in NSW could be developed.

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6. Appendices

6.1 Appendix 1: Participant Information Sheet

Australian Institute of Health Innovation
Faculty of Medicine and Health Sciences
MACQUARIE UNIVERSITY NSW 2109

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Chief Investigator's Name: Associate Professor Rebecca Mitchell

Participant Information and Consent Form

Name of Project: **Stocktake of data sources relevant to childhood injury in NSW**

The Australian Institute of Health Innovation at Macquarie University is conducting a stocktake of population-based injury data collections for NSW Kids + Families. As part of this stocktake the strengths and limitations of each data collection to conduct injury surveillance of injuries involving children and young people will be conducted. It is hoped that the information gained from this stocktake will increase the capacity of decision makers, researchers and clinicians to assess the applicability of information obtained from different data collections and, ultimately, enable better informed decisions to be made regarding identifying priorities for injury prevention and assessing the impact of injury prevention initiatives.

As a data manager/ data custodian of a population-based injury data collection, you are invited to contribute information for the stocktake of injury-related data collections that record information on injuries of children and young people. The purpose of the study is to obtain information on the operational and practical characteristics of injury-related data collections using the Evaluation Framework for Injury Surveillance Systems. Participation will involve you completing a short interview regarding the characteristics of the data collection, which should take about 30 minutes to complete. During the interview you will be asked questions regarding the operational and practical characteristics of the data collection. A copy of the interview questions will be provided to you prior to the interview.

Participation in the interview is entirely voluntary. You are not obliged to participate and if you decide to participate, you are free to withdraw at any time without having to give a reason and without consequence. Your decision whether or not to participate will not prejudice your future relations with the Australian Institute of Health Innovation, Macquarie University, NSW Kids + Families, or your employer.

The study is being conducted by Associate Professor Rebecca Mitchell and Luke Testa at the Australian Institute of Health Innovation and Macquarie University. If you have any queries regarding the interview they can be contacted at *email: r.mitchell@mq.edu.au or phone 02 9850 2321 or email: luke.testa@mq.edu.au or phone: 02 9850 2448*.

Any information or personal details gathered in the course of the study are confidential, except as required by law. No individual will be identified in any publication of the results. A summary of the results of the stocktake will be publically available from the NSW Kids + Families website at http://www.kidsfamilies.health.nsw.gov.au/

Macquarie University HREC approval number: 5201500533.

Thank you for your participation.

6.2   Appendix 2: Consent Form

I,_____ have read and understand the information above and any questions I have asked have been answered to my satisfaction. I agree to participate in this research, knowing that I can withdraw from further participation in the research at any time without consequence. I have been given a copy of this form to keep.

Participant's Name:_____
   (Block letters)

Participant's Signature: _____ Date:_____

Investigator's Name:_____
   (Block letters)

Investigator's Signature: _____ __Date:_____

The ethical aspects of this study have been approved by the **Macquarie University Human Research Ethics Committee**. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Committee through the Director, Research Ethics & Integrity (telephone (02) 9850 7854; email ethics@mq.edu.au). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome.

(INVESTIGATOR'S [OR PARTICIPANT'S] COPY)

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6.3   Appendix 3: Questions

Stocktake of data sources relevant to childhood injury in NSW

The following 8 questions will ask you about the operational characteristics of the data collection.

 (1a) What is the purpose of the data collection (i.e. the reason why the data collection exists)?

(1b) Are there any secondary aims or objectives of the data collection (i.e. what is the information from the data collection used for)?

(2) How is the data collected (i.e. what steps are involved in obtaining data for the data collection)?

(3a) Can injuries (or specific types of injuries) be identified in the data collection?

No; Yes; Don't know

(3b) How are injuries (or specific types of injuries identified)?

(4a)   How often is data entered into the data collection (e.g. instantly, hourly, daily, weekly, monthly)?

(4b) How often is data from the data collection analysed?

(4c) How often is the data and/or information from the data collection made available in the public domain?

(5) Is there a standard classification system that is used to classify data in the data collection (e.g. International Classification of Disease; Australian Institute of Health and Welfare National Data Dictionary)?

(6) Does the agency conduct any quality control measures on the data collection to check the quality of the data (e.g. guidelines for data collection; cross-checks on data items)?

(7) How does the agency ensure that an individual's information in the data collection remains confidential (e.g. staff confidentiality undertakings; guidelines regarding reporting of information from the data collection; do not report small cell sizes)?

(8) What are the data access requirements that are in place to guard against disclosure of confidential information (e.g. only key staff access; password protected etc)?

The following 4 questions will ask you about the practical characteristics of the data collection.

(1) If someone who did not work at the agency wished to access and analyse data from the data collection, how would this occur (e.g. what steps would they need to complete or would data access not be possible)?

(2a) In your opinion, can the data collection be used to identify new and/or emerging injury mechanism/ or injuries (e.g. new product-related injuries involving young people)?

(2b) In your opinion, can the data collection be used to monitor injury trends (or particular injury trends) over time?

(2c) Are the following data variables collected in the data collection? – Yes/No

Identifier	Indigenous origin
Age	Date of injury
Sex	Time of injury
Intent	External cause
Activity	Residence
Place of occurrence	Alcohol a factor
Nature of injury	Other drugs a factor
Mechanism of injury	Injury severity
	Disposition (i.e. patient outcome)
	Incident summary

(3a) Are routine data analyses conducted by the agency of the data collection?

Yes/no

(3b) Are the results of these routine data analyses publically released, and how often are they released (e.g. weekly, monthly, annually)?

(4) Does the data collection have a data dictionary and/or any guidance material to aid in data interpretation?

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