Australian Injury Surveillance Data Standards

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Routine scrutiny of the occurrence of injury is an essential component of effective public health injury control. Much can be achieved using data which are collected mainly for reasons other than public health injury surveillance. Coroners' records, hospital admission data, and workers' compensation records are examples of such data sources. The special virtue of these sources is that they are already in place, and the cost and difficulty of establishing a data collection system need not be borne (entirely) by those interested in injury prevention.

Typically, however, the data collected by these systems are of limited value, often because of the selection of data items, and the ways in which data are classified. Most Australian hospital admission data, and all deaths data, are classified in a way that enables (most) injury deaths to be identified. The data sets enable analysis of the data by age, sex, and a few other demographic variables. As for information useful for prevention - particularly on how injury comes about - relatively little is provided. A four-digit 'external cause' code (or 'E-code'; currently as specified in the 9th revision of the International Classification of Diseases, ICD-9) provides some insight.[1] E-codes are available for Australian deaths data and for hospital separation data. The E-code classification distinguishes categories such as 'Motor vehicle traffic accident involving collision with another vehicle: injury to pedal cyclist' (E813.6), 'Accidental drowning and submersion in bathtub' (E910.4), and 'Suicide and self-inflicted injury by other and unspecified means: jumping or lying before moving object' (E958.0).

E-codes provide useful information, but have important limitations. For example, E-codes do not (with a few exceptions) distinguish work-related cases, nor sporting and recreational cases, nor cases occurring in educational institutions. Yet all of these categories are important, because they define classes of injuries whose prevention falls into the domain of particular organisations and sectors. Nor do standard E-codes specifically distinguish drowning in domestic swimming pools, which are lumped into a group 'Accidental drowning and submersion: other'. Yet drowning accounts for one-third of injury deaths at ages 1-4 years in Australia, and about half of these deaths occur in domestic pools. A more general concern is that the E-code approach to classification begins by requiring a decision on the role of human intent in the occurrence of the injury ('accident', 'suicide', 'assault and homicide', 'uncertain intent'). Intent is more complex than is implied by the E-code approach, and the intent-based classification tends to obscure features such as the overall role of firearms as a cause of death.

Another part of ICD-9 provides codes to represent the nature and bodily location of injury. Examples are 'Fracture of neck of femur: trans-cervical fracture, closed' (820.0), 'Late effect of tendon injury' (905.8), and 'Poisoning by sedatives and hypnotics: barbiturates' (967.0). This

classification (or its more detailed 'Clinical Modification', ICD-9-CM[M]) is used for hospital in-patient classification, but not for Australian deaths data.[2]

One reaction to the limitations of existing data systems has been development of special data systems, designed for the purpose of injury surveillance. The Injury Surveillance Information System (ISIS) is one such system.[3] ISIS was designed (largely by Mr Jerry Moller) mainly for use in hospital emergency departments, and was developed and piloted by the National Injury Surveillance and Prevention Project. When ISIS was developed, few emergency departments had electronic case information systems in place. Hence, ISIS was developed as a 'stand-alone' system. A principle of its design was to create a 'multi-axial' classification, with a separate classification for each concept of interest.

In contrast, the ICD folds several concepts into a single classification, in a somewhat complex manner. For example, some E-codes embody each of the following concepts: intent (eg suicide); type of location (eg public highway); type of road user (eg motorcycle passenger); dynamics of an injury-producing event (eg 're-entrant collision with another motor vehicle); occupation (eg crew member of a commercial aircraft); context of person when injured (eg undergoing surgical or medical care); type of substance or object involved in producing injury (eg methyl alcohol, powered lawn-mower); type of 'breakdown event' (ie 'what went wrong' and resulted in injury; eg fall from slipping, tripping or stumbling); and the mechanism whereby injury was sustained (eg immersion, poisoning, burning, exposure to electricity).

The ISIS data set and classifications have been implemented in a software application that has been used at several dozen hospitals for periods of up to 5 years. More than 600,000 records have been collected.

The experience of using the ISIS data set has been mixed, and use of the system has declined in recent years. Strengths include the relatively great depth of information, both in the coded items (notably 'body part', 'nature of injury', 'context', 'location', and 'factors'), and in the free text fields (notably the 'what went wrong' field). Limitations include difficulties with some classifications (particularly 'breakdown event' and 'mechanism'); the total size of the data set (found to be difficult to apply with good reliability and completeness of ascertainment given the limited resources typically available); and difficulties in linking or comparing with data from other sources (in part because of differences in data definition and classification).

An alternative to the creation of a 'stand alone' injury surveillance data system is to develop a data set and classifications designed mainly to be taken up into other data systems, such as hospital case information systems. With this approach in mind, NISU and a number of others

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[M] A first Australian edition of ICD-9-CM was published in 1995, by the National Coding Centre, and has been used for coding all hospital separations beginning in July 1995. The Australian ICD, based on the US edition, will be updated annually.

interested in the subject proposed a data set for this purpose, late in 1991. The data set, originally referred to as the minimum data set for 'basic routine injury surveillance', was the basis for the NMDS (Injury Surveillance), version 1.1, released in February 1994.[4] The National Data Standards for Injury Surveillance (NDS-IS) are the next stage in this process.[5]

National Data Standards for Injury Surveillance

The National Injury Surveillance Unit, in conjunction with injury surveillance and prevention practitioners in Australia, has defined a set of data standards for public health injury surveillance.

The following principles have guided development of the standards. They should:

- Provide information seen as being of central importance by injury prevention practitioners;
- Be sufficiently small and simple to use (at least in its simplest form; it is hierarchical) to enable its incorporation as part of the routine operation of important types of data collection site (hospital emergency departments; possibly also hospital inpatient services, coroners' offices, etc);
- Have good compatibility with the International Classification of Diseases and with other widely-used data standards; and
- Be capable of providing reliable and valid data.

Development has focused on "core" data items whose inclusion in a data system is largely or solely for the purposes of injury surveillance. In contrast, "general information items" which are not specific to injury surveillance and are part of many health data systems, have been adoped from standard sources.

The current edition of NDS-IS provides for two levels of surveillance data, and foreshadows a third.

The *first*, minimal, level (almost the same as its predecessor, the NMDS–IS, version 1.1) the Level 1 standard is proposed for use in basic, routine public health surveillance.

The ***second*** level surveillance data standard builds on the first with more extensive classification of some items and several additional data items. This data set is suitable for use in emergency departments in hospitals and has been developed to reflect the need for a standard for use in the emergency departments of hospitals and in other settings where at least some special resources are available for injury surveillance data collection.

A ***third*** level data standard has been proposed for specialised surveillance or research involving detailed collection of special data items. Level 3 is in the early stages of development.

The standards are documented more fully in the report titled "National Data Standards for Injury Surveillance", on which this paper is based.[5] A summary of the three levels of NDS-IS

is presented in Table 1, and the data items are summarised in Table 2.

While development of the NDS-IS has focused on providing tools for data collection in hospital emergency departments, they are intended to be applicable to other data necessary for injury surveillance. Indeed, an aim is to provide a basis for improving comparability of injury data from a variety of sources.

The Level 1 standard has now been taken up quite widely. It has been embodied in State health department data dictionaries for emergency departments and will be included in the next edition of the National Health Data Dictionary. One State, so far, has mandated collection according to the standard. It has been included in commercial software designed for use in emergency departments, and embodied in a new national register of admissions to spinal units. The Level 2 standard has only recently been released. Interest in using it at several sites has been expressed, and pilot implementation will commence soon.

A key deficiency for injury surveillance in Australia at present is the lack of a source of national quantitative data suitable for monitoring consumer product safety. The most promising solution to this deficiency is collection of data on a well-defined sample of emergency department attendances. Current developments in emergency department data collection, and the national data standards for injury surveillance, are foundations for such a system. In the process, the NDS-IS will be tested and further developed as a tool for injury prevention and control.

References

1. World Health Organization. International Classification of Diseases, 9th revision. Geneva: World Health Organization, 1975.

2. National Coding Centre. Australian Version of the International Classification of Diseases, 9th revision, Clinical Modification (ICD-9-CM). Sydney: National Coding Centre, University of Sydney, 1995.

3. Vimpani G, Hartley P. National injury surveillance and prevention project: final report. Canberra: Australian Government Publishing Service, 1991.

4. AIHW National Injury Surveillance Unit. National Minimum Dataset for Injury Surveillance, version 1.1. Adelaide: AIHW National Injury Surveillance Unit, 1994.

5. AIHW National Injury Surveillance Unit. National Data Standards for Injury Surveillance (version 2.0 December 1995). Adelaide: AIHW National Injury Surveillance Unit, 1995.

Table 1: Three levels of the National Data Standards for Injury Surveillance

Level	Purpose	Data Items		Intended coverage
		Injury items	General items	
1	To provide the information most necessary for basic routine public health surveillance of injury levels and patterns: · as a basis for broad policy development · to inform communities · to generate hypotheses · to monitor most targets	• Narrative • Four categorical items based on ICD	• Ten items (a subset of NHDD items)	Universal data collection in settings for primary care of injuries (including EDs) and for surveillance of injuries in all settings
2	To provide information to: · assist identification of hazards and solutions · enable target setting · identify and monitor new/unusual injury events	As for Level 1 except: • Full ICD classification instead of short code lists • Extended classifications for Place and Activity • Four additional items	As for Level 1 except: • Three additional items	Preferred level for EDs and all settings where sufficient resources are available for collection and use of the data. Aim for representative or sentinel coverage in each state.
3	To investigate particular classes of injury events at a fine level of detail to increase understanding of risk factors and enable research and evaluation	To be decided	To be decided	Where defined need requires more detail, and if resources permit. Cases may be sampled from collection at a lower level.

NHDD = National Health Data Dictionary

Table 2. NDS-IS Data Items

Item	Level 1	Level 2
Description of injury event	Short narrative	Unlimited structured narrative
Main 'External Cause'	Major groups *29* Intent groups *11*	External Cause codes (ICD 9 or 10) *hundreds*
Type of Place	Place of injury occurrence: type *13*	Place of injury occurrence: sub-type *65* Place of injury occurrence: part *47*
Type of Activity	Activity when injured: type *9*	Activity when injured: sub-type *140*
Trauma	Nature of main injury *32* Bodily location of main injury *22*	Principle diagnosis: injury or poisoning (ICD9 or 10) *hundreds*
Major factors		Major injury factors *137*
Mechanisms of injury		Mechanisms of injury: types *54*
Date of injury		DDMMYYYY
Time of injury		HHMM

1. General information items: case ID, establishment ID, sex, birth date, area of residence, departure mode, country of birth, Aboriginality, employment status, occupation, preferred language, date and time of attendance
2. *Italics* indicate the number of categories in each classification