

# Guidance for sports injury surveillance: the 20-year influence of the Australian Sports Injury Data Dictionary

Caroline F Finch, Carolyn Staines

ABSTRACT

Australian Centre for Research into Injury in Sport and its Prevention (ACRISP), Federation University Australia, Ballarat, Victoria, Australia

#### Correspondence to

Professor Caroline F Finch, Australian Centre for Research into Injury in Sport and its Prevention (ACRISP), Federation University Australia, Ballarat, Victoria 3353, Australia; c. finch@federation.edu.au

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#### **Background** Injury prevention requires information about how, why, where and when injuries occur. The Australian Sports Injury Data Dictionary (ASIDD) was developed to guide sports injury data collection and reporting. Sports Medicine Australia (SMA) disseminated associated data collection forms and an online tool to practitioners and the sports community. This paper assesses the long-term value, usefulness and relevance of the ASIDD and SMA tools.

**Methods** A systematic search strategy identified both peer-reviewed and grey literature that used the ASIDD and/or the SMA tools, during 1997–2016. A text-based search was conducted within 10 electronic databases, as well as a Google Image search for the SMA tools. Documents were categorised according to ASIDD use as: (1) collected injury data; (2) informed data coding; (3) developed an injury data collection tool and/or (4) reference only.

**Results** Of the 36 peer-reviewed articles, 83% directly referred to ASIDD and 17% mentioned SMA tools. ASIDD was mainly used for data coding (42%), reference (36%), data collection (17%) or resource development (14%). In contrast, 86% of 66 grey literature sources referenced, used or modified the SMA data collection forms. **Conclusions** The ASIDD boasts a long history of use and relevance. Its ongoing use by practitioners has been facilitated by the ready availability of specific data collection forms by SMA for them to apply to directly their settings. Injury prevention practitioners can be strongly engaged in injury surveillance activities when formal guidance is supported by user-friendly tools directly relevant to their settings and practice.

#### INTRODUCTION

The prevention of sports injury is a primary focus for health promotion agencies and sporting bodies across all levels of participation, from elite athletes to community sport to active recreational pursuits. According to the Translating Research into Injury Prevention Practice framework,<sup>1</sup> injury surveillance provides essential data to drive the development and implementation of injury prevention strategies. Standardised injury data collection is therefore crucial to underpin the provision of safe opportunities for all those who participate in sport.

Injury surveillance is the standardised, routine and ongoing process of collecting data relating to injury occurrence and its causes.<sup>2</sup> Worldwide, there are numerous injury surveillance systems used in specific sporting contexts.<sup>3</sup> For example, the National Collegiate Athletic Association injury surveillance system is used specifically in the American collegiate sporting system<sup>4</sup> and the International Olympic Committee's Injury Surveillance System has been used widely during large-scale multisport events.<sup>5</sup> There is no nationwide sports injury surveillance system in Australia. However, since 1998, guidance for sports injury surveillance has been provided through the Australian Sports Injury Data Dictionary (ASIDD)<sup>6</sup> and associated resources disseminated by the national sports medicine authority, Sports Medicine Australia (SMA).

#### Contextual background to the Australian Sports Injury Data Dictionary development

In Australia during the mid-late 1990s, considerable attention was given to the availability of robust injury surveillance systems, to support the need for data to inform injury prevention strategies.<sup>7-10</sup> In 1997, the Australian Sports Injury Prevention Taskforce (ASIPT), which was a joint body representing the Australian Sports Commission and the Federal Department of Health, developed a national sports safety framework, Sportsafe Australia.9 11 A key recommendation from this framework was the development of a national sports injury surveillance system.<sup>7 11</sup> The Sportsafe framework was in accord with the recommendations of an earlier national feasibility study into a national sports injury surveillance in Australia which had advocated for the development of standardised data collection procedures and coding systems specifically for the Australian sports setting.<sup>12</sup> That feasibility study included a review of the sports injury surveillance practices of the time and a sports injury surveillance needs analysis. Key sports injury surveillance items were identified from the literature. Best practice from national and international injury surveillance systems were summarised, including from the then current Australian National Minimum Dataset for Injury Surveillance (NDS-IS), the currently used International Classification of Diseases Ninth Revision (ICD-9) and recent developments from the ICD Tenth Revision (ICD-10). These injury coding systems were the most widely used in Australia in the 1990s, but largely for hospital data collections (eg, hospital admissions data and emergency department presentations). Concurrently, in clinical sports medicine settings, there was increasing recognition of the value of the Orchard Sports Injury Classification Scheme (OSICS)<sup>13</sup> for coding sports injury diagnoses.



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It was considered by the general sports injury prevention community that injury surveillance guidance for use outside of hospital settings was urgently required. This was particularly needed for clinical sports medicine practice and for field-side reporting of injuries as they occurred during sport participation. To achieve this, the Australian Sports Injury Data Working Party (ASIDWP) was established as a national committee by the ASIPT to provide standardised guidelines for the collection of sports injury data in Australia. It comprised experts from the fields of epidemiology, statistics, database management/computing, injury surveillance, sports administration and clinical sports medicine. Its efforts resulted in the publication of the ASIDD in 1998.<sup>6</sup>

#### Structure of the Australian Sports Injury Data Dictionary

The ASIDWP agreed on a coding manual (ie, the ASIDD) which categorised data items with defined variables. Category 1 items were considered 'Core' and should be present in all data collection opportunities. Category 2 items were 'Strongly Recommended' to provide for additional injury related information, especially around their causation. Category 3 items were those 'Recommended' for further data related to the event. Elements of the items were chosen to be consistent with both the ICD and OSICS.

The development of the ASIDD addressed some of the issues in the area of injury of surveillance that were present at the time in Australia. For example, the earlier needs analysis demonstrated that sports injury data were being collected in a range of settings by a range of professionals with varying levels of expertise and data infrastructure;<sup>12</sup> therefore, the document needed to be user friendly yet comprehensive. The primary injury surveillance data collection tool at the time in Australia was the NDS-IS V.2.1. However, this was not specifically designed for a sporting context and only captured specific information about 35 sports or recreational activities. To obtain a more comprehensive view of injury across a broader range of sports, the ASIDD included codes for more than 120 sports/physical activities. Additionally, the ASIDD provided codes to capture external injury factors implicated in sports injury causation such as sporting equipment, natural objects, structures or fittings, surface characteristics or climate. This was in agreement with the then International Classification of External Causes of Injury.<sup>14</sup> To enhance reporting of the anatomical location of the injury, the ASIDD included an artist-designed body chart for clinical data recorders, in accordance with usual clinical practice.

#### Development of standardised injury reporting forms

Following from the earlier feasibility study, a prototype general sports injury data collection form had been developed by researchers, along with a supporting onsite computer-based data entry system. These were trialled at a large-scale multi-sport event, the 1995 World Police and Fire Games held in the Victorian capital city, Melbourne.<sup>15</sup> Based on this trial, the data collection form was refined and trialled again at another multiple sport event in Melbourne, the 1995 Australian Masters Games.<sup>16</sup> The trials demonstrated the usefulness of these tools for sports injury surveillance and sports injury research in the Australian context. The trial findings were made available to the ASIDWP and the trialled form was adopted as a generic template and used as the standardised data collection form in the ASIDD. The form was modified slightly to provide 18 sport-specific variants that could readily be used by practitioners who wanted to collect sports injury data in their settings. When the ASIPT functions were transferred to SMA from the end of the 1990s, SMA provided

images. Therefore, it was also possible to conduct searches

A later development arising from the ASIDD, and led by the Victorian Branch of SMA, was the production of an online sports injury surveillance system-Sports Injury Tracker (http:// sma.org.au/resources-advice/sports-injuries/injury-reportingform/). This tool aimed to enable community-sports organisations to record, store and analyse sports injury data. This work by SMA-Victoria was fully funded over 6 years by the Victorian Government (via Sport and Recreation Victoria).

#### Aims

The purpose of this paper is to describe the extent to which the ASIDD has been employed over its 20-year existence, including where, in what way and by whom. It is intended that the findings will contribute to ongoing discussions about the future value of ASIDD and the associated SMA resources (ie, the sport-specific injury surveillance data collection forms and the online Sports Injury Tracker web tool) as well as sports injury data collections globally.

#### **METHODS**

#### Literature search

To identify all literature that had used the ASIDD or SMA's associated injury reporting forms or SMA-Victoria's Sports Injury Tracker (hereafter collectively referred to as the SMA tools), two search strategies were employed for literature published before October 2016.

Text-based searches of both peer-reviewed and grey literature were conducted using databases (PubMed, CINHAL, MEDLINE, SPORTDiscus, Science Direct, Trove, ProQuest and British Library Ethos) and the Google Scholar/Google search engines. Searches were based on the following key words or phrases: Australian Sports Injury Data Dictionary; Sports Injury Data Dictionary; Sport Safe Australia Sports Injury Data Dictionary; Sportsafe Australia Sports Injury Data Dictionary; The Australian Sports Injury Data Working Party; Sports Injury Tracker; Australian Sports Injury Data Dictionary; injury reporting form; sports 'injury report' form.

Following the primary database search, the citation tracking option was employed to obtain additional articles that had referenced the tools. Articles were excluded if they were not available in the English language or if they were only available as a conference abstract. Peer-reviewed literature included published journal articles and theses. Grey literature included governmental, organisational and research reports and web-based material. The websites of sporting and sports medicine organisations were also searched.

The SMA tools included specifically designed anatomical

looking for these unique images. A Google Images search was conducted using reverse image searching. Reverse image searching identifies key points within an image and searches the internet for key points found at the same locations on other images.<sup>17</sup> Three variations of the anatomical images were used in the reverse image searches: entire chart (anterior body, posterior body and head); anterior/posterior views only; head only (figure 1). Results of the image searches were compared with the images unique to the SMA tools and only exact replications of the images were considered a match.

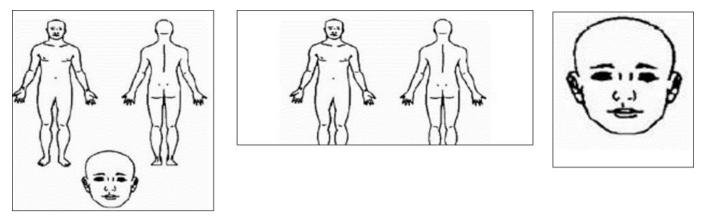


Figure 1 Images from the generic sports injury surveillance forms used in the reverse image searches in Google Images.

# Assessing how Australian Sports Injury Data Dictionary has been used

Each identified document was scanned by eye and searched electronically, using key word/phrase searches, to determine how ASIDD and the SMA tools had been used. Their use was classified into four function categories:

- 1. Data collection: used to collect sports injury data.
- 2. Data analysis: ASIDD categories employed in data coding and/or reporting.
- 3. Tool development: used in the development of another injury data collection tool.
- 4. Reference only: mentioned in the text but not used for other purposes.

#### RESULTS

Key features of the identified documents are shown in table 1 (peer-reviewed literature) and table 2 (grey literature).

#### **Peer-reviewed sources**

As shown in table 1, ASIDD or the SMA tools (forms or Sports Injury Tracker) were mentioned in 36 peer-reviewed articles. The majority of these, 30 (83%), referred to the ASIDD alone, while only 3 (8%) mentioned the reporting forms and 3 (8%) mentioned the injury tracker. The main use for the tools was data analysis, primarily data coding, 15 (42%), while 6 (17%) used them for data collection, 5 (14%) used them as a resource for the development of other data collection tools and 13 (36%) only referred to them in the text. The majority of mentions, 30 (83%), occurred in articles originating from Australia.

#### Grey literature sources

The grey literature search (table 2) found 73 current mentions of SMA tools but relatively little use was made of ASIDD itself with only 12 (16%) mentions. The majority of mentions related to the SMA Sports Injury Reporting Forms or to specific data items contained within them. Of the total grey literature mentions, 46 (63%) provided copies of, or links to, the SMA forms (or modified versions). A further 11 (15%) provided forms that contained identifiable elements from the SMA forms such as the body image or specific codes for variables such as mechanisms of injury. The SMA Sports Injury Tracker was mentioned on only four (6%) occasions. Many of the form-related mentions originated from community-based sporting organisations (31, 43%). Of the 52 form-related mentions where origin was known, the majority, 47 (90%), originated from Australia.

## DISCUSSION

Despite the recognised public health impact and increasing associated burden of sports injuries in Australia,<sup>18–20</sup> there is no nationally based systematic collection of data about sports injuries to inform policy development or practitioner initiated solutions to the problem.<sup>21 22</sup> This has not stopped the sports sector from collecting sports injury data, with many drawing on the availability of the ASIDD and associated SMA tools to assist them in their efforts.

The ASIDWP's expectations of the development of a national emergency data collection system in the early-mid 1990s did not materialise, so the need for other ways to collect sports injury data became more imperative. The Victorian Injury Surveillance Unit has presented sports data irregularly through its Hazard publications (https://www.monash.edu/muarc/research/research-areas/ home-and-community/visu/injury-by-topic). Ad-hoc reports about sports injuries published through the Australian Institute of Health and Welfare have summarised Australia-wide data.<sup>23</sup> However, all of the hospital-based data collections either rely solely on the ICD-10-Australian Modification or other hospital-based classification schemes or have not used the ASIDD.

From a research perspective, as evidenced from the peer-reviewed literature summarised in this paper, the ASIDD and its associated forms have been useful to inform data collection activities in limited-term cohort studies published in some sports, but relatively few of these have been conducted in community sport. In the elite and professional sports contexts, there are some good Australian examples of sports-specific injury data collections (eg, the Australian Football League<sup>24</sup> and the Australian Institute of Sport). Their data collection systems are based on tracking individual athletes in terms of their injury treatment/assessment, general well-being, training loads and so on and are not generally based on the ASIDD specifically, but do have overlapping data fields. It is not known if the ASIDD influenced the initial choice of their data fields, but this overlap could have arisen for other reasons. The fact that the document was only ever published as a grey literature source, with no accompanying or ongoing dissemination or distribution plan from a lead agency, may have also contributed to its limited uptake by such groups.

In more population and mass participation oriented clinical and sports injury prevention practitioner settings, including at local sporting clubs and by peak sports bodies, there has also been strong evidence of use of the SMA tools, especially the forms, to guide injury data collection activities. This is most evident from the grey literature. This indicates that injury prevention practitioners can be strongly engaged in injury surveillance

 Table 1
 Summary of the peer-reviewed literature that has used the Australian Sports Injury Data Dictionary, SMA Sports Injury Reporting Forms or

 SMA-Victoria's Sports Injury Tracker

Authors (year) (reference source)	Specific sport (where specified)	Country of Authorship	DC*	DA†	TD‡	RO§
Australian Sports Injury Data Dictionary (Au	ustralian Sports Injury Data Dictionary)					
Gabbe (1999) <sup>25</sup>	Australian Football	Australia		1		1
Gabbe and Finch (2001) <sup>31</sup>	Australian Football	Australia		1		
Besenyei <i>et al</i> (2002) <sup>32</sup>	N/A	Australia				1
Gabbe <i>et al</i> (2002) <sup>33</sup>	Australian Football	Australia		1	1	
Finch (2003) <sup>34</sup>	All	Australia		1		
Peasley (2003) <sup>35</sup>		Australia				1
Zazryn <i>et al</i> (2003) <sup>36</sup>	Boxing	Australia		1	1	
Zazryn <i>et al</i> (2003) <sup>37</sup>	Kick boxing	Australia		1		
Braham <i>et al</i> (2004). <sup>38</sup>	Australian Football	Australia		1		
Taylor <i>et al</i> (2004) <sup>28</sup>	Surfing	Australia			1	
Fradkin <i>et al</i> (2005) <sup>39</sup>	Golf	Australia		1		
Rae <i>et al</i> (2005) <sup>40</sup>	All	Australia				$\checkmark$
Taylor <i>et al</i> (2005) <sup>29</sup>	Surfing	Australia		1		
Rae and Orchard (2007) <sup>13</sup>	All	Australia				1
Rotem (2007) <sup>41</sup>	Rugby	Australia				1
Andrew <i>et al</i> (2008) <sup>42</sup>	All	Australia		1		
Matthews <i>et al</i> (2008) <sup>43</sup>	Recreational swimming	Australia		1		
Shaw and Finch (2008) <sup>44</sup>	Cricket	Australia		1		
Ross (2009) <sup>45</sup>	All	Canada				1
Smartt and Chalmers (2009) <sup>46</sup>	Horse riding	New Zealand				1
Zazryn <i>et al</i> (2009) <sup>26</sup>	Boxing	Australia		1		
Erby <i>et al</i> (2010) <sup>30</sup>	Surf lifesaving	Australia			1	
Gosling <i>et al</i> (2010) <sup>47</sup>	Triathlon	Australia			1	
Finch <i>et al</i> (2014) <sup>48</sup>	Australian Football	Australia				1
Smartt and Chalmers (2012) <sup>49</sup>	Snow sports	New Zealand		1		
Finch <i>et al</i> (2013) <sup>50</sup>	Australian Football	Australia				1
Reza <i>et al</i> (2013) <sup>51</sup>	All	Iran				1
Aman <i>et al</i> (2014) <sup>52</sup>	Several	Sweden		1		
Ekegren <i>et al</i> (2015) <sup>53</sup>	Australian Football	Australia				1
Sports Medicine Australia Injury Reporting	Form (or modified version)					
Gabbett (2003) <sup>54</sup>	Rugby league	Australia	1			
Atlas <i>et al</i> (2007) <sup>55</sup>	Multiple	Philippines	1			
Gianoudis <i>et al</i> (2008) <sup>56</sup>	Basketball	Australia	1			
SMA-Victoria's Injury Tracker						
Ekegren <i>et al</i> (2014) <sup>57</sup>	Australian Football	Australia	1			
Ekegren <i>et al</i> (2015) <sup>53</sup>	Australian Football	Australia	1			

\*DC, for data collection.

†DA, for data analysis.

‡TD, used to develop a new data collection tool.

§RO, reference only.

SMA, Sports Medicine Australia.

activities when formal guidance is supported by user-friendly tools directly relevant to their settings and practice. This uptake by practitioners would have been enhanced by the fact that the SMA tools were provided free-of-charge.

Overall, this study shows that the ASIDD has a demonstrated longevity with its use continuing from 1999 to the present.<sup>25</sup> The developers of the ASIDD aimed to create comprehensive, yet user-friendly injury surveillance guidance that could be applied by a range of practitioners in a variety of sporting contexts. The achievement of this aim is well illustrated by two investigations that have used it with practitioner data collectors with varying levels of expertise and in contrasting sporting contexts.<sup>26 27</sup> Furthermore, the developers of the ASIDD stressed that sporting

clubs and researchers could modify the data collection forms to suit their specific needs and this paper shows many examples of this, including in non-traditional sports such as surfing and surf lifesaving.<sup>28–30</sup> These examples from the literature demonstrate that the ASIDD has achieved its aims.

Perhaps one of the major long-term legacies of the ASIDD development has been its subsequent influence on the development of new 'Activity' codes in the ICD-10. One of the particular achievements of the ASIDWP was to develop a list of sports-related activities potentially associated with injuries. Identification of the injury potential of these activities had not occurred previously. This was at the time when the ICD-9 was still in use in Australia and there were essentially only two external cause

 Table 2
 Summary of the grey literature (eg, reports, presentations, web-based materials) that have used or made reference to the Australian Sports

 Injury Data Dictionary, or its associated sports injury reporting forms or the Sports Medicine Australia Sports Injury Tracker

uthor/Publisher (reference source)	Sport*	Country†	DC‡	RO§	RU¶
ustralian Sports Injury Data Dictionary (Australian Sports Injury Data Dictionary)					
Accident Compensation Corporation <sup>58</sup>	All	New Zealand			1
Australian Department of Health and Aging <sup>9</sup>	All	Australia		1	
Boufous <i>et al<sup>59</sup></i>	All	Australia		$\checkmark$	
Cassell <sup>60</sup>	Volleyball	Australia			1
Cassell and McGrath <sup>61</sup>	Tennis	Australia			1
Clearinghouse for Sport <sup>52</sup>	All	Australia			1
Cripps and O'Brien <sup>63</sup>	Equestrian	Australia		1	
Cook-Burrows <i>et al<sup>64</sup></i>	Multiple	Australia	1		
Grimmer <sup>65</sup>	Multiple	Australia		1	
Pawlak <i>et al<sup>66</sup></i>	Handball	Poland		1	
Sedgman <sup>67</sup>	Climbing	Australia	1		
lley <sup>68</sup>	Golf	Not specified		1	
ports Medicine Australia Injury Reporting Forms (or modified version)					
ACT Little Athletics <sup>69</sup>	Athletics	Australia			1
AFL Gold Coast Juniors <sup>70</sup>	Australian football	Australia			1
AnyForm <sup>71</sup> (Template)	All				1
ustralian Ice Racing <sup>72</sup>	Ice racing	Australia			
Barnstoneworth United Junior Football Club <sup>73</sup>	Soccer	Australia			1
Barrossa Valley Hockey Association <sup>74</sup>	Hockey	Australia			1
Byford Bushrangers <sup>75</sup>	Tee-ball	Australia			1
Capital Football <sup>76</sup>	Soccer	Australia			· /
Carina Junior Rugby League Football Club <sup>77</sup>	Rugby league	Australia			1
Carrara Australian Football Club <sup>78</sup>	Australian football	Australia			· /
Diving Victoria <sup>79</sup>	Diving	Australia			v V
Doncaster Hockey Club <sup>80</sup>	Hockey	Australia			✓ ✓
East Bentleigh Soccer Club <sup>81</sup>	Soccer	Australia			
East Brighton Vampires Junior Football Club <sup>82</sup>	Australian football	Australia			1
	Australian football	Australia			1
East Sandringham Junior Football Club <sup>83</sup> Football Brisbane <sup>84</sup>					1
	Soccer	Australia			1
Gawler Strikers Hockey Club <sup>85</sup>	Hockey	Australia			~
Goulburn–Mulwaree Athletics Club <sup>86</sup>	Athletics	Australia			1
Hampton Rovers Football Club <sup>87</sup>	Australian football	Australia			1
Highvale Netball Club <sup>88</sup>	Netball	Australia			~
Judo Federation of Australia (Queensland) <sup>89</sup>	Judo	Australia			1
Kiama Netball Association <sup>90</sup>	Netball	Australia			1
Kingsley Junior Football Club <sup>91</sup>	Australian football	Australia			1
Mackay Athletics <sup>92</sup>	Athletics	Australia			~
Melbourne Softball Association <sup>93</sup>	Softball	Australia			1
Motorcycling Australia <sup>94</sup>	Motorcycling	Australia			1
Norwood Flames Basketball Club <sup>95</sup>	Basketball	Australia			1
Oceania Judo Union <sup>96</sup>	Judo	Pacific region			~
Patu Aotearoa Gymnasium <sup>97</sup>	Fitness	New Zealand			$\checkmark$
PDFfiller <sup>98</sup> (Template)	All				1
Queensland Badminton Association <sup>99</sup>	Badminton	Australia			1
Renmore AFC <sup>100</sup>	Soccer	Ireland			1
Sawyoo.com <sup>101</sup> (Template)	All				1
Scribd <sup>102</sup> (Template)	All				1
South Australia Squash Association <sup>103</sup>	Squash	Australia			1
Souths Junior Rugby Union Club	Rugby	Australia			1
St Peters Football Club <sup>104</sup>	Australian football	Australia			1
Tango Netball Club <sup>105</sup>	Netball	Australia			1

Table 2   Continued					
Author/Publisher (reference source)	Sport*	Country†	DC‡	RO§	RU¶
Victory Netball Club <sup>107</sup>	Netball	Australia			1
Waterloo Minor Soccer Club <sup>108</sup>	Soccer	Canada			1
Wembley Junior Football Club <sup>109</sup>	Australian football	Australia			1
Western Region Academy of Sport <sup>110</sup>	Several	Australia			1
Woodvale Football Club <sup>111</sup>	Soccer	Australia			1
WordLayouts <sup>112</sup> (Template)	All				1
Yerrinbool-Bargo Soccer Club <sup>113</sup>	Soccer	Australia			1
Form contains identifiable elements of Sports Medicine Australia Injury Re	eporting Form				
Association Heads of Independent Girls Schools <sup>114</sup>	All	Australia			1
Ballina Netball Association <sup>115</sup>	Netball	Australia			1
Blaxland Football Club <sup>116</sup>	Soccer	Australia			1
Canning Vale Junior Football Club <sup>117</sup>	Australian football	Australia			1
Football New South Wales <sup>118</sup>	Soccer	Australia			1
Football South Coast <sup>119</sup>	Soccer	Australia			1
Greyhound Racing New South Wales <sup>120</sup>	Greyhound racing	Australia			1
Gymnastics Australia <sup>121</sup>	Gymnastics	Australia			1
Club 10 <sup>122</sup>	Gymnastics	Australia			1
Indoor Beach Volley Ball Federation of Western Australia <sup>123</sup>	Volleyball	Australia			1
Khalifa University <sup>124</sup>	All	UAE			1
SMA-Victoria's Injury Tracker					
Clearinghouse for Sport <sup>62</sup>	All	Australia		1	
Netball Victoria <sup>125</sup>	Netball	Australia			1
Skate Victoria <sup>126</sup>	Roller skating	Australia			1
Sport and Recreation Tasmania <sup>127</sup>	All	Australia			1

\* Specific sport (where specified).

+ Country of authrship or website host.

++DC, for data collection.

&RU, reference only.

#RU, recommended or required use.

codes that could be used to identify sports injury (collisions in sport and falls in sport). The then Director of the National Injury Surveillance Unit at Flinders University provided a direct link between the ASIDWP and ongoing national and international developments of the ICD external cause codes. Through these connections, the ASIDD sports activity list was provided to the ICD-10 development team, which used this as the basis of the Activity codes in the ICD-10, and similar modifications worldwide. The original ASIDD list was considered by the International Collaborative Effort of Causes of Injury and the Centres of Disease Control (USA) and extended to the 200+ longlist now used in the ICD-10 to ensure global relevance.

This review is limited by the completeness of the literature search process, especially as a variety of wording was used to reference the ASIDD and the SMA tools. We aimed to be comprehensive, but it is possible that some authors referenced the ASIDD differently and that many others did not reference it at all.

It is likely that we did not capture the full use of SMA tools, especially in the grey literature. While there is likely to be good capture from the peer-reviewed literature, as publication standards require the acknowledgement of sources, this may not apply equally in the grey literature. Many of the mentions in the grey literature make no acknowledgement of the sources. For example, through the Google Image search, it was found that several community sports organisations appeared to have used the ASIDD body chart in their own injury reporting form but did not identify the source of this. It is also known that the Sports Trainer training courses provided by SMA over the past 20 years have included modules on injury data collection based on the SMA tools. However, the course manuals underpinning this training are either not available online or do not explicitly mention the source of the recommended injury data collection tools. Nonetheless, this demonstrates the value of including the image search in our strategy to identify uses of ASIDD and the SMA tools.

#### CONCLUSION

Widespread availability of guidance to underpin ongoing activities, such as the ASIDD and its associated tools, has the potential to contribute to ongoing sports injury data collections both in Australia and internationally. The landscape of sports injury is constantly evolving with changes in the rules of competition, equipment, practices to prevent and treat sports injury and the development of or increased attractiveness of new sports and modes of physical activity. With the heightened awareness for the need to provide safe sporting and physical activity opportunities continually, and the global need for data collections to support this, this study contributes important information about the value of publically available sports injury data guidance. This study has shown widespread and current use of the ASIDD and SMA tool resources, particularly by Australian sports injury practitioners and researchers from both Australia and other countries, demonstrating that guidance on how to conduct sports injury surveillance is needed, and used by, by the sector.

## Systematic review

Given this, the value of having such resources available to the general sporting community as open-access resources that can be adapted to local contexts, is very apparent. However, given the very large advances in digital technology, data capture systems and data analysis approaches that have been made since the initial publication of ASIDD, future efforts could focus on making refinements to the resources to ensure they meet today's information needs. Future efforts will also need to comply with the developing international regulations around data protection. It is recommended that, where possible, both researchers and sports injury surveillance practitioners should cite ASIDD both in their references and as a keyword to allow its use to be monitored. In Australia, government departments of Sport and Recreation have increasingly been placed within broader government portfolios of health. Convincing the larger health portfolios of the need to invest in sports safety requires evidence of major impacts on, burden of, injuries on health service delivery systems. This in turn requires high-quality injury surveillance. Much of the focus in the sports injury literature to date has been directly on defining sports injury only. The lessons learnt from this evaluation of the impact of ASIDD can now be used to also inform the establishment and refinement of injury surveillance systems and data collection platforms to underpin sports injury data collections more globally.

#### What is already known on this subject?

- Sports injuries are known to be a public health issue and to place significant burden on both injured people and healthcare delivery systems. They are a priority prevention target.
- Injury prevention needs to be underpinned by high quality relevant injury surveillance data.
- Specific guidance in what data to collect as part of injury surveillance, and how to code it, is useful.

# What this study adds?

- The Australian Sports Injury Data Dictionary facilitates injury surveillance through its provision of specific coding guidance and readily available specific data collection forms specifically for sports injury surveillance in relevant settings and communities.
- Injury prevention practitioners can be strongly engaged in injury surveillance activities when formal guidance is supported by user-friendly tools directly relevant to their settings and practice.

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