

# **AIHW submission to the Senate Community Affairs References Committee inquiry into concussions and repeated head trauma in contact sports**

On 1 December 2022, the Senate referred the matter to the Senate Community Affairs References Committee for inquiry and report by 21 June 2023. This invited submission relates to item g. *the prevalence, monitoring and reporting of concussion and long-term impacts of concussion and repeated head trauma, including in First Nations communities.*

## **Who are we and what do we do?**

The Australian Institute of Health and Welfare (AIHW) is a corporate Commonwealth entity under the *Public Governance, Performance and Accountability ACT 2013* (PGPA Act) and an independent statutory authority, established under the *Australian Institute of Health and Welfare Act 1987* (AIHW Act).

We create authoritative and accessible information and statistics that inform decisions and improve the health and welfare of all Australians. Our work provides governments, stakeholders and the broader community with valuable evidence and insights about key issues affecting the health and welfare of Australians.

Our functions are set out in section 5 of the AIHW Act. Our role is to:

- collect, produce, coordinate and assist in the collection and production of health- and welfare-related information and statistics
- conduct and promote research into Australians' health and their health services
- develop specialised standards and classifications for health, and health and welfare services
- publish reports on our work
- make recommendations to the Minister for Health on prevention and treatment of diseases and improvement and promotion of the health awareness of Australians
- provide researchers with access to health- and welfare-related information and statistics, subject to confidentiality provisions.

The AIHW is part of the Health and Aged Care Portfolio. We are governed by the AIHW Board. The board is accountable to the Parliament of Australia through the Minister for Health and Aged Care, the Hon Mark Butler MP.

## Data on concussions and repeated head trauma in contact sports

The AIHW has access to more than 150 datasets containing health and welfare data that generally have a national scope. While data may exist in other data holdings that the AIHW does not regularly access such as sub-national or research entity based collections, the AIHW's concussion and head trauma data holdings related to specific sports activities are limited to concussions that require a hospital admission. These data are collected in the National Hospital Morbidity Database (NHMD). Data on repeated concussion or head trauma require a specific analysis using a linked dataset, such as the National Integrated Health Services Information Analysis Asset (NIHSI AA).

### Sports injury hospitalisations in Australia, 2019–20

In the 2019–20 NHMD, there were 52,262 sports injuries that led to a hospital stay in Australia. Concussions were the most common (80%) subset of hospitalised sport intracranial injuries. There were 2,305 cases of hospitalisation for concussion caused by sports in 2019–20. Of these:

- 1,608 were male and 697 were female
- the most common age group being hospitalised for a sports related concussion was 15-24 years old
- 591<sup>1</sup> of the 2,305 cases, or 26% of all hospitalisations for concussion caused by sport, were related to contact sports which include Australian rules football, basketball, combative sports, and rugby (union, league and unspecified).

Participation data are also needed to calculate concussion rates for different sports. For example, while there appear to be large numbers of concussions related to football and cycling (Table A16), this may be a reflection of the large numbers of participants in these sports.

See **Appendix A** for the 2019–20 data tables including data by age group and sex, and sport. The 2020–21 data will be published by June 2023.

### Health service use for patients with traumatic brain injury

A cohort (group) of 23,445 patients aged under 65 who were hospitalised with a traumatic brain injury (TBI) was analysed for service use over time using the NIHSI AA (version 0.5). The NIHSI AA is a linked dataset containing information on admitted patient care (hospitalisations), emergency department presentations, non-admitted patient care, deaths, prescription medications, Medicare services and residential aged care.

Following the injury, TBI patients typically arrived at an emergency department (93%) before being admitted to hospital. In hospital, TBI patients stayed an average of 6.8 days. Following hospitalisation, TBI patients received an increased number of Medicare services including diagnostic imaging, specialist services, and non-referred attendances such as general practitioner and allied health services. Most TBI patients in the cohort were male (70%) and were aged 15 to 24 (37%). Concussion was the most common TBI-related diagnosis (74%).

---

<sup>1</sup> Note that a portion of 'other' and 'other & unspecified football' could relate to contact sports but cannot be determined for this analysis by contact sport due to data quality issues.

## **Sport-specific data**

- 2,708 (11.5%) of TBI injuries occurred in sports and athletics areas.
- New analysis is required to identify the contact sport concussions that are currently mixed within the football, team sport and other categories.
- Any new analysis should use the most recent NIHSI AA datasets and longer follow-up timeframes to examine repeated head trauma and outcomes.

See **Appendix B** for data tables including data by age group and sex.

## **Can further information be provided?**

Data requests for specific analysis can be made to the AIHW. For example, subject to data privacy requirements, the AIHW may be able to provide information from the NHMD or NIHSI AA about hospitalisations for concussion and traumatic brain injuries for contact sports, or for specific demographic groups. Existing data sources from which analyses could be performed are at **Appendix C**. Please contact us to discuss your data requirements.

## **What is being done to improve sports injury data?**

Participation in sport and active recreation have physical and mental health benefits. Sports injuries can decrease participation and health outcomes. Better data on the risks of sports injury within a sport can inform injury prevention programs and decrease injury risks to benefit individuals, sporting organisations, sport performance outcomes, and health systems.

Sports injury data is limited by a lack of sport activity data being collected outside of the admitted hospitalisation data in the NHMD. This limits monitoring of the types and numbers of injuries in sports to inform policy and prevention activities. This evidence gap has led the Australian Sports Commission to contract the AIHW to implement a National Sports Injury Data Strategy. This provides:

- \$2.8 million over 4 years from the 2022–23 Budget
- publishing a data strategy in early 2023
- developing data in partnership with stakeholders such as sporting organisations and insurers, which will include a framework to guide data collection, a data dictionary, and support to encourage better sports data collection including concussion data
- bringing together data sources into a national sports injury data asset
- developing new methods to analyse data
- publishing and communicating findings.

## References

ACCD (Australian Consortium for Classification Development) 2019a. The international statistical classification of diseases and related health problems, 10th revision, Australian modification (ICD-10-AM), 11th edn. Tabular list of diseases and alphabetic index of diseases. Adelaide: Independent Hospital Pricing Authority (IHPA), Lane Publishing.

ACCD 2019b. The Australian classification of health interventions (ACHI), 11th edn. Tabular list of interventions and alphabetic index of interventions. Adelaide: IHPA, Lane Publishing.

ACCD 2019c. The international statistical classification of diseases and related health problems, 10th revision, Australian modification (ICD-10-AM), 11th edn. Australian coding standards for ICD-10-AM and ACHI. Adelaide: IHPA, Lane Publishing.

AIHW 2022. Sports injury hospitalisations in Australia, 2019–20. Cat. no. INJCAT 225. Canberra: AIHW. <https://www.aihw.gov.au/reports/injury/sports-injury-hospitalisations-2019-20/contents/sports-injury-hospitalisations>

AIHW 2021. Health service use for patients with traumatic brain injury. Cat. no. INJCAT 218. Canberra: AIHW. <https://www.aihw.gov.au/reports/injury/treatment-pathways-brain-injury/contents/about>

WHO (World Health Organization) 2019. The international statistical classification of diseases and related health problems, 10th revision (ICD-10). Geneva:

WHO. <https://icd.who.int/browse10/2019/en#/>

## Appendix A: Selected data tables from Sports injury hospitalisations in Australia, 2019–20

**Table A15: Sports-related concussion hospitalisations, by life-stage age groups and sex, Australia, 2019–20**

|                   |                | Age group (years) |              |              |              |             |             | Total        |
|-------------------|----------------|-------------------|--------------|--------------|--------------|-------------|-------------|--------------|
|                   |                | 0–4               | 5–14         | 15–24        | 25–44        | 45–64       | 65+         |              |
| <b>Count</b>      | Male           | 19                | 521          | 597          | 293          | 131         | 47          | <b>1,608</b> |
|                   | Female         | 14                | 167          | 261          | 146          | 82          | 27          | <b>697</b>   |
|                   | <b>Persons</b> | <b>33</b>         | <b>688</b>   | <b>858</b>   | <b>439</b>   | <b>213</b>  | <b>74</b>   | <b>2,305</b> |
| <b>Proportion</b> | Male           | 1.1%              | 32.4%        | 37.1%        | 18.2%        | 8.1%        | 2.9%        | <b>100%</b>  |
|                   | Female         | 2.0%              | 23.9%        | 37.4%        | 20.9%        | 11.7%       | 3.8%        | <b>100%</b>  |
|                   | <b>Persons</b> | <b>1.4%</b>       | <b>29.8%</b> | <b>37.2%</b> | <b>19.0%</b> | <b>9.2%</b> | <b>3.2%</b> | <b>100%</b>  |

Source: AIHW National Hospital Morbidity Database.

Notes:

1. Proportion is of the total for each sex.
2. Proportions may not add to 100 due to rounding.

**Table A16: Sports-related concussion hospitalisations, by sex and sport, Australia, 2019–20**

|                                       | Male         | Female     | Total        |
|---------------------------------------|--------------|------------|--------------|
| Australian rules football             | 196          | 50         | 246          |
| Basketball                            | 69           | 21         | 90           |
| Combative sports                      | 33           | 9          | 42           |
| Cricket                               | 29           | 4          | 33           |
| Cycling                               | 354          | 87         | 441          |
| Dancing                               | 2            | 11         | 13           |
| Equestrian activities                 | 37           | 194        | 231          |
| Hockey (all types)                    | 11           | 11         | 22           |
| Netball                               | 1            | 24         | 25           |
| Racquet sports                        | 11           | 8          | 19           |
| Recreational walking                  | 9            | 14         | 23           |
| Roller sports                         | 137          | 30         | 167          |
| Rugby (union, league and unspecified) | 175          | 38         | 213          |
| Running, athletics, track & field     | 11           | 12         | 23           |
| Skiing, ice skating and snowboarding  | 28           | 17         | 45           |
| Soccer                                | 120          | 33         | 153          |
| Surfing                               | 17           | 6          | 23           |
| Swimming and diving                   | 13           | 8          | 21           |
| Touch football                        | 6            | 12         | 18           |
| Wheeled motor sports                  | 155          | 26         | 181          |
| Other & unspecified football          | 80           | 16         | 96           |
| Other                                 | 114          | 66         | 180          |
| <b>Total</b>                          | <b>1,608</b> | <b>697</b> | <b>2,305</b> |

Source: AIHW National Hospital Morbidity Database.

Note: Sports with 10 or fewer concussions grouped into 'other'.

**Table A17: Sports-related concussion hospitalisations, by life-stage age groups and sport, Australia, 2019–20**

| Sport or activity                     | Life-stage age group |            |            |            |            |           | Total        |
|---------------------------------------|----------------------|------------|------------|------------|------------|-----------|--------------|
|                                       | 0–4                  | 5–14       | 15–24      | 25–44      | 45–64      | 65+       |              |
| Australian rules football             | 1                    | 72         | 136        | 34         | 2          | 1         | 246          |
| Basketball                            | 0                    | 37         | 41         | 10         | 2          | 0         | 90           |
| Combative sports                      | 1                    | 8          | 18         | 14         | 1          | 0         | 42           |
| Cricket                               | 0                    | 11         | 10         | 10         | 2          | 0         | 33           |
| Cycling                               | 10                   | 134        | 104        | 81         | 83         | 29        | 441          |
| Dancing                               | 0                    | 4          | 3          | 3          | 2          | 1         | 13           |
| Equestrian activities                 | 1                    | 51         | 76         | 63         | 38         | 2         | 231          |
| Hockey (all types)                    | 0                    | 5          | 6          | 11         | 0          | 0         | 22           |
| Netball                               | 0                    | 6          | 15         | 3          | 1          | 0         | 25           |
| Racquet sports                        | 0                    | 3          | 1          | 2          | 5          | 8         | 19           |
| Recreational walking                  | 0                    | 1          | 1          | 3          | 6          | 12        | 23           |
| Roller sports                         | 6                    | 79         | 52         | 23         | 6          | 1         | 167          |
| Rugby (union, league and unspecified) | 1                    | 50         | 133        | 28         | 1          | 0         | 213          |
| Running, athletics, track & field     | 2                    | 8          | 5          | 1          | 5          | 2         | 23           |
| Skiing, ice skating and snowboarding  | 0                    | 15         | 11         | 11         | 5          | 3         | 45           |
| Soccer                                | 1                    | 48         | 65         | 32         | 7          | 0         | 153          |
| Surfing                               | 0                    | 2          | 10         | 7          | 3          | 1         | 23           |
| Swimming and diving                   | 2                    | 8          | 3          | 8          | 0          | 0         | 21           |
| Touch football                        | 0                    | 6          | 5          | 7          | 0          | 0         | 18           |
| Wheeled motor sports                  | 1                    | 52         | 69         | 42         | 16         | 1         | 181          |
| Other & unspecified football          | 0                    | 28         | 52         | 16         | 0          | 0         | 96           |
| Other                                 | 7                    | 60         | 42         | 30         | 28         | 13        | 180          |
| <b>Total</b>                          | <b>33</b>            | <b>688</b> | <b>858</b> | <b>439</b> | <b>213</b> | <b>74</b> | <b>2,305</b> |

Source: AIHW National Hospital Morbidity Database.

Note: Sports with 10 or fewer concussions grouped into 'other'

**Table A18: Proportion of sports-related intracranial injury hospitalisations that are concussions, by age group, Australia, 2019–20**

| Age group (years) | Proportion   |
|-------------------|--------------|
| 0–4               | 84.6%        |
| 5–9               | 93.9%        |
| 10–14             | 91.0%        |
| 15–19             | 88.0%        |
| 20–24             | 85.5%        |
| 25–29             | 85.1%        |
| 30–34             | 76.2%        |
| 35–39             | 64.8%        |
| 40–44             | 74.2%        |
| 45–49             | 76.2%        |
| 50–54             | 64.6%        |
| 55–59             | 61.3%        |
| 60–64             | 55.7%        |
| 65+               | 37.0%        |
| <b>Total</b>      | <b>80.3%</b> |

Source: AIHW National Hospital Morbidity Database.

## Appendix B: Selected data tables from Health service use for patients with TBI

**Table S3: Number of cohort patients by external cause, place of occurrence and activity, by sex, 2013–14 to 2014–15**

|   | Male          | Female       | Persons       |
|---|---------------|--------------|---------------|
| <b>External cause of injury</b>                     |               |              |               |
| Falls   | 5,852         | 3,200        | 9,052         |
| Transport   | 5,187         | 2,147        | 7,334         |
| Assault   | 2,428         | 468          | 2,896         |
| Contact with living things                          | 1,112         | 249          | 1,361         |
| Contact with objects                                | 850           | 381          | 1,231         |
| Intentional self-harm                               | 135           | 97           | 232           |
| Other external causes                               | 812           | 506          | 1,318         |
| <b>Place of occurrence</b>                          |               |              |               |
| Home  | 2,323         | 1,686        | 4,009         |
| Residential institution                             | n.p.          | n.p.         | 158           |
| School, college, university, day care, kindergarten | 420           | 167          | 587           |
| Health service area                                 | 893           | 614          | 1,507         |
| Sports and athletics area                           | 2,234         | 474          | 2,708         |
| Street and highway                                  | 3,656         | 1,467        | 5,123         |
| Trade and service area                              | 778           | 295          | 1,073         |
| Industrial and construction area                    | n.p.          | n.p.         | 231           |
| Farm  | 269           | 111          | 380           |
| Other specified and unspecified place               | 5,459         | 2,189        | 7,648         |
| <b>Activity when injured</b>                        |               |              |               |
| Football (all codes)                                | 1,638         | 129          | 1,767         |
| Team sports (excluding football)                    | 210           | 119          | 329           |
| Motor sports  | 487           | 38           | 525           |
| Equestrian sports                                   | 68            | 280          | 348           |
| Other sports  | 1,174         | 378          | 1,552         |
| <i>Sub-total – sports</i>                           | <i>3,577</i>  | <i>944</i>   | <i>4,521</i>  |
| While working for income                            | 900           | 234          | 1,134         |
| While engaged in other types of work                | 331           | 158          | 489           |
| <i>Sub-total – work</i>                             | <i>1,231</i>  | <i>392</i>   | <i>1,623</i>  |
| Leisure activity                                    | 768           | 359          | 1,127         |
| Essential activities (resting, sleeping, eating)    | 378           | 366          | 744           |
| Other specified/unspecified                         | 10,422        | 4,987        | 15,409        |
| <b>Total<sup>(a)</sup></b>                          | <b>16,376</b> | <b>7,048</b> | <b>23,445</b> |

Source: NIHSI AA v0.5

**Notes:**

(a) The overall total includes 21 records where external cause, place of occurrence and activity when injured was not reported.

n.p. Not publishable because of small numbers, confidentiality or other concerns about the quality of the data.

**Table S4: Number of cohort patients by external cause of injury, place of injury occurrence and activity when injured, by age group, 2013–14 to 2014–15**

|  | 0 to 14      | 15 to 24     | 25 to 34     | 35 to 44     | 45 to 54     | 55 to 64     | Total         |
|--|--------------|--------------|--------------|--------------|--------------|--------------|---------------|
| <b>External cause of injury</b>                  |              |              |              |              |              |              |               |
| Falls  | 2,216        | 1,522        | 983          | 1,024        | 1,404        | 1,903        | 9,052         |
| Transport  | 793          | 2,179        | 1,331        | 1,178        | 1,007        | 846          | 7,334         |
| Assault  | 76           | 847          | 765          | 600          | 422          | 186          | 2,896         |
| Contact with living things                       | 357          | 651          | 205          | 66           | 39           | 43           | 1,361         |
| Contact with objects                             | 317          | 264          | 176          | 188          | 156          | 130          | 1,231         |
| Intentional self-harm                            | n.p.         | 45           | 56           | 54           | 45           | n.p.         | 232           |
| Other external causes                            | n.p.         | 179          | 186          | 203          | 244          | n.p.         | 1,318         |
| <b>Place of injury occurrence</b>                |              |              |              |              |              |              |               |
| Street and highway                               | 317          | 1,426        | 1,040        | 906          | 749          | 685          | 5,123         |
| Home   | 929          | 395          | 417          | 553          | 704          | 1,011        | 4,009         |
| Sports and athletics setting                     | 705          | 1,239        | 414          | 175          | 103          | 72           | 2,708         |
| Health service setting                           | 122          | 199          | 215          | 242          | 325          | 404          | 1,507         |
| Trade and service setting                        | 71           | 246          | 207          | 182          | 174          | 193          | 1,073         |
| Educational setting                              | 473          | 88           | n.p.         | n.p.         | 10           | n.p.         | 587           |
| Farm   | 63           | 98           | 49           | 57           | 47           | 66           | 380           |
| Industrial and construction setting              | n.p.         | 44           | 52           | 49           | 39           | n.p.         | 231           |
| Residential institution                          | n.p.         | n.p.         | 26           | 39           | 28           | 42           | 158           |
| Other specified and unspecified place            | 1,240        | n.p.         | n.p.         | n.p.         | 1,138        | 957          | 7,648         |
| <b>Activity when injured</b>                     |              |              |              |              |              |              |               |
| Football (all codes)                             | 498          | 922          | 259          | 59           | 18           | 11           | 1,767         |
| Team sports (excluding football)                 | 112          | 129          | 47           | 20           | n.p.         | n.p.         | 329           |
| Motor sports                                     | 110          | 213          | 80           | 62           | 45           | 15           | 525           |
| Equestrian sports                                | 65           | 93           | 54           | 53           | 50           | 33           | 348           |
| Other sports                                     | 424          | 435          | 207          | 197          | 177          | 112          | 1,552         |
| <i>Sub-total – sports</i>                        | <i>1,209</i> | <i>1,792</i> | <i>647</i>   | <i>391</i>   | <i>n.p.</i>  | <i>n.p.</i>  | <i>4,521</i>  |
| Paid work  | n.p.         | 207          | 219          | 224          | 247          | n.p.         | 1,134         |
| Non-paid work                                    | 50           | 42           | 35           | 73           | 112          | 177          | 489           |
| <i>Sub-total – work</i>                          | <i>n.p.</i>  | <i>249</i>   | <i>254</i>   | <i>297</i>   | <i>359</i>   | <i>n.p.</i>  | <i>1,623</i>  |
| Leisure activity                                 | 581          | 205          | 113          | 84           | 85           | 59           | 1,127         |
| Essential activities (resting, sleeping, eating) | 95           | 96           | 103          | 112          | 139          | 199          | 744           |
| Other specified/unspecified                      | n.p.         | 3,345        | 2,585        | 2,429        | n.p.         | 2,630        | 15,409        |
| <b>Total<sup>(a)</sup></b>                       | <b>3,925</b> | <b>5,687</b> | <b>3,702</b> | <b>3,313</b> | <b>3,317</b> | <b>3,480</b> | <b>23,445</b> |

Source: NIHSI AA v0.5

**Notes:**

(a) The overall total includes 21 records where external cause, place of occurrence and activity when injured was not reported.

n.p. not publishable because of small numbers, confidentiality or other concerns about the quality of the data.



# Appendix C: Data collections of relevance to the inquiry

## National Hospital Morbidity Database

The National Hospital Morbidity Database (NHMD) contains episode-level records for patients admitted to Australian hospitals. Hospitals included are all public and private acute and psychiatric hospitals, free standing day hospital facilities, and alcohol and drug treatment centres. Hospitals operated by the Australia Defence Force, corrections authorities and in Australia's offshore territories are not required to report information but are included if information is supplied.

The data include demographic, administrative and length of stay data, as well as diagnoses of the patients, the procedures they underwent in hospital and external causes of injury and poisoning. Demographic data may also include whether patients identify as First Nations peoples or not.

Diagnosis, intervention and external cause information are coded according to the *International statistical classification of diseases and related health problems, 10<sup>th</sup> revision, Australian modification* (ICD-10-AM) (ACCD 2019a, 2019b, 2019c). This coding enables the identification of patients whose injury diagnosis includes concussion and head trauma. Additionally, if the injury was reported to have occurred whilst the patient was playing sport, then the particular sport will usually also be reported. This is known as the activity code.

The NHMD contains episode-level records for each hospital admission. In the NHMD, it is not possible to link different episodes for the same person. That is, if a person is admitted to hospital twice for a concussion, it is not possible to identify that the two admissions were for the same person.

## National Mortality Database

The National Mortality Database (NMD) currently holds records for deaths in Australia from 1964 to 2020. The database comprises information about causes of death and other characteristics of the person, such as sex, age at death, area of usual residence and Indigenous status.

When a person is declared dead, information about their death is recorded on a death certificate by either a medical practitioner or a coroner. Registration of all deaths is compulsory in Australia and is the responsibility of the Registrar of Births, Deaths and Marriages of the relevant state or territory, under jurisdiction-specific legislation.

Causes of death are coded according to the *International statistical classification of diseases and related health problems 10<sup>th</sup> revision* (ICD-10) (WHO). This coding enables the identification of the underlying cause of death, as well as all the morbid conditions, diseases and injuries which contributed to the death. The ICD-10 does not include activity codes, therefore it is generally not possible to identify if a sport was related to the cause of death.

## National Integrated Health Services Information Analysis Asset

The National Integrated Health Services Information Analysis Asset (NIHSI AA) is a linked dataset containing information on admitted patient care (hospitalisations), emergency

department presentations, non-admitted patient care, deaths, prescription medications, Medicare services and residential aged care.

The NIHSI AA allows analysis of service use and provision across specific parts of the health care system, and across time. The NIHSI AA includes hospitals data (admitted patient care, emergency department and non-admitted patient), Medicare Benefits Schedule (MBS), Pharmaceutical Benefits Scheme (PBS), Residential Aged Care and National Death Index. Private hospital coverage is limited. The NIHSI AA version 2.0 includes hospitals data from New South Wales, Victoria, Queensland, South Australia, Tasmania and the Australian Capital Territory and covers the time period 2010–11 to 2019–20.

## Registry data

Clinical Quality Registries (CQRs) systematically monitor the quality (appropriateness and effectiveness) of health care, within specific clinical domains, by routinely collecting, analysing and reporting health-related information. Registry information is used to identify outcome benchmarks, significant outcome variance, and inform improvements in healthcare quality. The [Australia New Zealand Trauma Registry](#) (ATR) is a key component of the Australian Trauma Quality Improvement Program and collects in-hospital data from contributing sites on those most severely injured. The ATR now houses over 5 years of quality data for research purposes, and longer time frames may be needed to appreciate the long-term outcomes from concussion and other types of severe trauma.

## State emergency department data from injury surveillance units

Concussion data are collected in emergency departments, but data are not routinely collected on whether a sport was involved. Some states (Victorian and Queensland Injury Surveillance Units) analyse emergency department records to identify sport activities, but this is limited by the amount of detail entered into the medical record and is likely an underestimate of concussions occurring during sport.

## Other data sources

Concussion data are not currently collected from general practice or allied health in formats that support standardised reporting at state, territory or national levels.

## Limitations

Outside hospitals, none of the national data holdings routinely used by the AIHW specifically to identify concussions associated with sport. This can be partially remedied through data linkage, where the AIHW can use information from hospitals data to track the health service use patterns and outcomes of people who have suffered traumatic brain injuries. This could link a person's record of having a sport-related concussion hospitalisation with their Medicare Benefits Scheme (MBS), Pharmaceutical Benefits Scheme (PBS) or subsequent hospital or rehabilitation admission data but would miss most concussions that are believed to not result in a hospital admission and go largely unidentified in national collections.