The Senate

Community Affairs References Committee

Concussions and repeated head trauma in contact sports

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Terms of reference

Concussions and repeated head trauma in contact sports at all levels, for all genders and age groups, with particular reference to:

(a) the guidelines and practices contact sports associations and clubs follow in cases of player concussions and repeated head trauma, including practices undermining recovery periods and potential risk disclosure;
(b) the long-term impacts of concussions and repeated head trauma, including but not limited to mental, physical, social and professional impacts;
(c) the long and short-term support available to players affected by concussion and repeated head trauma;
(d) the liability of contact sports associations and clubs for long-term impacts of player concussions and repeated head trauma;
(e) the role of sports associations and clubs in the debate around concussion and repeated head trauma, including in financing research;
(f) the lack of a consistent definition of what constitutes 'concussion';
(g) the prevalence, monitoring and reporting of concussion and long-term impacts of concussion and repeated head trauma, including in First Nations communities;
(h) workers, or other, compensation mechanisms for players affected by long-term impacts of concussions and repeated head trauma;
(i) alternative approaches to concussions and repeated head trauma in contact sport, and awareness raising about its risks;
(j) international experiences in modifying sports for children; and
(k) any other related matters.

Contents

Abbreviations

ACC	Accident Compensation Corporation
ACL	Anterior Crucial Ligament
ACSEP	Australasian College of Sport and Exercise Physicians
AFL	Australian Football League
AFLW	Australian Football League Women's
AIHW	Australian Institute of Health and Welfare
AIS	Australian Institute of Sport
ARC	Australian Research Council
ARLC	Australian Rugby League Commission
ASBB	Australian Sports Brain Bank
ASC	Australian Sports Commission
CALD	culturally and linguistically diverse
CISG	Concussion in Sports Group
Connectivity	Connectivity Traumatic Brain Injury Australia
CRT5	Concussion Recognition Tool 5
CTE	Chronic Traumatic Encephalopathy
CTE-NC	Chronic Traumatic Encephalopathy Neuropathological Change
GP	General practitioner
IOC	International Olympic Committee
MCRI	Murdoch Children's Research Institute
MRFF	Medical Research Future Fund
mTBI	mild traumatic brain injury
NDIS	National Disability Insurance Scheme
NFL	National Football League
NHMD	National Hospital Morbidity Database
NHMRC	National Health and Medical Research Council
NRL	National Rugby League

NRLW	National Rugby League Women's
PoC	Point of Care
PPE	Personal protection equipment
QAFLW	Queensland Australian Football League Women's
RACGP	Royal Australian College of General Practitioners
RHT	Repeated head trauma
RLPA	Rugby League Players Association
SBB	Sydney Brain Bank
SCAT5	Sport Concussion Assessment Tool 5
TBI	Traumatic brain injury
TBI Mission	Traumatic Brain Injury Mission
TES	Traumatic Encephalopathy Syndrome
the department	Department of Health and Aged Care
the Florey	The Florey Institute of Neuroscience and Mental Health
TPD	Total and permanent disability
VFL	Victorian Football League
YPNHNA	Young People in Nursing Homes National Alliance

List of recommendations

Recommendation 1

2.96 The committee recommends that the Australian Government establish the National Sports Injury Database as a matter of urgency, noting this will significantly help address the lack of sports injury data available in Australia, including at the community level of sport.

Recommendation 2

2.97 With a view to increasing transparency, the committee recommends that professional sporting codes collect data on concussions and identified sub-concussive events and share this data with the National Sports Injury Database.

Recommendation 3

3.135 The committee recommends that the Australian Government consider establishing independent research pathways, including through a newly created body or through existing bodies, such as the National Health and Medical Research Council, that is dedicated to supporting and coordinating research into the short- and long-term effects of concussion and repeated head trauma incurred during participation in sport, including Chronic Traumatic Encephalopathy.

The committee envisages that, amongst other things, such pathways would enable well-structured scientific investigations—including prospective, longitudinal clinicopathological studies—to help identify clinical features, progression, and interventions.

Recommendation 4

3.136 The committee recommends that the Australian Government and sporting organisations continue to fund research into the effects of concussion and repeated head trauma on at-risk cohorts who incur these injuries during their participation in sport.

Recommendation 5

3.137 The committee recommends that the Australian Government consider measures to encourage Australians, in the event of their death, to donate their brain to a brain bank for scientific research into brain health and disease, including Chronic Traumatic Encephalopathy.

Recommendation 6

3.138 The committee recommends that the Australian Government consider a coordinated and consolidated funding framework for ongoing research regarding sport-related concussion and repeated head trauma.

This work should be undertaken in consultation with state and territory governments, sporting organisations, universities, and other scientific research bodies.

The committee recommends the governing bodies of sports associated with concussion and repeated head trauma support their codes to invest in the health and welfare of their players.

Recommendation 7

4.79 The committee recommends that the Department of Health and Aged Care in consultation with relevant stakeholders, consider how best to improve community awareness and education regarding concussion and repeated head trauma, with these measures being health lead. These initiatives would help individuals:

- **recognise the acute signs and symptoms of concussion;**
- **appropriately respond to and manage such injuries; and**
- **understand the short- and long-term risks of concussion and repeated head trauma.**

The committee recommends the development of awareness and education initiatives, with appropriate consideration given to dissemination strategies; the need to review or update existing materials; and ensuring tailored resources are available to different cohorts including, players, parents, coaches, teachers, other volunteers involved in sport and the general public.

Recommendation 8

4.83 The committee recommends that the Australian Government, in partnership with state and territory governments consider how best to address calls for:

- **the development of standardised, evidence-based, and easy-to-access concussion and head trauma guidelines for GPs;**
- **suitable general practice consultations for people with concussion, repeated head trauma and other complex care needs; and**
- **increased training for first aid responders at sporting venues that focuses specifically on treating concussion and head injury.**

Recommendation 9

5.141 The committee recommends that national sporting organisations in Australia explore further rule modifications for their respective sports in order to

prevent and reduce the impact of concussion and repeated head trauma. This work should prioritise modifications that protect children and adolescents, and take into account emerging evidence both domestically and internationally.

Recommendation 10

5.147 The committee recommends that the Australian Government, in collaboration with medical experts, develops return to play protocols, adaptable across all sports, for both children and adults that have incurred a concussion or suffered a head trauma. The committee envisages that protocols may include lengthier stand-down periods for children and individuals who have a history of repeated head trauma.

Recommendation 11

5.153 The committee recommends that the Australian Government consider developing a national strategy to reduce the incidence and impacts of concussion, including binding return to play protocols and other rules to protect sport participants from head injuries. Consideration should be given to whether any existing government bodies would be best placed to monitor, oversee and/or enforce concussion related rules and return to play protocols in Australian sports.

Recommendation 12

6.91 The committee recommends that professional sporting codes and players associations consider ways for a best practice model to provide ongoing support, financial and otherwise, to current and former players affected by concussions and repeated head trauma.

Recommendation 13

6.96 The committee encourages professional sports organisations to ensure their athletes have insurance coverage for head trauma. The committee also encourages state and territory governments to engage with professional sporting organisations to explore how the general exclusion of professional sports people from various state and territory workers' compensation schemes could be removed.

The committee envisages that such a review should, amongst other things, assess the financial impact such a reform would have on the various sporting organisations across Australia.

Chapter 1
Introduction

1.1 Australia has long prided itself on being 'a sporting nation'. As a country, we have high participation rates across a range of sports, host a number of major sporting events, and often outperform on the global stage.

1.2 The vast social, developmental, physical, and mental health benefits of playing, participating in and watching sport are well established, and for many Australians, sport is a significant part of life. As one submitter highlighted, sport forms 'an integral part of our society's fabric, bringing together a diverse community under the dual banners of belonging and competition'.[1]

1.3 Increasing participation in sport and physical activity at the community level, as well as improving international success, have long been policy objectives of Australian governments at all levels. Currently, the Australian Government's goal is for Australia to be the world's most active and healthy nation, known for our integrity and sporting success. Australia's National Sport Plan, *Sports 2030*, was developed to achieve this vision.[2]

1.4 According to the Department of Health and Aged Care, more than 90 per cent of Australian adults have an interest in sport, with 13 million adults and 3 million children taking part in sport each year, and 3.1 million Australians volunteering in sport and active recreation each year.[3]

1.5 Contact sports are also highly popular amongst Australians. For example, the Australian Football League (AFL) reported over 517 000 participants in 2022, the National Rugby League (NRL) reported over 170 000 participants for the same year, and over 127 000 Australians regularly play Rugby Union in Australia.[4] These sports also attract significant match attendance and broadcast audiences each year.

1.6 In recent years there have been increasing reports and concern, both in Australia and internationally, about the growing evidence of the link between

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1 Dr David Munro PhD, *Submission 37*, p. 8.

2 Sport Australia, *Sport 2030 – National Sport Plan*, www.sportaus.gov.au/nationalsportplan (accessed 6 June 2023).

3 Department of Health and Aged Care, *About sport in Australia*, 12 January 2023, www.health.gov.au/topics/sport/about-sport-in-australia (accessed 16 May 2023).

4 Australian Football League (AFL), *Submission 18*, p. 2; National Rugby League (NRL), *Rugby league celebrates club participation growth across the nation*, 19 April 2023, www.nrl.com/news/2023/04/19/rugby-league-celebrates-club-participation-growth-nationally/ (accessed 17 May 2023); Rugby Australia, *Submission 12*, [p. 2].

sport-related concussions and repeated head trauma, and short and long-term impacts on athletes' health, including links to neurodegenerative diseases such as Chronic Traumatic Encephalopathy (CTE).[5]

1.7 Even as this report is being drafted, significant developments such as various class actions and individual proceedings, key policy and rule enforcement changes by the major sporting codes, and new cases of CTE, including the tragic case of the late Heather Anderson (a former AFL Women's player who has become the first, known professional female athlete to be diagnosed with CTE) have emphasised how quickly and significantly this space is developing.[6]

1.8 During the course of this inquiry, the committee heard confronting accounts from former athletes and their families of the impacts that sport-related concussion and head injuries had on them and their loved ones. The committee heard of former athletes suffering from anxiety, depression, psychosis, hallucinations, dizziness and brain fog, and how those closest to them watched their rapid decline.

1.9 However, evidence to this inquiry has clearly highlighted that the link between concussion, repeated head trauma and contact sport is a contentious issue and space, with sporting organisations, medical, research and legal professionals, governments, the media and the community alike, all grappling with its evolving complexities and evidence.

1.10 The purpose of this inquiry is to explore the current evidence and challenges regarding contact sport-related concussion and repeated head injuries, and consider measures to improve the identification and prevention of these injuries, as well as reduce their short and long-term impacts.

1.11 The committee recognises that sports in Australia are largely governed by private organisations and businesses, and acknowledges that this makes the role of the Australian Government less straightforward. However, given the

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5 See, for example, Australian Sports Commission, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 5; MindMirror, *Submission 14*, p. 1.

6 See, for example, Australian Associated Press, 'Landmark class action chases up to $1bn compensation for alleged long-term concussion damage to AFL players', *The Guardian*, 14 March 2023, www.theguardian.com/sport/2023/mar/14/landmark-class-action-chases-compensation-for-alleged-long-term-concussion-damage-to-afl-players (accessed 10 July 2023); Michael Gleeson, 'Another week, another suspension: Behind the AFL's crackdown on dangerous tackles', *The Age*, 23 June 2023, www.theage.com.au/sport/afl/another-week-another-suspension-behind-the-afl-s-crackdown-on-dangerous-tackles-20230620-p5dhxc.html (accessed 10 July 2023); Australian Associated Press, 'NRL orders 11-day stand-down period for concussed players', *The Guardian*, 15 March 2023, www.theguardian.com/sport/2023/mar/15/nrl-to-implement-11-day-stand-down-period-for-concussed-players (accessed 10 July 2023); Elias Clure, 'AFLW player Heather Anderson the first female athlete to be diagnosed with CTE in landmark case', *ABC*, 4 July 2023, www.abc.net.au/news/2023-07-04/cte-diagnosis-in-female-athlete-heather-anderson-aflw-730/102555944 (accessed 10 July 2023).

significant public health issues involved, the committee considers that there is still a pivotal role for government to play in this space.

1.12 Finally, the committee does not intend for this report to discourage sport participation or to create unnecessary fear about the risks relating to concussion in sport. As evidence from the Royal Australian College of General Practitioners (RACGP) highlighted, Australians should be encouraged to undertake regular physical activity (which may include contact sports), but the safety of people who participate in sports, especially junior players, is of utmost importance. The committee agrees with the RACGP that widespread participation in sporting activities will only be achieved if sports are made safe, and are also perceived to be safe.[7]

Referral of inquiry

1.13 On 1 December 2022 the following matter was referred to the committee for inquiry and report by 21 June 2023:

> Concussions and repeated head trauma in contact sports at all levels, for all genders and age groups, with particular reference to:
>
> (a) the guidelines and practices contact sports associations and clubs follow in cases of player concussions and repeated head trauma, including practices undermining recovery periods and potential risk disclosure;
>
> (b) the long-term impacts of concussions and repeated head trauma, including but not limited to mental, physical, social and professional impacts;
>
> (c) the long and short-term support available to players affected by concussion and repeated head trauma;
>
> (d) the liability of contact sports associations and clubs for long-term impacts of player concussions and repeated head trauma;
>
> (e) the role of sports associations and clubs in the debate around concussion and repeated head trauma, including in financing research;
>
> (f) the lack of a consistent definition of what constitutes 'concussion';
>
> (g) the prevalence, monitoring and reporting of concussion and long-term impacts of concussion and repeated head trauma, including in First Nations communities;
>
> (h) workers, or other, compensation mechanisms for players affected by long-term impacts of concussions and repeated head trauma;
>
> (i) alternative approaches to concussions and repeated head trauma in contact sport, and awareness raising about its risks;
>
> (j) international experiences in modifying sports for children; and
>
> (k) any other related matters.[8]

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7 Royal Australian College of General Practitioners (RACGP), *Submission 22*, p. 3.

8 *Journals of the Senate,* No. 27, 1 December 2023, pp. 807–808.

1.14 On 16 June 2023, the Senate granted an extension of time for reporting until 2 August 2023. On 1 August 2023, the Senate granted a further extension of time for reporting until 5 September 2023.[9]

Scope of the inquiry

1.15 As set out in the terms of reference, the committee's primary focus is on concussions and repeated head trauma in contact sports. However, the committee acknowledges that the issues raised as part of this inquiry are not limited to traditional contact sports, and that many of these same issues pertain to non-contact sports including but not limited to cycling, horse riding and gymnastics. Correspondingly, many of the recommendations made in this report also apply to non-contact sports.

1.16 The committee is also aware that the prevalence and risk of concussions and repeated head trauma are significantly heightened in combat sports such as boxing and mixed-martial arts.

1.17 Finally, the committee is cognisant that concussion does not just occur in a sporting context, but that it is also a significant concern for other groups including victim-survivors of domestic violence, other physical assault victims such as from one-punch attacks, defence force personnel and veterans, motor vehicle accident victims, and for those who have experienced accidents during recreation and play.[10]

1.18 Whilst concussions that occur in these contexts sit outside the scope of this inquiry, the committee acknowledges that concussion should be prevented and responded to in many different contexts, and believes the insights from this inquiry have application in terms of the importance of prevention, better management, and response to these injuries regardless of their cause.

Conduct of the inquiry

1.19 Details of the inquiry were published on the committee's website and the committee invited organisations and individuals to lodge submissions. The committee received 92 submissions which are listed at Appendix 1.

1.20 The committee held a number of public hearings across Australia:

- 30 January 2023 – Western Sydney, New South Wales;
- 22 February 2023 – Brisbane, Queensland;
- 1 March 2023 – Canberra, Australian Capital Territory; and
- 26 April 2023 – Melbourne, Victoria.

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9 *Journals of the Senate,* No. 52, 17 June 2023, p. 7; *Journals of the Senate,* No. 58, 1 August 2023, p. 1670.

10 See, for example, RACGP, *Submission 22*, p. 7; Brain Injury Australia, *Submission 23*, pp. 5, 7; Professor Robert Vink, *Submission 38*, p. 2; Mr Peter (Wombat) Maguire, *Submission 47*, [p. 8]; Mr Robin McGilligan, *Submission 73*, [p. 2].

1.21 The committee also held a number of in camera hearings.

1.22 A list of witnesses who gave evidence at the public hearings is available at Appendix 2 of this report.

1.23 In this report, references to *Committee Hansard* are to both proof and official transcripts. Page numbers may vary between proof and official transcripts.

Structure of this report

1.24 This chapter sets out general information outlining the conduct of the inquiry and provides background information relating to concussions, repeated head trauma and contact sports in Australia and around the world.

1.25 Chapter 2 discusses the challenges present in determining the incidence of concussion in sport in Australia, including inconsistencies around the definition of concussion and the limitations of current diagnosis tools. It also outlines the need for better data collection on the prevalence of concussion and head trauma across all levels of sport to improve prevention and treatment outcomes.

1.26 Chapter 3 explores the various perspectives that inquiry participants have on the impact that concussion and head trauma have on long-term brain health. Additionally, it discusses various research initiatives which are currently underway, concerns about research integrity in this space and the need for further, independent and unconflicted research going forward.

1.27 Chapter 4 outlines how cultural factors and a lack of understanding about sport-related concussion and repeated head trauma can contribute to the under-reporting of incidents, concealing of symptoms and poor management of concussive injuries. It also outlines the need for increased education and public awareness measures at all levels, and discusses the need to improve the capacity of the health system and health professionals to better deal with concussive injuries.

1.28 Chapter 5 outlines on-field harm minimisation strategies and return-to-play protocols to help prevent and reduce the impact of concussions and repeated head trauma. It also discusses the need to encourage and enforce better adherence to the wide variety of concussion related safety policies and rules which Australian sports have in place.

1.29 Chapter 6 discusses the support available to sportspeople who have suffered from the impacts of sport-related concussions and head trauma, including insurance, remediation and compensation measures.

Acknowledgements

1.30 The committee thanks all those who contributed to the inquiry by making submissions, providing additional information and appearing at public hearings.

1.31 In particular, the committee would like to acknowledge the individuals who shared their lived experiences of concussion and repeated head trauma in sport, including those who experienced these injuries themselves and those who shared how this issue has impacted loved ones. These personal testimonies have been vital in deepening the committee's understanding of the impacts that concussion and repeated head trauma in sport is having on Australian individuals and families.

Sport in Australia

1.32 According to the Department of Health and Aged Care, 13 million Australian adults and 3 million children take part in sport each year. Additionally, 3.1 million Australians volunteer in sport and active recreation each year and over 90 per cent of adults have an interest in sport.[11]

1.33 The Australian Institute of Health and Welfare (AIHW) reports that in 2019–20, the most popular team sports in Australia by estimated number of participants aged 15 and over are:

- soccer (1.1 million participants);
- basketball (831 000 participants);
- netball (622 000 participants);
- Australian rules football (537 400 participants);
- cricket (480 000 participants);
- touch football (337 900 participants);
- rugby – league and union combined (296 400 participants) and
- hockey (169 600 participants).[12]

1.34 Estimates also indicate other popular physical activities for people aged 15 and older in Australia include cycling (estimated 2.9 million participants) and combative sports (estimated 878 500 participants).[13]

Contact sports and scope of the inquiry

1.35 Various definitions of contact sport exist, both from general dictionary sources and from sporting bodies. Many of these descriptions are general in nature;

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[11] Department of Health and Aged Care, *About sport in Australia*, 12 January 2023, www.health.gov.au/topics/sport/about-sport-in-australia (accessed 16 May 2023).

[12] Australian Institute of Health and Welfare (AIHW), *Sports injury hospitalisations in Australia, 2019–20*, 23 March 2022, www.aihw.gov.au/reports/injury/sports-injury-hospitalisations-2019-20/contents/sports-participation-and-rates-of-injury (accessed 2 June 2023).

[13] Combative sports include boxing, fencing, judo, jujitsu, karate, kendo, kung fu wushu, martial arts, mixed martial arts, muay thai, taekwondo, wrestling. See AIHW, *Sports injury hospitalisations in Australia, 2019–20*, 23 March 2022, www.aihw.gov.au/reports/injury/sports-injury-hospitalisations-2019-20/contents/sports-participation-and-rates-of-injury (accessed 2 June 2023).

however, typically they reference sports that involve tackling, or where impact of one person against another is an inherent part of the sport.[14]

1.36 Several inquiry participants encouraged the committee to adopt a broad definition of contact sport throughout the inquiry and urged the committee to consider non-contact sports in addition to contact sports.[15]

1.37 Submitters pointed out that there is also risk of head impacts in other sports, including but not limited to, soccer, netball, basketball, cricket, cycling, gymnastics, equestrian and water and winter sports.[16]

1.38 Notwithstanding the well documented physical, social and mental benefits of participating in sport, the committee understands that participation in any sport can increase a person's risk of injury. However, as described by the Public Health Association of Australia, the committee is aware that this 'risk-benefit balance' is most tested in sports where there is a greater chance of players' heads receiving a biomechanical hit.[17]

Organisation of sport in Australia

1.39 In Australia, sport is organised and governed by a range of bodies that span across non-government organisations, private sector organisations and government regulators and oversight bodies. According to the Australian Government's National Sports Plan, over 75 000 not-for-profit sporting organisations operate at national, state and local levels.[18]

Federal government

1.40 The Department of Health and Aged Care (the department) stated that the Australian Government's interests in regard to sport are:

> … to encourage greater participation in sport by all Australians and contribute to a competitive, sustainable, and clean sports sector, based on the pursuit of excellence, integrity, and leadership. Sport also assists to achieve broader health, social, economic, and cultural outcomes.[19]

1.41 The Office for Sport within the department is responsible for providing support and advice to the Minister for Sport, including:

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14 Public Health Association of Australia, *Submission 58*, p. 5.

15 See, for example, Orygen, *Submission 39*, p. 2; RACGP, *Submission 22*, p. 7; Public Health Association of Australia, *Submission 58*, p. 5; Dr David Maddocks, *Submission 55*, p. 1; Australasian Injury Prevention Network, *Submission 21*, p. 2; Mr Robin McGilligan, *Submission 73*, [p. 2].

16 See, for example, Orygen, *Submission 39*, p. 2; RACGP, *Submission 22*, p. 7; Ms Aisha Stewart, *Submission 51,* pp. 2, 4; Australian Sports Commission, *Submission 10,* p. 4.

17 Public Health Association of Australia, *Submission 58*, p. 5.

18 Department of Health, *Sport 2030*, August 2018, p. 9.

19 Department of Health and Aged Care, *Submission 9*, [p. 3].

- new policy development and implementation;
- appointments;
- international engagement and sports diplomacy;
- delivery of commonwealth government sports grants;
- coordinating Australian Government support for the staging of major international sporting events; and
- portfolio agency support to the Australian Sports Commission, Sport Integrity Australia, the National Sports Tribunal, and the Australian Sports Foundation.[20]

1.42 The department's submission states that it recognises 'the growing concern in Australia and internationally about the incidence of sport-related concussion, as well as the potential long-term consequences of multiple concussions and the health ramifications for athletes'. It noted that the Australian Sports Commission currently leads work on concussion and repeated head trauma for the sports portfolio.[21]

Australian Sports Commission

1.43 The Australian Sports Commission (ASC) is the Australian Government agency responsible for supporting and investing in sport at all levels. The ASC's strategic vision is 'to ensure sport has a place for everyone and delivers results that make Australia proud'.[22]

1.44 According to a submission from the ASC, it plays a leadership role in guiding sporting organisations and the sport sector in relation to a range of issues impacting sport (including sport-related concussion), though it is not a regulatory authority and has no power to enforce compliance or regulations. The ASC also includes the Australian Institute of Sport (AIS), the high-performance arm of ASC.[23]

1.45 In 2019, the AIS released its *Concussion in Sport Australia Position Statement*. This position statement was recently updated in February 2023, with the new document titled *Concussion and Brain Health Position Statement 2023*.[24]

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20 Department of Health and Aged Care, *Submission 9*, [p. 3].

21 Department of Health and Aged Care, *Submission 9*, [p. 3].

22 Australian Sports Commission, *Submission 10*, p. 3.

23 Australian Sports Commission, *Submission 10*, p. 3.

24 Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023.

State and territory governments

1.46 State and territory governments generally focus on developing and delivering policies and programs regarding community sport and active recreation participation, and sports facility and infrastructure development.[25]

1.47 States and territories also have a role in high-performance sport and talent pathway development, with each jurisdiction administering their own academies of sport to assist their high-performing athletes.[26]

Non-government sector

1.48 The greatest number of sporting organisations sit outside government in the non-government sector, consisting of:

- international peak sporting organisations;
- national sporting organisations;
- state or territory sporting organisations;
- local sporting clubs;
- university and school sport associations; and
- peak advocacy and professional organisations for sporting interests.[27]

Concussion, sub-concussive impacts and repeated head trauma

1.49 Various definitions of concussion exist in sporting, research and medical settings. The term 'mild traumatic brain injury' (mTBI) is also often used interchangeably with concussion, particularly in medical settings.[28]

1.50 The ASC defines concussion as 'a traumatic brain injury induced by biomechanical forces'.[29]

1.51 The United States Centres for Disease Control and Prevention provides a more detailed description:

> A concussion is a type of traumatic brain injury—or TBI—caused by a bump, blow, or jolt to the head or by a hit to the body that causes the head and brain to move rapidly back and forth. This sudden movement can cause the

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[25] Australian Sports Commission, *Structure of Australian Sport*, 3 February 2022, www.clearinghouseforsport.gov.au/kb/structure-of-australian-sport (accessed 24 May 2023).

[26] Australian Sports Commission, *Structure of Australian Sport*, 3 February 2022, www.clearinghouseforsport.gov.au/kb/structure-of-australian-sport (accessed 24 May 2023).

[27] Australian Sports Commission, *Structure of Australian Sport*, 3 February 2022, www.clearinghouseforsport.gov.au/kb/structure-of-australian-sport (accessed 24 May 2023).

[28] Connectivity Traumatic Brain Injury Australia (Connectivity), *Submission 24*, p. 3.

[29] Australian Sports Commission, *Submission 10*, p. 10.

> brain to bounce around or twist in the skull, creating chemical changes in the brain and sometimes stretching and damaging brain cells.[30]

1.52 According to the ASC, symptoms of concussion are broad ranging and can vary from case to case. They can include:

- loss of consciousness
- seizure
- balance disturbance
- confusion
- blurred vision
- headache
- 'don't feel right'
- 'pressure in the head'
- difficulty concentrating
- neck pain
- difficulty remembering
- nausea or vomiting
- fatigue or low energy
- dizziness
- drowsiness
- sensitivity to light
- emotional lability
- sensitivity to noise
- irritability
- feeling slowed down
- sadness
- feeling like 'in a fog'
- nervous or anxious
- sleep disturbance.[31]

1.53 The ASC explained that concussion is an evolving injury and that currently no specific diagnostic test to confirm a concussion diagnosis is available:

> It should be noted that concussion is often an evolving injury, therefore, signs and symptoms can change or be delayed reflecting the underlying physiological injury status of the brain. Currently there is no specific diagnostic test that confirms the presence or otherwise of a concussion. Concussion remains a clinical diagnosis, which is identified based on a person's history, symptoms and signs on physical examination by a qualified medical practitioner.[32]

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30 United States Centres for Disease Control and Prevention, *What is Concussion?*, 12 February 2019, www.cdc.gov/headsup/basics/concussion_whatis.html (accessed 17 May 2023); Brain Injury Australia, *Submission 23*, p. 3.

31 Australian Sports Commission, *Submission 10*, p. 10.

32 Australian Sports Commission, *Submission 10*, p. 11.

1.54 'Sub-concussive impacts' or 'sub-concussion' were also terms used by many inquiry participants to describe head impacts that do not cause the person to experience acute symptoms after a hit to the head.[33] Similar terminology that was used included sub-concussive events, episodes, knocks and blows, as well as sub-clinical concussion.

1.55 Repeated head trauma is a broader term, which includes concussions, as well as sub-concussive impacts that may not meet the threshold of a concussion, or result in its symptoms. The ASC described repeated head trauma as follows:

> Repeated head trauma (RHT) includes head impacts that lead to a concussion or a mild traumatic brain injury, as well as head trauma that do not cause an individual to experience any subsequent symptoms.[34]

1.56 The committee heard that some people experience persistent post-concussion symptoms, such as headaches, migraines, fatigue, dizziness, cognitive difficulties and emotional changes.[35] Further, some inquiry participants also referred to 'second impact syndrome', which a witness described as a 'fatal complication that can happen when someone sustains a concussion while still suffering the symptoms of an earlier one'.[36]

Concussion and traumatic brain injury hospitalisation data

1.57 Data for sport-related concussions and repeated head trauma is under-reported, with the AIHW noting that its concussion and head trauma data holdings related to sports activities are limited to concussions that require a hospital admission.[37]

1.58 Noting these limitations, the most recent AIHW data indicated that of 52 262 sports injuries that led to hospitalisation in Australia in 2019–20, 2305 cases were due to concussion caused by sports. Of the 2305 cases:

- 1608 (70 per cent) were male and 697 (30 per cent) were female;
- the most common age group being hospitalised for a sport-related concussion was 15–24 years old (37 per cent);
- approximately 730 occurred while playing some form of football; and

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33 See, for example, RACGP, *Submission 22*, p. 6; Mr Leon Harris, *Submission 71*, pp. 2, 3; Dr Andrew McIntosh, *Submission 42,* p. 5.

34 Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023,* February 2023, p. 5.

35 See, for example, Concussion Australia, *Submission 3*, p. 2; Shine Lawyers, *Submission 6*, pp. 2, 3 and 12, Miss Lydia Pingel, *Submission 8*, [p. 2]; Queensland Paediatric Rehabilitation Service, *Submission 28*, [p. 1]; Brain Injury Australia, *Submission 23,* p. 4; Brain Foundation, *Submission 61,* [pp. 1, 2].

36 Griffins Lawyers, *Submission 50*, p. 10.

37 AIHW, *Submission 15*, [p. 2].

- approximately 440 occurred while cycling.[38]

1.59 The AIHW also provided data around health service use for patients with traumatic brain injury more broadly (not just sport-related injuries). Analysis indicated that in a cohort of 23 445 patients under 65 who were hospitalised with a traumatic brain injury:

- most patients were male (70 per cent);
- most were aged 15 to 24 (37 per cent);
- concussion was the most common traumatic brain injury diagnosis (74 per cent); and
- 2708 (11.5 percent) of traumatic brain injuries occurred in sports and athletic areas.[39]

Chronic Traumatic Encephalopathy

1.60 There has been growing evidence that suggests a link between sport-related concussions and long-term impacts on athletes' brain health. Of particular concern is the link between repeated head trauma and Chronic Traumatic Encephalopathy (CTE).

1.61 In general terms, CTE is a neurodegenerative disease characterised by the accumulation of the abnormal tau protein within the brain. It is associated with a history of repeated head trauma. Currently, CTE can only be diagnosed by post-mortem examination of brain tissue.[40]

1.62 The committee heard that typical symptoms of CTE include memory loss, confusion, impaired judgment, emotional instability, erratic behaviour, impulsive anger-control problems and depression.[41]

1.63 Brain Injury Australia provided an overview of CTE and summarised its signs and symptoms:

> Chronic traumatic encephalopathy (CTE) is a progressive degenerative neurological disease. Researchers who have found evidence of CTE in the brains of retired athletes state that it "results in a progressive decline of

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38 AIHW, *Submission 15*, [pp. 2, 5 and 6], AIHW, *Sports injury hospitalisations in Australia, 2019–20,* 23 March 2023, www.aihw.gov.au/reports/sports-injury/sports-injury-hospitalisations-2019-20/contents/sports-injury-hospitalisations (accessed 2 June 2023).

39 AIHW, *Submission 15*, [pp. 2–3].

40 See, for example, Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 30; Australian Sports Commission, *Submission 10*, p. 5; Dr Rowena Mobbs, *Submission 1*, p. 6; Dr Alexandra Veuthey, *Submission 56*, [p. 2]; Queensland Government Department of Tourism, Innovation and Sport, *Submission 31*, p. 1.

41 Dr Alexandra Veuthey, *Submission 56*, [p. 2].

> memory and cognition, as well as depression, suicidal behaviour, poor impulse control, aggressiveness, parkinsonism, and, eventually, dementia.[42]

1.64 Several inquiry participants also used the terminology Chronic Traumatic Encephalopathy Neuropathological Change (CTE-NC) to describe this condition. Throughout the report, the committee predominantly uses the term CTE, however will refer to CTE-NC when quoting directly from an inquiry participant that has also done so.

History of sport-related concussion and international landscape

1.65 Brain injuries in sport are not a new problem, with historical research indicating that there has been notable scientific and public concern about the long-term effects of sports-related concussion since the late 1800s.[43]

1.66 In Australia specifically, evidence to the committee highlighted that there has been over a century of media reporting on the medical dangers of sport-related concussion, with a period of particular interest in the early 1930s.[44]

1.67 In 1994, the National Health and Medical Research Council (NHMRC), identified several precautionary recommendations directed to the administrators of the four football codes (AFL, NRL, rugby union and soccer). These guidelines were rescinded in 2004 after its review by NHMRC's Advisory Health Committee and assessed as being 'out of date'.[45]

1.68 More recent interest and concern has been generated in response to Dr Bennet Omalu publishing the first case of CTE in American football in 2005, and the 2012 class action against the National Football League (NFL) which resulted in a settlement of over US$1 billion in 2015 for over 5000 former players.[46] The players alleged that the NFL 'failed to take reasonable actions to protect players from the chronic risks created by concussive and sub-concussive head injuries and fraudulently concealed those risks from players'.[47]

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42 Brain Injury Australia, *Submission 23*, Attachment 1 (Brain Injury Australia 2011-12 Policy Paper, Concussion in Sport), p. 28.

43 Dr Stephen Townsend, Senior Research Project Officer, School of Human Movement and Nutrition Sciences, University of Queensland, Answers to questions on notice, 22 February 2023 (received 11 April 2023).

44 Dr Stephen Townsend, *Submission 60*, [p. 2].

45 National Health and Medical Research Council, *Head and neck injuries in football: Guidelines for prevention and management*, 1995, https://webarchive.nla.gov.au/awa/20170819043007/https://www.nhmrc.gov.au/guidelines-publications/si2b (accessed 6 June 2023). See also National Health and Medical Research Council, *Submission 13*, [p. 2].

46 Brain Injury Australia, *Submission 23*, Attachment 1 (Brain Injury Australia, *2011-12 Policy Paper; Concussion in Sport*), p. 3; Dr Rowena Mobbs, *Submission 1*, p. 9; Dr Alexandra Veuthey, *Submission 56*, [p. 3]; Margalit Injury Lawyers, *Submission 45*, p. 3.

47 Margalit Injury Lawyers, *Submission 45*, p. 3.

1.69 A class action is also underway in the United Kingdom in respect of various rugby codes, where players allege that '… rugby's governing bodies negligently failed to protect them from concussion and non-concussion injuries that caused various neurological disorders, including early onset dementia, chronic traumatic encephalopathy, epilepsy, Parkinson's disease and motor neurone disease'.[48]

1.70 Other recent international developments have also spurred local interest. The United States, England, Scotland and Northern Ireland have introduced bans and/or rules to reduce headers in football for children. In another example, Hockey Canada has banned those under the age of 13 from 'body checking' (slamming into another player to keep them away from the puck) in ice hockey.[49]

1.71 Some jurisdictions have introduced legislation to address this issue. In Canada, the Ontario Government passed 'Rowan's Law' in 2018, requiring sporting bodies to implement and maintain mandatory concussion awareness resources, including a 'Concussion Code of Conduct' amongst its officials, athletes and parents. Rowan's Law was developed following recommendations of a coronial inquest into the death of 17-year-old high school student, Rowan Stringer, who died following multiple concussions over a short number of days which resulted in second impact syndrome.[50]

1.72 Similarly, the state of Washington in the United States passed the 'Zackary Lystedt Law' in 2009, promoting concussion education for athletes, coaches, parents and guardians. The law also requires young athletes suspected of sustaining a concussion to be removed from practice and play, and prohibits them from returning until cleared by a medical professional. Similar legislation has since been adopted in all 50 states in America.[51]

Concussion in Sport Group

1.73 In 2001, the first Concussion in Sport Group (CISG) international conference was held in Vienna, Austria.[52] The conference brought together a range of major sporting bodies, academics and other medical professionals, with the aim to 'provide recommendations for the improvement of safety and health of athletes

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48 Margalit Injury Lawyers, *Submission 45*, p. 3.

49 Dr Annette Greenhow, *Submission 7*, p. 6; Dr Alexandra Veuthey, *Submission 56*, [p. 6]; Mr Leon Harris, *Submission 71,* [p. 9].

50 Griffins Lawyers, *Submission 50*, p. 10; Dr Annette Greenhow, *Submission 7*, p. 6; Dr David Munro, *Submission 37*, p. 3.

51 Margalit Injury Lawyers, *Submission 45*, p. 8.

52 Headsafe, *Submission 68*, [p. 3]; M Aubry, R Cantu, J Dvorak et al., 'Summary and agreement statement of the first International Conference on Concussion in Sport, Vienna 2001', *British Journal of Sports Medicine*, 36, 2002, pp. 6, 7, http://dx.doi.org/10.1136/bjsm.36.1.6.

who suffer concussive injuries in ice hockey, football (soccer), and other sports'.[53]

1.74 Subsequent meetings of the group have been held approximately every four years since 2001, with a 'consensus statement' containing the group's findings and outcomes published following each meeting. The most recent meeting of the group was held in Amsterdam in 2022, hosting an expanded group of 11 national and international sporting organisations, including the AFL and NRL.[54] The consensus statement following the 2022 Amsterdam conference was published on 30 June 2023.[55] The 2022 consensus statement acknowledges the importance of conducting further research into the potential long-term effects of concussion and repetitive head impacts on mental health and neurodegenerative conditions and recommended the formation of an interdisciplinary group to allow more time and attention on this topic.[56]

1.75 Due to the timing of this inquiry's public hearings and submission due dates, submitters and witnesses referred to the consensus statement published in 2016 following the CISG's 5th international conference on concussion in sport held in Berlin.[57]

1.76 The CISG has been, and continues to be, an influential body in relation to sport-related concussion policies and guidelines across the globe, with CISG 'consensus statements' over the years long being the reference point of concussion policies of many countries and sporting organisations.[58] For example, almost every Australian sporting body that participated in this inquiry

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53 Headsafe, *Submission 68*, [p. 3]; M Aubry, R Cantu, J Dvorak et al., 'Summary and agreement statement of the first International Conference on Concussion in Sport, Vienna 2001', *British Journal of Sports Medicine*, 36, 2002, pp. 6, 7, http://dx.doi.org/10.1136/bjsm.36.1.6.

54 Headsafe, *Submission 68*, [p. 3].

55 For more information see, JS Patricios, KJ Schneider, J Dvorak, et al, 'Consensus statement on concussion in sport: the 6th International Conference on Concussion in Sport–Amsterdam, October 2022', *British Journal of Sports Medicine,* vol. 57, no. 11, 2023, pp. 695–711, http://dx.doi.org/10.1136/bjsports-2023-106898.

56 JS Patricios, KJ Schneider, J Dvorak, et al, 'Consensus statement on concussion in sport: the 6th International Conference on Concussion in Sport–Amsterdam, October 2022', *British Journal of Sports Medicine,* vol. 57, no. 11, 2023, p. 707, http://dx.doi.org/10.1136/bjsports-2023-106898.

57 References in this report to the CISG consensus statement refer to the 2016 CISG consensus statement published following the 5th international conference on concussion in sport held in Berlin. For more information see, P McCrory, W Meeuwisse, J Dvorak, et al 'Consensus statement on concussion in sport—the 5th international conference on concussion in sport held in Berlin, October 2016', *British Journal of Sports Medicine,* vol. 51, no. 11, 2017, pp. 838–847, http://dx.doi.org/10.1136/bjsports-2017-097699.

58 Dr Reidar Lystad, *Submission 79*, p. 2; Queensland Government Department of Tourism, Innovation and Sport, *Submission 31*, p. 3; Headsafe, *Submission 68*, [p. 3]; Connectivity Traumatic Brain Injury Australia, *Submission 24*, p. 2; Mr Leon Harris, *Submission 71*, [pp. 6, 7].

indicated that their concussion management approaches and policies are informed by the CISG meetings and consensus statements to some extent.[59]

1.77 The committee heard that the integrity of the CISG has been called into question over recent years, including concerns regarding the group's methodology and transparency behind its publications, and lack of disclosure regarding potential conflicts of interest among its members.[60]

1.78 The influence of the CISG and the importance of independence and integrity of research in this space will be explored further in Chapter 3 of this report.

[59] AFL, *Submission 18*, p. 5; NRL, *Submission 17*, [pp. 2, 3 and 6]; Netball Australia, *Submission 19,* p. 2; Rugby Australia, *Submission 12,* [p. 8]; Dr Alex Kountouris, Head of Sports Science and Sports Medicine, Cricket Australia, *Committee Hansard*, 26 April 2023, pp. 16, 19; Professional Footballers Australia, *Submission 57*, pp. 2, 13, 24 and 25.

[60] See, for example, Dr Reidar Lystad, *Submission 79*, p. 2; Mr Leon Harris, *Submission 71*, [pp. 6, 7].

Chapter 2
Data, definitions and diagnostics

2.1 This chapter discusses the evidence received by the committee in relation to:

- the challenges present in diagnosing concussion in contact sports, including inconsistencies around the definition of concussion and the limitations of current diagnostic tools; and
- the need for better data collection on the prevalence of concussion across all levels of contact sports in order to improve prevention and treatment outcomes.

2.2 It concludes with the committee's views and recommendations on these issues.

Challenges of diagnosing concussion in sports

2.3 Considerable evidence to the committee indicated that there are challenges present in accurately diagnosing instances of concussion in the sporting context due to limitations in the current protocols and tools for the assessment of concussion.

2.4 As noted in Chapter 1 of this report, various definitions of concussion exist in sporting, research and medical settings. Additionally, the term 'mild traumatic brain injury' (mTBI) is also often used interchangeably with concussion, particularly in medical settings.[1]

2.5 Some submitters contended that the competing or inconsistent definitions of concussion used by stakeholders in sport led to confusion and the risk that concussion is not always diagnosed accurately. The Public Health Association of Australia argued it was important to ensure there is a clear definition of concussion and related evidence-based guidelines available for sports clubs and associations to follow.[2] It highlighted that inconsistency in how concussion is defined in key documents, such as position statements from the Australian Institute of Sport (AIS), led to confusion for stakeholders.[3]

2.6 For example, the AIS *Concussion and Brain Health Position Statement 2023* states that a concussion occurs through a collision with another person or object where biomechanical forces to the head, or anywhere on the body, transmit an

1 Connectivity Traumatic Brain Injury Australia (Connectivity), *Submission 24*, p. 3.

2 Public Health Association of Australia, *Submission 58*, p. 6.

3 Public Health Association of Australia, *Submission 58*, p. 6.

impulsive force to the head/brain, resulting in 'transient neurological impairment'.[4]

2.7 It goes on to state:

> The current clinical definition of concussion does not distinguish persistent symptoms, or the underlying processes that impair brain function or any potential brain abnormalities. To overcome this limitation, the Berlin panel of the Concussion in Sport Group (CISG) defined concussion as "a **traumatic brain injury** induced by biomechanical forces".[5]

2.8 After including the above characterisation of concussion as 'traumatic brain injury', in its next paragraph the position statement goes on to note:

> It remains unclear whether concussion involves microscopic structural changes, which would position it within the traumatic brain injury spectrum, or whether it's limited to physiological changes.

2.9 The Public Health Association of Australia raised concerns with this conflicting information from the AIS. It flagged that the 2023 position statement could confuse readers given that in one sentence the AIS appears to identify concussion as a traumatic brain injury, and in the next sentence queries whether concussion is on the traumatic brain injury spectrum at all.[6]

2.10 Concussion Australia also observed that there is no consistent definition of concussion. Similar to the Public Health Association of Australia, it raised concerns with the 'incorrect information' disseminated through the AIS position statement.[7]

2.11 In response to these concerns, the Australian Sports Commission (ASC) informed the committee that research into concussions in sport is 'continually developing', and 'the updated 2023 position statement reflects the current information and medical advice available'.[8]

2.12 The Royal Australian College of General Practitioners (RACGP) drew attention to the lack of consistency in defining concussion, and pointed out that this has flow-on impacts for the treatment and management of the injury in the context of contact sports.[9] It recommended that 'standardised, evidence-based clinical guidelines' for concussion and repeated head trauma be developed, detailing:

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4 Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 6.

5 Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 6. Citations omitted, emphasis added.

6 Public Health Association of Australia, *Submission 58*, p. 6.

7 Concussion Australia, *Submission 3*, pp. 3–4.

8 Australian Sports Commission, *Supplementary Submission 10*, p. 3.

9 Royal Australian College of General Practitioners (RACGP), *Submission 22*, pp. 4, 6.

> While an updated International Consensus Statement is expected to be published in 2023, recommendations are needed that provide context to the Australian health system and contact sports commonly played in Australia. The current lack of a consistent definition of concussion results in confusion and an inconsistent approach to its treatment and management. Additionally, concussion protocols vary between different contact sports, contributing further to confusion between coaches, managers, players, carers and medical professionals. Standardising concussion protocols across all sports should be a priority.[10]

2.13 The submission from Connectivity Traumatic Brain Injury Australia (Connectivity) also noted that the inconsistent use of definitions and medical coding makes it difficult to establish the true epidemiology of concussion, which in turn limits both research capacity and effective health service planning.[11] It further reported that in medical settings the term 'mild traumatic brain injury' is often used interchangeably with 'concussion', which could lead to confusion amongst community members.[12]

2.14 Dr Reidar Lystad PhD, a full-time research fellow at the Australian Institute of Health Innovation in the Faculty of Medicine, Health and Human Sciences at Macquarie University with particular expertise in the epidemiology of sports injuries, traumatic brain injury, and paediatric trauma, submitted to the inquiry in his private capacity. He observed that while a clear and consistent definition of concussion is important, the debate around the definition of concussion could be a distraction from the significant issues pertaining to the impact of traumatic brain injuries and repetitive head trauma in sport. He cautioned that definitional disagreements among academics and health professionals should not be used as an excuse for inaction.[13]

2.15 Other submitters to the inquiry contended that inconsistencies in the definition of concussion were not an issue. The ASC advised the committee that concussion is defined as 'a traumatic brain injury induced by biomechanical forces' because it can occur through a collision with another person or object where biomechanical forces to the head, or anywhere on the body, transmit an impulsive force to the head/brain, resulting in neurological impairment. It noted that concussion can also occur with relatively minor knocks to the head or body.[14]

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10 RACGP, *Submission 22*, p. 4.

11 Connectivity, *Submission 24*, p. 3.

12 Connectivity, *Submission 24*, p. 3.

13 Dr Reidar Lystad, *Submission 70*, p. 4.

14 Australian Sports Commission, *Submission 10*, p. 10.

2.16 The ASC indicated that it is 'not aware' of inconsistencies in the definition of concussion. It stated that the essential components included in definitions used by 'most reputable bodies' include:

- A rapid onset, transient disturbance of neurological function, secondary to a trauma to the head, or trauma to the body where forces are transmitted to the head.
- Evolution of symptoms in the minutes, hours and days after the acute trauma.
- Spontaneous recovery over days or weeks.
- Clinical signs and symptoms which cannot be explained by drug, alcohol, or medication use, other injuries or other comorbidities.
- A broad range of symptoms in the acute and subacute phases.[15]

2.17 Dr Andrew McIntosh also noted that while there are a range of definitions of concussion, there is a 'high level of consistency' between those definitions in the context of sport.[16]

2.18 The National Health and Medical Research Council (NHMRC) informed the committee that it is Australia's leading expert body in health and medical research. It has a legislated role in issuing guidelines and advising the community on 'matters relating to the improvement of health and the prevention, diagnosis and treatment of disease'.[17]

2.19 The NHMRC told the committee that there were no current NHMRC-produced guidelines on concussions or repeated head trauma, nor were there any relevant NHMRC-approved guidelines produced by third parties.[18]

2.20 The NHMRC did, however, inform the committee that it had played a historical role in regard to these topics. For example, in 1994 the NHMRC published its Boxing Injuries report, that:

> … was developed by a panel with expertise in sports medicine, neurosurgery, ophthalmology, radiology, general practice, neurology and neuropsychology, and provided new directions for those concerned with public health and legislation appropriate for boxing. The report highlighted the non-neurological injuries that can follow repeated head trauma in boxing, such as damage to the eye, neck, nose and ears and hearing, and reported that protective equipment may not reduce the risk of brain injury.[19]

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15 Australian Sports Commission, *Submission 10*, p. 10.

16 Dr Andrew McIntosh, *Submission 42*, p. 7.

17 National Health and Medical Research Council (NHMRC), *Submission 13*, [p. 1].

18 NHMRC, *Submission 13*, [p. 1].

19 NHMRC, *Submission 13*, [p. 1].

2.21 Additionally, in 1994 the NHMRC released its *Head and Neck Injuries in Football: Guidelines for Prevention and Management* (1994 Guidelines for Head and Neck Injuries in Football) along with an accompanying document titled *Concussion: Notes for Referees, Umpires and Coaches*. The NHMRC submission set out:

> The guidelines were developed by a panel of medical specialists in neurosurgery, sports medicine, plastic surgery, neurology, rheumatology, trauma and rehabilitation. The panel included medical experts representing the Australian football codes including the International Rugby Football Board, Australian Rugby League, ACT Rugby Union, the Australian Soccer Federation and the Australian Football League.
>
> The guidelines made broad recommendations on management and administrative arrangements, data collection, equipment (such as fitted mouthguards) and research and education. In addition, the guidelines contained recommendations on the management of concussion, post-concussion and return to play (adapted from International Rugby Football Board recommendations), and the management of severe head injury.
>
> The accompanying notes for referees, umpires and coaches made a recommendation that, because concussion destroys judgement, head injured players should not be allowed to influence the decision of a referee, umpire or coach about whether the player should be removed from play. The notes point out that the player's health and the reputation of the game are at stake.[20]

2.22 The NHRMC advised that the guidelines are now considered to be 'out of date' and were rescinded in 2004. It noted that it was usual practice for it to rescind guidelines after several years, in recognition that the evidence reviews relied upon to produce the guidelines would be out of date. It stated that the guidelines have not been updated given that 'other agencies have been established to manage and provide up-to-date advice about the issues discussed in the NHMRC guidelines'.[21]

2.23 Griffins Lawyers raised concerns regarding the NHMRC's decision to rescind these guidelines.[22] It submitted:

> The NHMRC Publications were two of twenty NHMRC publications that were rescinded on 16-17 September 2004. The review process involved public consultation held between October 2003 to October 2004 and included letters sent to stakeholders to advise them of the process. It has been noted that only three submissions to the review process were received in response, with two of those written by or on behalf of the incumbent AFL Medical Officer Dr Paul McCrory. The first was a submission by Dr McCrory on behalf of the Australian College of Sports Physicians, and the second was a submission from the Australian Association of Neurologists (AAN). The

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20 NHMRC, *Submission 13*, [pp. 1, 2].

21 NHMRC, *Submission 13*, [p. 2].

22 Griffins Lawyers, *Submission 50*, pp. 8, 9; Mr Gregory Griffin, Principal, Griffins Lawyers, *Committee Hansard,* 26 April 2023, pp. 29, 30.

> submission from AAN was that Dr McCrory be its expert medical representative on any concussion related issues going forward.
>
> Both submissions, largely verbatim asserted that the "reports require major revision or rewriting primarily due to the new and extensive scientific evidence that has been published in medical literature on each of these topics," and that the NHMRC should form a new expert panel to revise the publication. This is the panel AAN sought Dr McCrory to be invited to join. The documentary material suggests that the rescission of the NHMRC Publications were predominantly based on these two submissions.[23]

2.24 In response to further questions regarding the circumstances surrounding the decision to rescind its 1994 Guidelines for Head and Neck Injuries in Football, the NHMRC told the committee that as part of a large-scale review overseen by its Health Advisory Committee, this publication was among several others that were identified for review based on their currency.[24]

2.25 The NHMRC explained that this process was also informed by public consultations, which invited individuals to comment on the strengths and weaknesses of the existing publications, issues that had emerged since publication, and any other relevant matters. Contrary to the claim made by Griffith Lawyers, the NHMRC noted that 44 submissions were received, and at the conclusion of the review the Health Advisory Committee recommended that 'the research base for, and recommendations and guidelines in, Football Injuries of the Head and Neck are no longer current'.[25]

2.26 The NHMRC informed the committee that the NHMRC Council accepted the Health Advisory Committee's recommendation to rescind the guidelines in 2004. It also noted that the Health Advisory Committee did not recommend the football guidelines to be updated and in its advice to the NHMRC Council, it identified the ASC as the appropriate agency to which documents should be referred.[26]

Limitations of diagnostic tools

2.27 Several submitters highlighted challenges and limitations in relation to the tools that are currently used in the diagnosis of concussion and mTBI.[27]

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23 Griffins Lawyers, *Submission 50,* p. 8.

24 NHMRC, *Decision to rescind 1994 Head and Neck Injuries in Football: Guidelines for Prevention and Management,* Additional information received 6 July 2023, [p. 1].

25 NHMRC, *Decision to rescind 1994 Head and Neck Injuries in Football: Guidelines for Prevention and Management,* Additional information received 6 July 2023, [p. 1].

26 NHMRC, *Decision to rescind 1994 Head and Neck Injuries in Football: Guidelines for Prevention and Management,* Additional information received 6 July 2023, [p. 2].

27 See, for example, Dr Stephen Townsend, *Submission 60,* [pp. 2, 3]; Dr Michael Czajka, *Submission 43,* [p. 1]; MindMirror, *Submission 14,* [p. 1]; Shine Lawyers, *Submission 6,* pp. 4, 5 and 10;

2.28 MindMirror, an organisation of emergency doctors and software engineers which provides diagnostic solutions and tools, outlined that to ensure public confidence in the participation in contact sport, diagnostics for concussion and mTBI must be 'democratised'. It explained that current approaches to the diagnosis of sport-related mTBI rely on guided, subjective assessments by health or sports professionals and that these assessments take time and are not available at all levels of competition. It added that an ideal diagnostic tool would be:

> … available to all; be non-invasive, require minimal training and provide a reliable, objective and reproducible diagnosis. Such an objective tool could also be used to track the recovery from mTBI, providing an indication of when it would be safe for a participant with diagnosed concussion to return to play.[28]

2.29 The ASC informed the committee that there is currently no specific diagnostic test that confirms the presence or otherwise of a concussion. It stated that concussion remains a 'clinical diagnosis' identified based on a person's history, symptoms and signs upon physical examination by a qualified medical practitioner.[29]

2.30 The 2023 AIS Concussion and Brain Health Position Statement explains:

> …in diagnosing concussion, medical practitioners need to conduct a clinical history and examination across a range of domains including the mechanism of injury, symptoms and signs, cognitive functioning and neurological assessment, including balance testing.[30]

2.31 As part of the overall clinical assessment to assess potential concussion, medical professionals can use the Sport Concussion Assessment Tool 5 (SCAT5) for athletes aged 13 years and older, which encompasses both an on-field and off-field component.[31]

2.32 The SCAT5 is a standardised tool for evaluating concussions designed only for use by physicians and licensed healthcare professionals. It cannot be performed

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HITIQ, *Submission 11*, p. 7; Brain Injury Australia, *Submission 23*, p. 7; Dr Doug King, *Submission 79*, [p. 4].

28 MindMirror, *Submission 14*, [p. 1].

29 Australian Sports Commission, *Submission 10*, p. 11.

30 Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 15.

31 Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 15. Note: The position statement notes that the current SCAT5 is under review and once SCAT6 becomes available, the content and link in the position statement will be updated accordingly.

correctly in less than 10 minutes, and children aged 12 years or under should be assessed using the specific Child SCAT5.[32]

2.33 The SCAT5 encompasses an on-field assessment to be used at the time of the concussion, as well as a brief history of the injury, a Glasgow Coma Score and a series of questions known as 'Maddocks questions'. According to the AIS Concussion and Brain Health Position Statement 2023, these questions have been validated as an indicator of concussion and are more sensitive in the sports-context than standard orientation questions.[33] The position statement details:

> The questions assess athlete orientation (in time and place) and they should be preceded by: 'I am going to ask you a few questions, please listen carefully and give your best effort.'
>
> The modified Maddocks questions are:
>
> - What venue are we at today?
> - Which half is it now?
> - Who scored last in this match?
> - What team did you play last week/game?
> - Did your team win the last game?[34]

2.34 The remainder of SCAT5 is for use off-field, in the medical room or in the consulting room after a referral for a suspected concussion has been made.[35]

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[32] Concussion in Sport Group, *SCAT5: Sport Concussion Assessment Tool – 5th Edition*, April 2017.

[33] Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 15.

[34] Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 15.

[35] Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 15.

2.35 There are a possible 22 symptoms of concussion listed in SCAT5:

Table 2.1 Concussion symptoms listed in SCAT5

Headache	Neck pain	Dizziness
Balance problems	Sensitivity to noise	Feeling like 'in a fog'
Difficulty concentrating	Fatigue or low energy	Drowsiness
Irritability	Nervous or anxious	Blurred vision
Pressure in head	Nausea or vomiting	'Don't feel right'
Sensitivity to light	Feeling slowed down	More emotional
Trouble falling asleep	Confusion	Sadness
Difficulty remembering		

Source: Australian Institute of Sport, Concussion and Brain Health Position Statement 2023, p. 15.

2.36 The committee received evidence advising that there were limitations to the SCAT5 tool.

2.37 For example, the 2023 AIS position statement notes that SCAT5 is 'relatively insensitive and describes non-specific symptoms'. It also makes comment on the limitations of SCAT5 in regard to its use with culturally and linguistically diverse (CALD) cohorts:

> It is important to note that SCAT5 was developed in English, which limits its use in culturally and linguistically diverse populations. There is no evidence that SCAT5 is a culturally appropriate tool for Aboriginal or Torres Strait Islander peoples and Australians with culturally and linguistically diverse backgrounds, especially for those individuals whose first language is not English and might have a different second language.[36]

2.38 Headsafe raised a number of concerns with the efficacy of SCAT5, including that:

- SCAT5 'has not been validated as a concussion tool';
- the 22 symptoms listed are 'vague and unavoidably subjective';
- parts of the tool require relatively advanced levels of numeracy and literacy;
- the physical and coordination tests are subject to observer inconsistency and error; and
- it is 'not clear' how to reach an overall conclusion on whether some sections should be marked as 'passed' or 'failed'.[37]

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[36] Australian Institute of Sport, *Concussion and Brain Health: Position Statement 2023*, February 2023, p. 15.

[37] Headsafe, *Submission 68*, [p. 9].

2.39 When asked whether the current protocols on assessment of concussion in sport are adequate, Dr Adrian Cohen, Chief Executive Officer of Headsafe, referenced SCAT5 in his response:

> They're woefully inadequate. We're so used to this terminology now when we look at our television: 'Oh, he's gone for an HIA [head injury assessment]. Oh, they're going to have the SCAT test.' It's like people think Moses came down from Mount Sinai with these tablets with the HIA written on them. It's a terrible test, and everybody knows it's a terrible test, but, hey, it's the best we've got. It's only the best we've got because we, the sporting codes, are part of the groups that form the Concussion in Sport Group that actually decides that's good enough.[38]

2.40 The committee heard that major professional contact sports routinely conduct mandatory pre-season concussion baseline measurement of athletes in order to facilitate interpretation of post-injury test scores.[39] However, Headsafe contended that it was 'well recognised' that professional athletes are being 'coached' as to how to 'game' or 'sandbag' baseline SCAT5 tests in order to influence their baseline results. It asserted:

> …performing poorly sets a low baseline pre-season so if/when they sustain a concussion the true nature of it can be hidden to an inexperienced assessor. Sandbagging is now so prominent that players actually boast of it. They tell other players to "go slow" the first time around, to either create a false impression or to create an "invalid" test that cannot later be used.[40]

2.41 It further argued:

> Subjectivity in answering questions about symptoms (especially for a player keen to return to playing) is well recognised, and even some medical professionals have been criticised as being less than completely objective when facing pressures from coaches, players and parents as to a player's performance on tests designed to ascertain their concussion status.[41]

2.42 A submission from neuropsychologist Dr David Maddocks also made reference to the temptation for sport participants to 'fake bad' on baseline testing so as to potentially conceal concussive injury or the effects of injury.[42]

2.43 The AIS Concussion and Brain Health Position Statement 2023 highlights the Concussion Recognition Tool 5 (CRT5) as the most appropriate tool for concussion assessment in recreational sport, particularly as medical

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38 Dr Adrian Cohen, Chief Executive Officer, Headsafe, *Committee Hansard*, 30 January 2023, p. 15.

39 Dr David Munro PhD, *Submission 37*, p. 6.

40 Headsafe, *Submission 68*, [p. 10].

41 Headsafe, *Submission 68*, [p. 10].

42 Dr David Maddocks, *Submission 55*, p. 2.

professionals often rely on self-reported symptoms to diagnose concussion in individuals who play recreational sports.[43]

2.44 CRT5 is a free resource, suitable for use by individuals without medical training, that can assist to identify concussions in children, adolescents and adults. It is a simplified summary of the key signs, symptoms and 'red flags' that should raise concern about a possible concussion, although the position statement noted that, similar to the SCAT5, it is relatively insensitive to non-specific systems.[44]

2.45 In addition to highlighting the CRT5, the AIS Concussion and Brain Health Position Statement 2023 promotes the 'if in doubt, sit them out' messaging. It states:

> At the recreational level, the athlete should be permanently removed from play if an athlete, coach, first aider/sport trainer, parent, match official, or dedicated spotter has any suspicion of a concussion, particularly given medical professionals, sideline spotters, and sideline technology may not be available.[45]

2.46 The AIS Concussion and Brain Health Position Statement 2023 highlights that the diagnosis of concussion is based on the clinical judgement of a healthcare professional. However, it notes that while in some instances it is obvious there has been a significant injury (e.g. where the athlete immediately suffers a loss of consciousness, has a seizure or has significant balance difficulties), in other instances the signs and symptoms of concussion can be 'variable, non-specific, subtle, and may be difficult to detect'.[46] It explains:

> Symptoms that are initially subtle can become more significant in the hours and days following the injury and require repeat/serial evaluations. Owing to delays in presentation, it may take up to 48 hours following a head contact to exclude a diagnosis of concussion. Parents, coaches and attending medical personnel need to be alert to behaviour that is unusual or out of character.[47]

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43 Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 17.

44 Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 17.

45 Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023,* February 2023, p. 17.

46 Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 23.

47 Australian Institute of Sport, *Concussion and Brain Health: Position Statement 2023*, February 2023, p. 23. Citations omitted.

Potential of emerging technology

2.47 Some submitters to the inquiry drew the committee's attention to emerging technological tools which they asserted could be used to improve the process of diagnosing or detecting concussion in sports.[48]

2.48 The AIS Concussion and Brain Health Position Statement 2023 observes that detecting a concussion in routine brain imaging is difficult as it is predominantly considered a functional neurological disturbance rather than a structural injury. However, it points out that there is a growing interest in Point of Care (PoC) devices that use biomarkers to provide an objective assessment tool to assist with concussion diagnosis and clinical decision-making. It states:

> For instance, in a prospective observational study of 1,028 male professional players, salivary small non-coding RNAs were identified as unique signatures of concussion. There is also research underway to explore the potential clinical utility of blood biomarkers as an objective PoC to diagnose concussion.[49]

2.49 The position statement also notes that although imaging modalities may be useful in research settings to detect changes consistent with concussion, current evidence does not support the clinical use of these modalities to diagnose or manage concussion.[50]

2.50 It concluded that although the prudent use of technological advancements may improve concussion assessment over time, there was not yet sufficient evidence to prove the accuracy or efficacy of the emerging imaging or biomarker tools. It outlined:

> …caution needs to be exercised when using such tools and validation is required before their global adaptation. At present, the evidence base is insufficient to recommend the routine use of any medical imaging or biomarker tests in the diagnosis and management of concussion.[51]

2.51 The committee also heard evidence from HITIQ, an Australian business which builds and distributes technology to assist in the surveillance, detection, assessment and diagnosis of sports related brain injury. HITIQ informed the

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48 See, for example, HITIQ, *Submission 11*; MindMirror, *Submission 14*; NeuralDx, *Submission 33*.

49 Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 29. Citations omitted.

50 Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 29.

51 Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 29.

committee of its instrumented mouthguards which are worn by athletes and contain sensors that can detect both concussive and sub-concussive impacts.[52]

2.52 HITIQ advised the mouthguard technology was developed to 'identify, collect, and quantify all head impacts exposures in training environments' and emphasised that accurately quantifying the number and magnitude of head impacts experienced by contact sport participants is vital. HITIQ also advised that the mouthguards are currently being utilised in the Australian Football League (AFL), Super Rugby and United States College Football.[53]

Challenges in diagnosing Chronic Traumatic Encephalopathy

2.53 As outlined in chapter 1, Chronic Traumatic Encephalopathy (CTE), also known as CTE Neuropathological Change (CTE-NC), is a neurodegenerative disease characterised by the accumulation of the abnormal tau protein within the brain. It is associated with a history of repeated head trauma.[54]

2.54 Some inquiry participants explained that currently, CTE can only be diagnosed post-mortem, based on histopathological examination of brain tissue.[55]

2.55 For example, the ASC submitted that CTE-NC has 'unclear clinical diagnostic criteria' and is unable to be diagnosed during life. The ASC added that most research data available on CTE-NC is obtained from sports brain bank studies. Whilst the work of various sports brain banks in Australia is discussed further in chapter 3, the ASC considered that the mode of retrospective clinical analysis used by sports brain banks is 'insufficient for creating a robust clinical diagnostic criteria for CTE-NC in living patients'.[56]

2.56 Consultant Neurologist Dr Rowena Mobbs explained that Traumatic Encephalopathy Syndrome (TES) is the 'in-life syndrome of CTE'.[57] In contrast to other submitters, Dr Mobbs considered that, just as Alzheimer's

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52 HITIQ, *Submission 11,* pp. 3, 4; Mr Michael Vegar, Founder and Managing Director, HITIQ, *Committee Hansard,* 1 March 2023, p. 21.

53 HITIQ, *Submission 11,* p. 7.

54 See, for example, Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 30; Australian Sports Commission, *Submission 10*, pp. 3, 5; Dr Rowena Mobbs, *Submission 1*, p. 6; Dr Alexandra Veuthey, *Submission 56*, [p. 2]; Queensland Government Department of Tourism, Innovation and Sport, *Submission 31*, p. 1.

55 See, for example, Australian Sports Commission, *Submission 10,* p. 5; Dr Alexandra Veuthey, *Submission 56,* [p. 2]; Australian Football League (AFL), *Submission 18,* p. 18; Dr Sharon Flahive, Chief Medical Officer, National Rugby League, *Committee Hansard,* 1 March 2023, p. 9; Dr Chris Davlantes, Senior Director, Global Medical Affairs, Abbott Point of Care, *Committee Hansard,* 30 January 2023, p. 39.

56 Australian Sports Commission, *Submission 10*, pp. 3, 5 and 6.

57 Dr Rowena Mobbs, *Submission 1,* p. 3. See also, AFL, *Submission 18*, p. 18.

disease is diagnosed clinically over time, she is confident in assessing patients as having TES, or suspected CTE during life.[58]

2.57 The AFL also referred to these matters in its submission. The AFL considered that the diagnosis of CTE or TES during life may lead to 'unintended negative consequences such as a sense of hopelessness and fatality' and added:

> In such cases, problems with cognition that are perhaps associated with psychiatric illness, rather than neurodegenerative changes in the brain, if treated pharmacologically and with counselling, might lead to functional improvement. If the person is told that their symptoms are related to CTE, they may be less likely to seek alternative diagnoses and treatment options.[59]

The need for a national data set

2.58 Some submitters informed the committee that there was a lack of data on the rates of concussion in sports across Australia, and argued there was a need for a consistent, national dataset for both diagnosed concussions and identified sub-concussive events.[60]

2.59 Brain Injury Australia estimated that every year in Australia more than 3000 people are hospitalised after being concussed participating in sport; however, it emphasised that hospitalisations 'radically underestimate' the incidence of concussion in the community across all age groups and external causes.[61]

2.60 Dr Reidar Lystad noted that the true incidence of concussion in Australia is not known due to limitations of existing data collection, and this precluded the effective monitoring of trends and the proper evaluation of potential policy changes and interventions. He suggested that a potential solution could be to implement mandatory reporting of concussion and head trauma by all sports governing bodies.[62]

2.61 Dementia Australia recommended the establishment of a centralised database that collects information on brain injuries at all ages and levels of contact sports. It stated that rigorous reporting and collection of brain injury data is key to improving understanding about the risks and long term impacts of brain injury in contact sports.[63]

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58 Dr Rowena Mobbs, *Submission 1*, p. 3.

59 AFL, *Submission 18*, p. 18.

60 See, for example, Dr Reidar Lystad, *Submission 70*, p. 4; Concussion Australia, *Submission 3*, p. 4; Community Concussion Research Foundation, *Submission 52*, p. 10; Baseline, *Submission 92*, [pp. 3–6].

61 Brain Injury Australia, *Submission 23*, p. 4. Emphasis omitted.

62 Dr Reidar Lystad, *Submission 70*, pp. 4–5.

63 Dementia Australia, Answers to questions on notice, 30 January 2023 (received 27 February 2023).

2.62 Neuroscientist Professor Robert Vink suggested there was merit in a national concussion registry for professional athletes, given they are 'the most at-risk group' for developing CTE. He stated that such a registry could help ensure that affected athletes receive appropriate personalised care after each concussion, including return to play management, and assist in tracking their brain health over time. He also noted that such a registry would be extremely useful to identify best practice and update concussion management guidelines as required.[64]

2.63 Making a similar point, neurologist Dr Rowena Mobbs recommended that sporting organisations be required to implement a public register of suspected and confirmed player concussions.[65]

2.64 Dr Alexandra Veuthey PhD, a lawyer specialising in sports law, submitted to the inquiry in a private capacity. She posited that while many sports governing bodies collect data on concussion in order to assess the effectiveness of their prevention strategies, or even make comparisons with other sports, in the absence of guidance on how to collect and share data, current data on concussion is 'inconsistent and often difficult to access'.[66]

2.65 Dr Stephen Townsend, a historian specialising in the history of sport, health, and exercise from critical sociocultural perspectives, highlighted that there is a lack of consistency in sport-related concussion reporting protocols in non-elite competitions. He argued this is a 'major problem' that needed to be addressed immediately, noting that 'even before exclusion periods and recovery protocols can be discussed, it is necessary to first identify when a brain injury has occurred'.[67] He also commented on the difficulties in tracking the prevalence of concussion in non-elite sport, compared to professional elite sports:

> Diagnostic challenges exist even in professional competitions, where players are under the scrutiny of coaches, medical staff, media, and spectators. These challenges are greatly exacerbated in non-elite and recreational contact sport, where athletes play the same games without oversight from medical staff and the media.[68]

2.66 To address this challenge and overcome the lack of data, Dr Townsend recommended that the contact sports national sporting organisations in Australia introduce a sport-related concussion reporting tool for non-elite

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64 Professor Robert Vink, *Submission 38*, p. 2.

65 Dr Rowena Mobbs, *Submission 1*, p. 2.

66 Dr Alexandra Veuthey, *Submission 56*, [p. 5].

67 Dr Stephen Townsend, *Submission 60*, [p. 2].

68 Dr Stephen Townsend, *Submission 60*, [pp. 2–3].

competitions that is based upon the SCAT5 protocol, mandatory, digitised and free, simple, culturally safe, and linked to a central database.[69]

2.67 Dr Townsend stated that a consistent and universal reporting program will also provide epidemiologists and public health researchers with more reliable data on the real incidence of brain injuries in sport. He noted that epidemiological data on incidences of sport-related concussion is 'patchy at best' because it relies mostly on extrapolated data from hospital admissions, and isolated academic studies of sports-related concussion in a single league, team, or season. He also suggested that a national reporting program would remind recreational sportspeople that concussion is a serious injury that can occur at all levels of contact sport. Dr Townsend also flagged that the NHMRC called for a 'centralised injury register' of head and neck injuries in football almost 30 years ago.[70]

2.68 Australia does not currently have a national sports injury surveillance system. The AIS Concussion and Brain Health Position Statement 2023 notes that as a result, precise data on the incidence, frequency, and prevalence of sport-related concussion in Australia is undetermined. The position statement also notes that this is compounded by a lack of recognition of the signs and symptoms of concussion, under-reporting, and a failure to seek medical advice.[71]

2.69 The ASC informed the committee that the risk of concussion and repeated head trauma varies across sports and that precise data on incidence, frequency and prevalence is 'unavailable'. It stated:

> Precise data on the incidence, frequency, and prevalence of concussion and RHT [repeated head trauma] in Australians, including First Nations Communities, and long-term impacts of concussion is unavailable. This is further compounded by a lack of recognition of the signs and symptoms of concussion, under-reporting and failing to seek medical advice. For example, under-reporting of concussions and failing to seek medical advice range from 17% to 82% across different sports.[72]

2.70 The ASC submission also stated that concussion is a 'common experience' amongst individuals who have played a contact or collision sport for five years or more in their adult lives, although for the majority of those individuals, concussion is experienced on 'a small number of occasions during their sporting lives' and they 'report no long-term consequences'.[73]

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69 Dr Stephen Townsend, *Submission 60*, [p. 3].

70 Dr Stephen Townsend, *Submission 60*, [p. 3].

71 Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 6.

72 Australian Sports Commission, *Submission 10*, p. 12. Citations omitted.

73 Australian Sports Commission, *Submission 10*, p. 5.

2.71 The ASC noted that data on concussion and long term brain health (including CTE-NC) in Australia is 'lacking'. It further stated that it is difficult to determine accurate incidence, frequency and prevalence of concussion due to the absence of an Australia-wide injury surveillance system, inconsistent reporting methods, and a lack of recognition of the signs and symptoms of concussion.[74]

2.72 The committee also heard that there is a lack of research on the prevalence of concussion in First Nations individuals. Connectivity stated that overall there is a paucity of research on the causes, prevalence and outcomes of concussion and repeated head injury among First Nations people, noting that there is also limited research conducted investigating Indigenous knowledge and perceptions of concussion.[75]

2.73 Dr Stephen Townsend also highlighted this issue. He explained that as is the case with mTBI more broadly, the incidence rate of sport-related brain injuries amongst First Nations peoples is unknown. However, Dr Townsend noted that a 2022 article in the Medical Journal of Australia indicated that First Nations people are approximately 1.7 times more likely to suffer traumatic brain injury (TBI) than non-Indigenous Australians, though the portion of these TBIs that are attributable to sporting injuries is unknown.[76]

2.74 Dr Townsend also flagged that First Nations people make up approximately 3.8 per cent of the Australian population, but represent around 11 per cent of AFL player lists and 13 per cent of NRL players. Dr Townsend submitted that it therefore stands to reason that this correlates with an overrepresentation of First Nations individuals with sports-related concussions.[77]

2.75 Additionally, the ASC noted that the current data regarding concussion-related injuries of First Nations individuals may be 'heavily underreported', owing to a lack of culturally appropriate health services which may result in health assessments where there is a 'failure to elicit appropriate information, incorrect assumptions are potentially made, and diagnoses are missed'.[78]

2.76 The Department of Health and Aged Care (the department) also acknowledged that precise data on the incidence of sport-related concussion in Australia 'requires further collection and analysis'.[79]

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74 Australian Sports Commission, *Submission 10*, p. 5.

75 Connectivity, *Submission 24*, p. 4.

76 Dr Stephen Townsend, Submission 60, pp. 5, 6.

77 Dr Stephen Townsend, Submission 60, pp. 5, 6.

78 Australian Sports Commission, *Submission 10*, p. 13.

79 Department of Health and Aged Care, *Submission 9*, [p. 6].

2.77 It observed that potential limitations to obtaining accurate data on incidence include a lack of recognition of symptoms, as well as under-reporting and failure to seek medical advice. It concluded that these barriers provide further impetus to develop innovative and evidence-based research and resources to support those affected by sport-related concussions.[80]

2.78 The Australian Institute of Health and Welfare (AIHW) advised that sports injury data is limited by a lack of sport activity data being collected outside of the admitted hospitalisation data in the National Hospital Morbidity Database (NHMD). It acknowledged that this limits the monitoring of the types and numbers of concussion in sports to inform policy and prevention activities.[81]

2.79 The AIHW further noted that 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.[82]

National Sports Injury Database

2.80 The AIHW stated that in light of this evidence gap, the ASC has contracted the AIHW to implement a National Sports Injury Data Strategy (the strategy) which will encompass:

- $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; and
- publishing and communicating findings.[83]

2.81 The goal of a national sports injury data asset will be achieved through the development of the National Sports Injury Database (the database), which will better capture nationwide sport injury data, including concussion in sport.[84] The ASC informed the committee that although the database will not solely focus on concussion reporting, it is included within the project purview.[85]

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80 Department of Health and Aged Care, *Submission 9*, [p. 6].

81 Australian Institute of Health and Welfare (AIHW), *Submission 15*, [p. 3].

82 AIHW, *Submission 15*, [p. 3].

83 AIHW, *Submission 15*, [p. 3]. Punctuation added.

84 Australian Sports Commission, *Submission 10*, p. 12.

85 Australian Sports Commission, *Submission 10*, p. 12.

2.82 The draft consultation report for the strategy (consultation report) that was published in February 2022, confirmed that Australia lacks a national database that can provide information about the frequency and cause of sports injuries. It also specifically recognised that Australia does not currently collect community sports injury data at a national level.[86]

2.83 The consultation report described how a national sports injury data asset would address these issues, and benefit Australian sporting communities, individuals, and organisations:

> The collection of sports injury data across community sport aims to provide data to the public, sports organisations and researchers so that the risks of participation are understood and prevention programs can be prioritised. Ongoing data collection will also help us understand how prevention programs are working in community sports and inform adjustments over time. An ongoing data collection will also provide early detection of emerging issues to enable more rapid responses. Better data are anticipated to support injury prevention and improve sport participation and physical activity.[87]

2.84 The consultation report also explained that alongside data collection from existing sources, a new online sports injury data collection tool will be developed to address the data gap in the area of community sport organisation incident reporting. The tool aims to provide a simple way to record injury on a smartphone, tablet or computer, using dropdowns and buttons as much as possible to minimise text entry.[88]

2.85 Further, the consultation report outlined that in all stages of the National Sports Injury Database Strategy, including data collection, data storage, data analysis and data reporting, the privacy and confidentiality of individuals and organisations will be protected.[89]

2.86 The department advised that it is a member of the National Sports Injury Database Steering Committee. In regard to the aims of the database it stated:

> When established, the Database will allow for analysis of sport injuries trends, including concussion, which can be utilised by sporting organisations alongside provision of the latest evidence for treatment and prevention. The Database will aim to keep participants safe and identify areas where further initiatives are required to support the prevention of injuries and development of new treatments.[90]

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86 AIHW, *National sports injury data strategy: Draft consultation report*, February 2022, p. 1.

87 AIHW, *National sports injury data strategy: Draft consultation report*, February 2022, p. 3.

88 AIHW, *National sports injury data strategy: Draft consultation report*, February 2022, pp. 36, 37.

89 AIHW, *National sports injury data strategy: Draft consultation report*, February 2022, p. 44.

90 Department of Health and Aged Care, *Submission 9*, [p. 6].

2.87 Additionally, the ASC advised that this database would also facilitate a better understanding of concussion rates in First Nations communities.[91]

2.88 The Queensland Department of Tourism, Innovation and Sport told the committee that it supported the concept of a 'harmonised injury reporting system' such as the National Sports Injury Database. It commented that such a project may help to promote safer sporting practices, as well as influence future injury prevention strategies.[92] It further noted:

> Development of any such data surveillance mechanism will require ongoing consultation with the active industry to ensure proposals take into account the operational constraints of grassroots clubs and their largely volunteer-based workforce and the importance of medically trained personnel being responsible for accurately identifying and categorising injuries to ensure the integrity and validity of an injury database.[93]

Committee view

2.89 The evidence to the committee shows that competing or inconsistent definitions of concussion used by stakeholders in sports contribute to confusion and the risk that concussion is not always diagnosed accurately.

2.90 The committee sees a clear need for a consistent, trusted, and independent definition of concussion, tailored to the sports context, to help guide stakeholders and inform protocols across all levels of sport in Australia.

2.91 The committee believes there could be a place for the NHMRC to guide or facilitate this work, or to at least conduct an independent approval process for a definition or set of guidelines produced by another body (such as the ASC).

2.92 Additionally, while the committee is encouraged to see that there may be potential for emerging technologies to assist with the diagnosis of concussion in sport in the future, it is mindful that there must be sufficient peer-reviewed evidence base available to validate any new tool before it can be safely utilised.

2.93 The committee has heard the concerns from submitters about the distinct lack of data on the rates of concussion sustained during sports across Australia. It is clear that there is an urgent need for better data collection of the incidence of concussion in contact sports in Australia.

2.94 It commends the idea of the National Sports Injury Database and urges the Australian Government to prioritise the establishment of this data asset. The committee understands that establishing this nationwide, population level dataset, will significantly improve the understanding of the frequency and cause of sports injuries in Australia amongst researchers, policy makers, the sports

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91 Australian Sports Commission, *Supplementary Submission 10.1*, [p. 3].

92 Queensland Department of Tourism, Innovation and Sport, *Submission 31*, p. 2.

93 Queensland Department of Tourism, Innovation and Sport, *Submission 31*, p. 2.

sector and the public alike. It considers that part of this work should include requiring professional sporting codes to collect and publish data on concussions and identified sub-concussive events.

2.95 Additionally, the committee sees value in the National Sports Injury Database collecting information such as the sport and level in which the injury was sustained, as well as the demographic information of the individual injured. It considers that this will assist in producing a fuller picture of the prevalence of concussion and repeated head trauma in contact sports, which will in turn be beneficial to creating guidelines and protocols for the prevention and treatment of these injuries.

Recommendation 1

2.96 The committee recommends that the Australian Government establish the National Sports Injury Database as a matter of urgency, noting this will significantly help address the lack of sports injury data available in Australia, including at the community level of sport.

Recommendation 2

2.97 With a view to increasing transparency, the committee recommends that professional sporting codes collect data on concussions and identified sub-concussive events and share this data with the National Sports Injury Database.

Chapter 3
Long-term impacts and ensuring the integrity of research

3.1 This chapter firstly explores the views that inquiry participants have on the impact of head trauma, including concussion, on long-term brain health, and its links to neurodegenerative conditions, such as Chronic Traumatic Encephalopathy (CTE). It then considers the very personal and distressing stories of a number of individuals who suffered head trauma during their sporting careers and who either were still, or were prior to their passing, suffering from the effects of repeated head trauma and neurodegenerative disease. It also canvasses the perspectives that Australian Government agencies and several national sporting organisations have on the link between repeated head trauma and long-term health impacts.

3.2 This chapter also discusses the various research initiatives that are currently underway, or are about to commence, and their funding models—including suggestions of conflicts of interest and a lack of independence. It concludes with the committee's view on the issues discussed in the chapter, along with a number of recommendations.

The link between concussion and repeated head trauma and long-term health impacts

3.3 The committee heard a range of views from inquiry participants regarding the association between concussion and repeated head trauma and subsequent health implications, such as CTE, post-traumatic headache, dementia, and other neurological and health impacts.

Views of medical professionals, researchers, and other experts

3.4 Medical professionals, researchers and other experts were in broad agreement that at a minimum, there is an association between sport-related concussion and repeated trauma and long-term neurological conditions.

3.5 Consultant Neurologist Dr Rowena Mobbs highlighted that almost 30 years ago, the National Health and Medical Research Council (NHMRC) reported that boxing and football-related head injuries can be associated with long-term neurological effects. She noted that despite this, such issues have been overlooked in the community, and raised concern about the lack of independent research over the years:

> … our community has turned a blind eye to systematic concussion. The absence of mandatory reporting on concussion, neurological care after concussion, and stories of returning to the field too early are harrowing. Furthermore, the dearth of meaningful, fully independent, and

> appropriately funded research has represented a dark chapter in Australian sport.[1]

3.6 Neuroscientist Professor Alan Pearce who, over the past 15 years, has assessed hundreds of individuals with concussion/repeated head trauma at all levels of sport, has observed from his research that all athletes with a history of repetitive head trauma (whether they express ongoing concerns or not, and irrespective of the level of competitive participation) show some physiological changes compared to age-matched controls.[2]

3.7 Professor Pearce also told the committee that nearly 100 years of retrospective evidence have demonstrated the risks of repetitive head trauma with regards to CTE:

> We have nearly 100 years of retrospective evidence to argue [the risk between repetitive head trauma and CTE]. I understand that people want to have prospective research studies, but we should also be looking back at the research that we've done for nearly, as I said, 100 years internationally. I don't think this is just a sport-by-sport issue. It's a repeated head trauma, irrespective of whether it's a football, basketball, netball, cricket ball, anything.[3]

3.8 Dr Alexandra Veuthey PhD, an attorney specialising in sports law, similarly noted that the association between head trauma in sport and long-term neurodegenerative disease was first discovered almost a century ago. She submitted that 'convincing scientific studies postulating in favour of the acknowledgement of an extensive causal link are accumulating day by day' and added that multiple CTE cases have now been diagnosed in a range of team sports such as American football, Canadian football, Australian Rules football, football, ice hockey, baseball, rugby union and rugby league. Dr Veuthey also outlined that links between multiple head injuries and Alzheimer's disease have been discussed within the scientific community.[4]

3.9 Whilst Dr Veuthey noted that the full extent of long-term impacts of head trauma on athletes, and the role of other potential risk factors (such as genetic predisposition, the use of illicit substances, alcohol consumption and age) remain unknown, she also made it clear that government organisations and sports governing bodies can no longer deny the long-term risks:

> It is crucial that sports medicine bodies and governmental organisations, such as Sports Medicine Australia (SMA) and the Australian Institute of Sport (AIS), acknowledge the potential long-term risks of head injuries, as

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1 Dr Rowena Mobbs, *Submission 1*, p. 1.

2 Professor Alan Pearce, *Submission 46*, p. 3.

3 Professor Alan Pearce, Private capacity, *Committee Hansard,* 26 April 2023, p. 48.

4 Dr Alexandra Veuthey, *Submission 56*, [p. 2].

> their US counterparts have already done. The same is true for Australian sports governing bodies, whose denial is no longer tenable today.[5]

3.10 Injury epidemiologist, Dr Reidar Lystad made a similar point, submitting that the scientific evidence for a causal relationship between repetitive head trauma and long-term health impacts, including neurodegenerative diseases such as CTE, is imperfect but undeniable. He added that:

> Skeptics [sic] who deny or dismiss the causal relationship often rely on either or both an outdated or selective body of evidence and inappropriate frameworks and standards for evaluating causation involving environmental exposures. Had we used the same approach in the case of tobacco smoking and lung cancer – or asbestos and mesothelioma, or thalidomide and birth defects – then we would have dismissed these causal relationships too.[6]

3.11 The Concussion Legacy Foundation, which was founded by Dr Chris Nowinski, a behavioural neuroscientist and former American footballer and professional wrestler, noted that a review published in 2022 which explored the link between repeated heard trauma and CTE concluded:

> We have the highest confidence in the conclusion that RHI [repetitive head impacts] causes CTE. We encourage the medical, scientific and public health communities to now act under the premise of a causal relationship and take immediate action to prevent CTE, minimize risk, and develop therapeutics to slow or stop disease progression.[7]

3.12 The Concussion Legacy Foundation also submitted that besides CTE, long-term participation in contact sports is associated with an increased risk of dementia, motor neuron disease, and Lewy-body disease.[8]

3.13 Brain Injury Australia submitted that having a history of serious or repeated concussions has been linked to long-term complications, including chronic traumatic encephalopathy, cognitive impairment, early onset dementia, movement disorders, psychiatric disorders, and, potentially, motor neuron disease, though it also acknowledged the potential role of other variables and risk factors such as genetic predisposition and alcohol and other drug use.[9]

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5 Dr Alexandra Veuthey, *Submission 56*, [p. 2].

6 Dr Reidar Lystad, *Submission 70,* p. 1.

7 Concussion Legacy Foundation, *Submission 16*, [p. 2].

8 Concussion Legacy Foundation, *Submission 16*, [p. 2].

9 Brain Injury Australia, *Submission 23*, p. 3.

3.14 Dementia Australia submitted that current research indicates a causal link between repeated head injuries 'along a spectrum of severity and an increased risk of developing a range of neurological conditions, including CTE'.[10]

3.15 Neuroscientist Professor Robert Vink AM, who has over 30 years of experience in traumatic brain injury research, explained that it seems clear that repetitive head injury in professional football athletes is a major risk factor for CTE development, but he also cautioned that current incidence data may not be representative of the risk to the broader population:

> There have been several scientific studies demonstrating the presence of CTE in brains donated to brain banks, with those reporting positive findings in former professional athletes receiving considerable media attention over recent years. While not denying the presence of CTE in these studies, the incidence data are widely considered as being skewed given that the people who donate their brains for post-mortem analysis come from a non-representative demographic and in many cases, they or their families already have concerns about the mental health of the donating individual. Nonetheless, even with this limitation, such studies are very useful for the identification of behaviours that may be associated with the development of CTE.[11]

3.16 Clinical Legal Educator and PhD candidate in the area of concussion in contact sports in Australia, Mr Leon Harris noted that players of contact sports, such as Australian football, rugby league, and rugby union have suffered from a range of neurodegenerative diseases, including CTE, Alzheimer's disease, amyotrophic lateral sclerosis—also known as Lou Gehrig's disease—Parkinson's disease, and frontotemporal lobar degeneration.[12] He added:

> Evidence indicates contact sport participants are up to four times more likely to die from some form of neurodegenerative disease than those who don't. This is the case even after all other risk factors such as drug and alcohol abuse and heart disease for example are excluded from the cohort.
>
> Evidence suggests the earlier a player begins to play, and the longer they play, the more likely they will develop such a condition. Studies show the risk of developing CTE increase the longer a person plays contact sport.
>
> CTE is not an inevitable consequence of repeated head trauma but without repeated head trauma, CTE is very rare or even absent in the general population.[13]

3.17 Connectivity Traumatic Brain Injury Australia (Connectivity) submitted that there is 'a large and growing body of studies suggesting an association between

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[10] Dementia Australia, Answers to questions taken on notice, 30 January 2023 (received 27 February 2023).

[11] Professor Robert Vink, *Submission 38*, [p. 1].

[12] Mr Leon Harris, *Submission 71*, [p. 4].

[13] Mr Leon Harris, *Submission 71*, [pp. 4–5].

repeated head injury and long-term impacts to an individual's mental, physical, and social well-being' as well as high-profile, and community level, reports of sportspeople experiencing persistent and/or long-term impacts from concussions.[14]

3.18 Connectivity reported that despite this, there is insufficient high-level evidence that allows firm conclusions to be drawn about the long-term effects of concussion and repeated head injury, including CTE. It added:

> Frequently cited concerns about the evidence gathered to date include a lack of adequately powered case-control longitudinal, prospective studies of CTE, and an evolving definition of chronic traumatic encephalopathy. It is unlikely that all episodes of concussion result in CTE.[15]

3.19 Concussion Australia also highlighted the need for further research. It submitted that the long-term impacts of concussion and repeated head trauma, with respect to causing CTE, was 'evidentially inconclusive' and that, although CTE had an association with concussions, the extent of that relationship was not yet known.[16] It argued that:

> To make definitive conclusions more research is required into matters such as the number of concussions that someone has suffered throughout their life, the space of time between those concussions, the age at which the concussion/s occurred and genetics.[17]

3.20 The Royal Australian College of General Practitioners (RACGP) similarly contended that there is 'currently insufficient evidence to fully understand and determine the long-term impacts of concussion and repeated head trauma' and recommended significant investment in further clinical research into the long-term impacts of concussion and repeated head trauma in contact sports.[18]

3.21 A recently published report into concussion in sport by the United Kingdom's House of Commons Digital, Culture, Media and Sport Committee (UK House of Commons Concussion in Sport Report) also highlighted the need for more conclusive evidence:

> The need for more conclusive evidence that links brain injury to increased neurological diseases such as dementia is evident for a number of reasons. While the FIELD study[19] showed a significant correlation between injury and incidence of disease, this was a population level study that explained neither why there was a correlation between brain injury and neurological

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14 Connectivity Traumatic Brain Injury Australia (Connectivity), *Submission 24*, p. 1.

15 Connectivity, *Submission 24*, p. 2.

16 Concussion Australia, *Submission 3*, p. 2.

17 Concussion Australia, *Submission 3*, p. 2.

18 The Royal Australian College of General Practitioners (RACGP), *Submission 22*, p. 4.

19 For further information on the FIELD study, see: https://gbirg.inp.gla.ac.uk/the-field-study/.

> disease nor what caused it. There is a need to understand the mechanisms by which neurological disease occurs to allow for the development of treatments that might mitigate the severity of disease or even prevent it happening at all.[20]

Lived experiences of head trauma and health impacts including neurodegenerative disease

3.22 The committee heard compelling personal evidence and lived experience accounts regarding the health impacts of sport-related concussion and repeated head trauma. This section canvasses a number of these stories.

Mr Barry Taylor—Rugby union

3.23 Ms Enid Taylor and Mrs Jennifer Masters, respectively the wife and daughter of the late Barry Taylor, spoke about the impact that dementia had on their family. Ms Taylor noted that her husband had played rugby union from under sevens until he was almost in his mid-30s, and that his personality started to change later in life. She described this change as follows:

> He showed signs of a change of personality at around about 60. But prior to that—we realise now he'd had CTE long before that—he had become quite aggressive. Once he was diagnosed with dementia, from then on it was horrendous. I can't begin to tell you how serious the whole scene was. He was aggressive and irrational. It was a madness; it wasn't normal. He eventually became totally dependent, incontinent and the rest, so he went into care where he was for 3½ years until he passed away at 77.[21]

3.24 After Mr Taylor passed away, his brain was donated to Boston University and examined by Dr Ann McKee, who determined that his brain size had reduced to that of a very small woman and that his brain was one of the worst five she had ever encountered.[22]

Ms Kirby Sefo—Rugby union

3.25 Ms Kirby Sefo, a former Australian Rugby sevens and Australian Wallaroos player, stated that she had sustained in excess of 40 head knocks of varying severity over her career, and spoke about the debilitating symptoms she started experiencing:

> … my symptoms always present in the same order but for varying lengths of time. I begin with dizziness and hypersensitivity to light. I lose parts of my vision. I experience a loss of balance and disorientation, followed by heavy fevers and sweats and then severe vomiting. Once the vomiting

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20 House of Commons Digital, Culture, Media and Sport Committee, *Concussion in sport: Third Report of Session 2021–22*, 22 July 2021, p. 24. https://committees.parliament.uk/work/977/concussion-in-sport/publications/ (accessed 28 May 2023).

21 Ms Enid Taylor, Private capacity, *Committee Hansard*, 30 January 2023, p. 43.

22 Ms Enid Taylor, Private capacity, *Committee Hansard*, 30 January 2023, p. 43.

> settles, I'll pass out into a deep, deep sleep that can vary anywhere from 45 minutes, with the longest I've experienced being around eight hours.
>
> There are no triggers to my episodes that I or anyone else has been able to track. They can come on at any time of the day or night, and I've been woken up from my sleep on various occasions due to the intense dizziness, before the fevers and vomiting start to occur. When these episodes occur, it is completely debilitating for me. I have about a three- to four-minute window where the initial dizziness comes on before I completely lose control of the symptoms.[23]

3.26 Ms Sefo submitted that her symptoms resulted in her being unable to work and that, in one instance, she lost her job, while in another she had to resign because she was unable to manage her symptoms. She also stated that there were times when she was hospitalised because an episode occurred in public, and an ambulance was called on her behalf.[24]

Mr Terry Strong—Rugby league

3.27 Mrs Kathy Strong spoke about her late husband, Mr Terry Strong, who was a grass-roots, amateur, semi-professional rugby league player during the 1970s and 80s, and who was later diagnosed with Lewy body dementia and REM sleep behaviour disorder. She described the impact these illnesses had on her family as follows:

> With regard to the impact on the family and on me in particular, we were managing these behaviours as best we could with the medication, because, after he had the fall and went into hospital, he became psychotic and paranoid, and he was catatonic at one stage. This was during COVID, and I couldn't let the grandchildren see him. The hospital wouldn't let me in, but, in the end, they let me in because he was so bad. He had a psychotic episode that lasted three or four hours. They called me in at half past one in the morning to try and help. The boys couldn't see him; they had to get special permission from the counsellor. I couldn't allow our friends to see him, because it was so sad the way that he died.
>
> In the end the hospital called me in and said, 'Terry's so distressed. We really need to think about starting palliative care.' And within four days he passed, which was a blessing in the end because it was so sad to see this incredibly fit and great man—great family man—end up with his brain torturing him. To watch him go downhill so quickly was very sad.[25]

3.28 An autopsy on Mr Strong's brain indicated that he had suffered from severe late-stage CTE—a condition which he may have had for as long as 16 years—as

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23 Ms Kirby Sefo, Private capacity, *Committee Hansard*, 22 February 2023, p. 33.

24 Ms Kirby Sefo, Private capacity, *Committee Hansard*, 22 February 2023, p. 33.

25 Mrs Kathy Strong, Private capacity, *Committee Hansard*, 30 January 2023, p. 44.

well as a number of other illnesses, including frontotemporal disease and Alzheimer's disease.[26]

Mr James Graham—Rugby league

3.29 A former professional rugby league player, Mr James Graham stated that, although rugby league gave him a 'great life' and many opportunities, he believes that it is likely that it will come at cost to his health and life span:

> Some of this is due to the nature of my sport, due to the environment that I was put into, the attitudes that existed around concussion and my own choices, at times, to carry on and take advantage of a system that allowed me to play six days after being knocked unconscious.
>
> I … received the information that I'm in the bottom three percent for a certain area of the volume of my brain. I'm glad I know that information because I can look to do something about it. Unfortunately, that resource isn't there for a number of the people I used to play with and play against. I think it should be. During that time of my own ill health, I was diagnosed with depression and anxiety, and I'm now looking at possible bipolar disorder as well. It's an ongoing process, and it's something that I will likely deal with for the rest of my life.
>
> You can't cease the decline, but you can put the brakes on things. You can certainly hit that accelerator. Unfortunately, people don't know where to turn to, they don't know what resources are available to them, and that self-medication aspect is far too common, in my opinion, from what I've seen in the community.[27]

Mr Shane Tuck—Australian football

3.30 Ms Renee Tuck told the story of her younger brother, Mr Shane Tuck, who was a former Australian Football League (AFL) player who played 173 games, and occasional boxer who took his own life in July 2020 after a long battle with CTE. Ms Tuck said the following regarding her brother's battle with this disease:

> Shane's CTE and brain disease had been a very slow burn for him up until the last four years of his life, when it really ramped up. We watched him decline over many years, but the last two years were probably the most tormenting and traumatising for him. Shane had a lot of auditory hallucinations, which are voices. He slowly ended up on the verge of dementia. By the end, he'd lost motor skills and memory. He was very confused. He'd had two prior attempts at taking his life. [28]

3.31 Ms Tuck said it was probably one of the most traumatising and awful things she had ever witnessed in her life:

> … I watched a young man be taken away physically and mentally and watched him know it as well, without having a cure or anything to lean on

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26 Mrs Kathy Strong, Private capacity, *Committee Hansard,* 30 January 2023, p. 44.

27 Mr James Graham, Private capacity, *Committee Hansard,* 30 January 2023, pp. 48, 49.

28 Ms Renee Tuck, Private capacity, *Committee Hansard,* 26 April 2023, p. 56.

> at that time to get anything better. Nothing worked. He was a goner. His brain was rotting on him. It was dying out like an electric field would with water over it. He was just fizzling out. We all knew that we were going to lose him, but we worked our guts out as a family to try and keep him here.[29]

3.32 The significant impact that CTE had on both Mr Tuck and the people around him was also described in a submission from Mrs Katherine Tuck, the widow of Shane Tuck:

> … Shane's psychiatric symptoms continued to worsen and as his sister Renee submitted in her statement to the Inquiry, he made two attempts at taking his life, and underwent hospitalisations and electroconvulsive therapy, as well as continued to take medications, all of which made little to no difference to his suffering.
>
> Katherine and the children lost Shane much earlier than the day he passed. It was such a sad journey to see the loneliness of Shane's experience from the time he retired from the AFL system and the end of the institutional support that was available as an employed player, to floundering with the ongoing symptoms of anxiety, psychosis, sleeplessness and increasingly other symptoms which we now know were caused by CTE. It was traumatic for Shane's children to witness their father lose his grip on reality.[30]

Mr Danny Frawley—Australian football

3.33 Mrs Anita Frawley told the story of her late husband, Mr Danny Frawley, who played 240 senior matches for the professional AFL team St Kilda between 1984 and 1995:[31]

> On 9 September 2019, my husband of almost 30 years left our family home and drove his car into a tree near his hometown of Bungaree.
>
> Five years before his death, Danny had a massive mental health breakdown. I called our family doctor, who recommended a psychiatrist. During this breakdown he did not sleep for about three weeks. He could not function and became quite childlike. He was very dependent on the girls and me, following me around the house and constantly seeking reassurance that he was going to be okay.
>
> The subsequent finding that Danny had CTE stage 2 gave the girls and I clarity about his condition and the choices he made. Strangely, it almost provided us with relief—relief that he had no choice over his action because of his brain injury.
>
> When I hear that someone who played significant levels of contact sport has taken their life, my mind instantly goes to CTE as well as the pain and suffering the sufferer and the family must have gone through and are still

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29 Ms Renee Tuck, Private capacity, *Committee Hansard*, 26 April 2023, p. 56.

30 Mrs Katherine Tuck, *Submission 91*, p. 3.

31 Tom Maddocks and Luke Pentony, 'Danny Frawley's family calls on AFL to act quickly on CTE as Senate concussion inquiry continues', *ABC News*, 26 April 2023, www.abc.net.au/news/2023-04-26/danny-frawley-family-urges-afl-to-act-on-cte-concussion/102269648 (accessed 3 June 2023).

> going through. It triggers so many emotions, namely anger, that someone else must go through what Danny and the girls and I went through.[32]

Mr Peter 'Wombat' Maguire—Australian football

3.34 Mr Peter 'Wombat' Maguire submitted that, in April 1994, he sustained multiple concussions within one game of AFL that triggered a 'life-changing tidal wave of medical events'. He said that, even as recently as a few weeks prior to his giving evidence to the inquiry, certain health practitioners did not believe his account of how medications prescribed to him were adversely affecting him.[33] Mr Maguire also said:

> There is no doubt that concussions cause psychological conditions such as sleep disturbance, depression, anxiety. Yet because many times over neurologists cannot see it, like in my case, on an MRI or CT scan, I then get referred to psychiatrists, whose medications, instead of helping symptoms, in fact lead to making symptoms much worse, including suicidal tendencies.
>
> This is not just an athlete issue, despite the crux of this hearing being about concussion in sport alone. This also affects our veterans, domestic violence victims, as well as car accident victims, where more times than not explanations for symptoms are put under the PTSD banner and medicated away, leading to many suicides purely because the sufferer simply is not heard as a sufferer.[34]

Ms Lydia Pingel—Australian football

3.35 In her evidence to the inquiry, Miss Lydia Pingel, a former female Australian footballer who played over a three-year period in Queensland's premier QAFLW and division 1 leagues[35] said the following:

> I'm a 30-year-old ex-AFL-player, now medically retired from contact sports and pretty much all sports, due to concussions I received whilst playing. I had seven in three years, and it's been two years since my last concussion.
>
> Since then, although I physically look normal, I've got a cognitive impairment and I suffer from persistent post-concussion syndrome, which basically entails the symptoms that you have 24 to 48 hours after a concussion; I suffer them every day in various forms and in various intensities. That hasn't stopped for over two years now.
>
> Subsequently, my life has completely changed due to that. There is no rehab. There are no specific treatments. There is nothing specific, essentially, to what I'm going through or specific to concussion in general. It's a very grey and unknown space. It's a bit of a 'figure it out on your own' kind of thing

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32 Mrs Anita Frawley, Private capacity, *Committee Hansard*, 26 April 2023, p. 57.

33 Mr Peter 'Wombat' Maguire, Private capacity, *Committee Hansard*, 26 April 2023, p. 59.

34 Mr Peter 'Wombat' Maguire, Private capacity, *Committee Hansard*, 26 April 2023, pp. 59, 60.

35 Miss Lydia Pingel, *Submission 8*, [p. 2].

> in a way. There's not a lot of direction there for people like me to follow and go through with.[36]

Mr Joseph Didulica—Soccer

3.36 Mr Joseph Didulica, a former goalkeeper who played in Australia's national soccer league and for various clubs across Europe, shared his story with the inquiry. Mr Didulica, who grew up in Geelong in Victoria, started playing soccer in his youth and believes he experienced his first concussion when he was five or six years old:

> Through the late teenage years these concussions would become a little bit more prevalent. As a goalkeeper I would get knocked in the head and I would play through the game. It wasn't until one game when I was a teenager and I got smashed in the head, I was in the showers after everyone left and I was still in there not knowing where I was. All of a sudden my mum and dad came down and asked me 'What's going on?' I said, 'I just don't know where I am, mum and dad.' And they got me up.
>
> In 2006 … I was uppercut with a ball during a game. I was laying there unconscious. They've taken me off. My head's wobbling. In the change rooms I wake up talking German. I was in Holland, right? So they said: 'Okay, you're up. Take a shower and go home.' My wife came. I didn't know I was married, so I was, 'This strange lady is driving me home.' I didn't know I had a daughter. I went home and I didn't play for two years after that. I obviously had a whiplash and then my life turned into what it is today.
>
> Since that day light affects me, noise affects me, long days affect me. My nervous system's shot. I've had bad headaches and migraines every day since that day. I'm tense. Every morning I wake up and that's what wakes me up, the pounding of my head. How I get through the day is through meditation. I'm now on medicinal marijuana, for whatever that's worth. That's probably the only thing that helps me stay sane, I think. I'm not sure of the long-term consequences of that, but I'm living day to day, week to week. Also, the mental blanks that you have and the brain fog, which is constant as well—as long as the day goes that's crippling.[37]

The position of the Australian Sports Commission, the Australian Institute of Sport, and the Department of Health and Aged Care

3.37 As noted in chapter 1, the Australian Sports Commission (ASC) is the Australian Government agency responsible for supporting and investing in sport across all levels and it plays a leadership role in guiding sporting organisations, and the sport sector more broadly, in relation to a range of issues impacting upon them. Further, the Australian Institute of Sport (AIS) is the high performance arm of the ASC.[38]

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36 Miss Lydia Pingel, Private capacity, *Committee Hansard,* 22 February 2023, p. 32.

37 Mr Joseph Anthony Didulica, Private capacity, *Committee Hansard,* 26 April 2023, pp. 60, 61.

38 Australian Sports Commission, *Submission 10,* p. 3.

3.38 In its submission to the inquiry, the ASC acknowledged that there is evidence that some individuals who suffer repeated head trauma are susceptible to long-term degenerative brain disease and that there is an association between a history of repeated concussions and cognitive deficits later in life. However, it also noted:

> … there is currently a lack of high-quality evidence indicating the degree of association between RHT [repeated head trauma] and concussion with CTE-NC [Chronic Traumatic Encephalopathy Neuropathological Change].[39]

3.39 The ASC submitted that most research data on CTE was obtained from sport brain bank studies, and that those individuals who donate their brain for these studies almost 'universally' have pre-existing clinical symptoms of degenerative brain disease, resulting in a skewed representation in donors which makes it difficult to apply the findings more broadly to the general population.[40]

3.40 The ASC also noted that clinical data obtained from sport bank studies also relied on retrospective interviews with athletes, and their relatives, for information on playing time, repeated head trauma exposure, symptom patterns, mental health issues, and substance abuse. It concluded that '[r]ecall bias is highly likely to affect the reliability of such information'.[41]

3.41 The ASC argued that the weakness with current research needs to be addressed with appropriately structured, prospective research projects which attempt to control for confounding variables, such as mental health, drug and alcohol use, genetic predisposition, and education, and which includes control groups that have not been exposed to repeated head trauma.[42]

3.42 At a public hearing of the inquiry, Dr David Hughes, Chief Medical Officer of the AIS recognised the link between repeated head trauma and CTE, but stated CTE is not an inevitable consequence of concussion. Dr Hughes also cautioned that the strength of the association, and extent of the role of other factors will only be understood with further, robust research:

> I want to clarify, yet again, that the AIS is not dismissing or trivialising CTE, but perspective and scientific reality are important. In summary, CTE is not an inevitable consequence of concussion. Yes, there is a link between repeated head trauma and the development of CTE. However, the strength of that link and the manner in which moderating factors which others have alluded to, such as alcohol abuse, recreational drug use, education exposure, past history of psychiatric illness and genetic factors interact with repeated head trauma will only be discovered by appropriately structured,

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39 Australian Sports Commission, *Submission 10,* p. 3.

40 Australian Sports Commission, *Submission 10,* p. 5.

41 Australian Sports Commission, *Submission 10,* p. 5.

42 Australian Sports Commission, *Submission 10,* p. 6.

> prospective, longitudinal studies that include a control group of individuals who have not been exposed to repeated head trauma...[43]

3.43 Dr Hughes also told the committee that the AIS is concerned about the acute and long-term effects of concussion and is committed to optimising safety in sport, but also urged for 'balance and perspective' in the reporting of CTE:

> … the AIS is concerned about the acute and long-term effects of concussion and is committed to optimising safety in sport. CTE is a histopathological diagnosis associated with repeated head trauma.
>
> AIS is also aware, however, of an inaccurate perception in the community of the prevalence of CTE among athletes who have been exposed to concussion. To be clear, this does not diminish the AIS's concern about CTE or its commitment to optimising safety. The truth, however … is that, for the vast majority of individuals who experience concussion, the experience is transient, short lived and results in no long-term health consequences. In the majority of cases, with or without medical intervention, recovery occurs in about 10 to 14 days in adults and about four weeks in children and adolescents.
>
> Conservative estimates suggest at least 100,000 sport related concussions occur in Australia each year. That equates to at least three million cases over the past three decades. At the last report from the Australian Sports Brain Bank, published in 2022, there had 12 cases of CTE confirmed in retired Australian athletes.
>
> … the AIS urges balance and perspective in reporting this condition. Public perception is that CTE is a common consequence of concussion in sport. It is not.[44]

3.44 When asked about the correlation between concussion and repeated head trauma with CTE, the Secretary of the Department of Health and Aged Care, Professor Brendan Murphy AC, said:

> … this is still an area of some controversy and where there needs to be a lot more evidence and a properly accumulated database. Beyond that, I can't think of much else I can add.[45]

The position of national sporting organisations

3.45 In its submission to the inquiry, the AFL acknowledged that there is an association between head trauma and neurodegenerative disease, including CTE-NC. The AFL also noted that it supports and adopts the recent statement

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[43] Dr David Hughes, Chief Medical Officer, Australian Institute of Sport, *Committee Hansard,* 1 March 2023, p. 39.

[44] Dr David Hughes, Chief Medical Officer, Australian Institute of Sport, *Committee Hansard,* 1 March 2023, pp. 38–39.

[45] Professor Brendan Murphy AC, Secretary, Department of Health and Aged Care, *Committee Hansard,* 1 March 2023, p. 41.

on CTE-NC by the National Institutes of Health, part of the United States Department of Health and Human Services:

> Chronic traumatic encephalopathy (CTE) is a delayed neurodegenerative disorder that was initially identified in postmortem [sic] brains, and research-to-date suggests, is caused in part by repeated traumatic brain injuries.[46]

3.46 The AFL endorsed the view of the AIS and other bodies that further exploration of the potential link between concussion and/or repeated head impacts and CTE-NC is needed through well-designed prospective epidemiological studies that take into account the potential confounding variables.[47]

3.47 When asked about the causal relationship between concussion and CTE, Dr Sharon Flahive, Chief Medical Officer of the National Rugby League (NRL) told the committee:

> There is an association with repeated head trauma. We don't know how strong this association is and we don't know what type of head trauma this involves. Whether there's a certain type of concussion or whether it is a dose effect, the medical evidence is not clear. We also don't know, with regard to the diagnosis of CTE, who is susceptible, what part the modifying factors take and what the prevalence is; but we do accept there is an association.[48]

3.48 In answers to questions on notice, Rugby Australia stated that:

> Rugby Australia acknowledges that the current science recognises an association between traumatic brain injuries and long-term neurodegenerative changes. The science around what this association is and how it relates to concussion is evolving. Regardless, Rugby Australia's approach to concussion is comprehensive and conservative and will continue to evolve as the science evolves.[49]

3.49 Representing Football Australia, Chief Operating Officer and Deputy General Secretary Mr Mark Falvo told the committee:

> I think that there is certainly some research that links repeated head trauma to CTE. That's the reason we take this issue very seriously and have been doing the work that we've been doing for some time now.[50]

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46 Australian Football League (AFL), *Submission 18*, p. 19. For more information on the United States National Institutes of Health statement on CTE, see: www.ninds.nih.gov/current-research/focus-disorders/focus-traumatic-brain-injury-research.

47 AFL, *Submission 18*, p. 19.

48 Dr Sharon Flahive, Chief Medical Officer, National Rugby League (NRL), *Committee Hansard*, 1 March 2023, p. 9.

49 Rugby Australia, Answers to questions on notice, 1 March 2023 (received 11 April 2023).

50 Mr Mark Falvo, Chief Operating Officer and Deputy General Secretary, Football Australia, *Committee Hansard*, 1 March 2023, p. 14.

3.50 At a public hearing of the inquiry, Dr John Orchard, Chief Medical Officer of Cricket Australia told the committee he accepts there is a link between repetitive head trauma and CTE.[51] However, Cricket Australia's submission to the inquiry noted:

> There is no cricket specific data on the long-term impacts of concussion and repeated head trauma. CA [Cricket Australia] has been collecting accurate data on all head impacts from the 300 professional elite players each year for almost a decade, as well as data from elite pathway players. This data will form the foundation for ongoing research to better understand the medium and long-term impacts of cricket related head trauma and concussion, as current players transition out of the professional game.[52]

The need for immediate action and precautionary measures

3.51 Several inquiry participants outlined the need for immediate and precautionary action, despite the lack of settled evidence. For example, Dr Reidar Lystad submitted that absolute resolution or 100 per cent certainty of a causal relationship between repetitive head trauma and neurodegenerative diseases, is not, and cannot, be the minimum standard for public health action.[53]

3.52 Dr Adrian Cohen, Chief Executive Officer of Headsafe, expressed similar sentiments, stating 'if we wait to act until the evidence is perfect and complete, we will never act'.[54]

3.53 Lawyer and legal academic, Dr Annette Greenhow, an expert in the regulation of sport-related concussion in Australia, noted that precautionary-based approaches should be adopted whilst the science continues to evolve:

> The scientific discussion as to the extent of the causal relationship will likely continue for many years into the future. In the meantime, a precautionary-based approach, developed in consultation with key stakeholders and reflective of the nuances across various sports settings, can guide decision-makers.[55]

3.54 The RACGP similarly suggested precautionary measures. It noted that whilst there is not enough evidence to determine the long-term impacts of concussion and repeated head trauma, it is important that contact sports are made as safe as possible to those currently participating, so that they are protected from any potential known or unknown harms of concussions or repeated head impacts.[56]

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51 Dr John Orchard, Chief Medical Officer, Cricket Australia, *Committee Hansard,* 26 April 2023, p. 20.

52 Cricket Australia, *Submission 20,* [p. 3].

53 Dr Reidar Lystad, *Submission 70,* p. 1.

54 Dr Adrian Cohen, Chief Executive Officer, Headsafe, *Committee Hansard,* 30 January 2023, p. 12.

55 Dr Annette Greenhow, *Submission 7*, p. 3.

56 RACGP, *Submission 22*, p. 4.

3.55 When asked whether sports should wait until more research is completed before acting on these issues, Professor Terry Slevin, Chief Executive of the Public Health Association of Australia, Professor Mark Morgan of the RACGP and Professor Vicki Anderson of the Murdoch Children's Research Institute, all agreed that sporting organisations should act now.[57]

3.56 Mrs Anita Frawley also implored sporting bodies to act now given an association between contact sport and CTE has been established:

> I know that we cannot sit waiting for the causal results from longitudinal studies when we already know there is an association between contact sport and CTE. The sporting bodies need to act now. Now that we know we need to act, to know and not to do is to not really know at all.[58]

Current research initiatives and funding

3.57 The committee heard that concussion research in Australia has been funded through a variety of mechanisms, including by governments, philanthropic and academic partnerships, as well as through major sporting organisations.[59]

3.58 Inquiry participants highlighted a number of research initiatives that are either currently underway or are expected to commence in the near future. A selection of these are discussed below.

Government initiatives and funding

3.59 In Australia, funding for medical research is available via the NHMRC grant system and the Medical Research Future Fund (MRFF). The ASC noted that both these entities are currently funding long-term studies of mild traumatic brain injury and concussion, and that funding approval provided by these bodies is based on a researcher's track record and the strength of any proposed study.[60]

Medical Research Future Fund and the Traumatic Brain Injury Mission

3.60 The MRFF provides grants to support health and medical research, improve health outcomes, quality of life, and health system sustainability. Through this fund, $50 million has been committed over a decade to the Traumatic Brain Injury Mission (TBI Mission) to support research designed to improve the lives

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57 Professor Terry Slevin, Chief Executive Officer, Public Health Association of Australia, *Committee Hansard,* 26 April 2023, p. 44; Professor Mark Morgan, Chair of Expert Committee for Quality Care, RACGP, *Committee Hansard,* 26 April 2023, p. 44; Professor Vicki Anderson, Theme Director, Clinical Sciences Research, Murdoch Children's Research Institute *Committee Hansard,* 26 April 2023, p. 44.

58 Mrs Anita Frawley, Private capacity, *Committee Hansard*, 26 April 2023, p. 57.

59 Dr Andrew McIntosh, *Submission 42,* p. 6.

60 Australian Sports Commission, *Submission 10,* p. 9.

of Australians who experience mild, moderate, and severe traumatic brain injuries.[61]

3.61 The goal of the TBI Mission is to better predict recovery outcomes after a traumatic brain injury, identify the most effective care and treatments, and reduce barriers to support people to live their best possible life after incurring such an injury.[62]

3.62 According to the Department of Health and Aged Care, the MRFF, primarily through the TBI Mission, has invested $7.5 million across six grants with a focus on concussion research since 2015.[63]

3.63 Professor Melinda Fitzgerald, Chair of the Expert Working Group of the TBI Mission, told the committee that a road map and implementation plan for the Mission have been developed and noted that whilst its research is underway, it will take some time due to the nature of the research, which involves the collection of data and monitoring of people over a long period of time.[64]

Australian Sports Commission and the Australian Institute of Sport initiatives

3.64 Through funding provided by the Australian Government, the AIS is involved in concussion and long-term brain health research. It has also obtained a grant from the International Olympic Committee (IOC) to fund concussion research. The ASC submitted that one of the significant limitations of existing and past research is the lack of studies comparing findings between retired athletes who have not been exposed to repeated head trauma to those who have.[65]

3.65 Given this, in 2021 the Government provided an additional $340 000 for the ASC to deliver the Concussion and Brain Health Project 2021–24, with the aim of improving the understanding of, and evidence base for, the relationship between sports-related concussion and long-term brain health. This funding comprised two components:

- $105 000 to update the 'Concussion in Sport Australia Position Statement' and associated education resources—with a focus on the recent scientific evidence regarding the links between sports-related concussions and long-term brain health; and
- $235 000 for the implementation of the Retired Elite Level Athletes' Brain Health Research Program (Brain Health Research Program), aimed at

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61 For further information on the Traumatic Brain Injury Mission, see: www.health.gov.au/our-work/traumatic-brain-injury-mission.

62 Department of Health and Aged Care, *Submission 9*, [p. 6].

63 Department of Health and Aged Care, *Submission 9*, [p. 7].

64 Professor Melinda Fitzgerald, Chair, Expert Working Group, Mission for Traumatic Brain Injury, *Committee Hansard,* 1 March 2023, pp. 30, 31.

65 Australian Sports Commission, *Submission 10,* p. 9.

> addressing current gaps in research—including research into the brain health of retired elite level men and women collision and non-collision sport athletes.[66]

3.66 The department noted that the Brain Health Research Program supports ongoing collaborations with the University of Newcastle and the University of Canberra to implement the retired elite level athlete brain health survey and to examine the brain health of retired elite level men and women from collision and non-collision sports. The department submitted that the project involves psychological tests, cognitive tests, somatosensory assessments, and multi-modal experimental brain imaging.[67]

3.67 The Chief Medical Officer of the AIS, Dr David Hughes, highlighted the importance of longitudinal studies:

> The only way that you'll be able to thread out that complex relationship between repeated head trauma and those modifying factors [such as alcohol abuse, recreational drug use, and a past history of psychiatric illness] is to undertake a longitudinal prospective study. The one that we are involved with at the University of Newcastle and the University of Sydney has been running, I think, since 2012, so for 10 years, and there will be follow-ups.[68]

3.68 Dr Hughes also indicated that the AIS had recently secured another research grant from the IOC to introduce a 'female arm' of research into the ongoing study as it was agreed that there was a lack of evidence in relation to females in sport.[69]

Academic and Australian-based brain bank research

3.69 The committee is aware that a number of academics and researchers, both domestically and internationally, are conducting a wide variety of studies exploring issues relating to sport-related concussion and repeated head trauma.

3.70 The committee is also aware of the operation of various sports 'brain banks' in Australia which are undertaking research using donated brain specimens.

Australian Sports Brain Bank

3.71 The Australian Sports Brain Bank (ASBB) was established in 2018 by the Neuropathology Department at Royal Prince Alfred Hospital, Sydney, in

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66 Department of Health and Aged Care, *Submission 9*, [p. 4].

67 Department of Health and Aged Care, *Submission 9*, [p. 4].

68 Dr David Hughes, Chief Medical Officer, Australian Institute of Sport, *Committee Hansard*, 1 March 2023, p. 42.

69 Dr David Hughes, Chief Medical Officer, Australian Institute of Sport, *Committee Hansard*, 1 March 2023, p. 42.

partnership with the Brain and Mind Centre at the University of Sydney and the Concussion Legacy Foundation in the United States of America.[70]

3.72 The ASBB's mission is to use expert diagnostic neuropathology, coupled with research, to understand CTE and other brain pathology that is associated with repetitive head injuries.[71] Since commencing, it has received more than 600 donation pledges from amateur and professional sportspeople.[72]

3.73 In June 2022, researchers at the ASBB published an article titled *Chronic Traumatic Encephalopathy as a Preventable Environmental Disease.* This article noted that there was already a large body of evidence strongly linking repeated head trauma to subsequent risks of neurodegenerative diseases later in life, and that despite this evidence, there remained significant 'scepticism and confusion', particularly around CTE and its relationship to sports-related repeated head injuries.[73]

3.74 The authors considered that the debate around CTE and repeated head injuries was 'reminiscent of controversies on tobacco use and lung cancer risk that were fostered by tobacco companies intending to protect their business'.[74] In the article's concluding remarks, the four authors wrote:

> CTE is a neurodegenerative pathology closely associated with a history of repetitive traumatic brain injury. Currently CTE can only be diagnosed after death, but the living signs and symptoms of those harboring CTE are indicative of RHI-induced neuropsychological decline.
>
> Dismissal or downplaying of the evidence for the long-term consequences of RHI in sport, or elsewhere, does nothing to advance our understanding of either CTE, or neurodegeneration more broadly. The costs incurred by ignoring, downplaying, or denying CTE are likely to be far greater than the costs of acknowledging, researching, and acting on this preventable environmental disease as a matter of urgency.[75]

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70 Australian Sports Brain Bank, *About us,* www.brainbank.org.au/about-us/ (accessed 30 May 2023).

71 Australian Sports Brain Bank, *About us,* (accessed 30 May 2023).

72 Wiley Online Library, Medical Journal of Australia, vol. 216, issue. 10, June 2002, pp. 491–540. Available at: https://onlinelibrary.wiley.com/doi/epdf/10.5694/mja2.51420 (accessed 31 May 2023).

73 Michael E. Buckland et al, 'Chronic Traumatic Encephalopathy as a Preventable Environmental Disease', *Frontiers of Neurology,* vol. 13, 13 June 2022. Available at: www.frontiersin.org/articles/10.3389/fneur.2022.880905/full (accessed 3 June 2023).

74 Michael E. Buckland et al, 'Chronic Traumatic Encephalopathy as a Preventable Environmental Disease', *Frontiers of Neurology,* vol. 13, 13 June 2022.

75 Michael E. Buckland et al, 'Chronic Traumatic Encephalopathy as a Preventable Environmental Disease', *Frontiers of Neurology,* vol. 13, 13 June 2022.

Sydney Brain Bank

3.75 The Sydney Brain Bank (SBB) is a specialised research facility established to collect brain and spinal cord tissue from donors with the aim of promoting research into disorders that affect the central nervous system. The SBB is housed at, and supported by, Neuroscience Research Australia.[76]

3.76 The SBB has approval to collect, characterise, and store human brain and spinal cord tissue specimens for research purposes. With the assistance of an independent scientific review committee, it assesses research proposals to use the tissue and distribute the specimens to domestic and international researchers with the goal of advancing knowledge of human brain and spinal cord disorders. The SBB focuses on collecting the brain and spinal cord from both healthy aged donors and those with neurodegenerative conditions.[77]

3.77 A research article published in 2022 regarding the prevalence of CTE in the SBB found the following:

> Our study shows a very low rate of chronic traumatic encephalopathy neuropathological change in brains with or without neurodegenerative disease from the Sydney Brain Bank. Our evidence suggests that isolated traumatic brain injury in the general population is unlikely to cause chronic traumatic encephalopathy neuropathologic change but may be associated with increased brain ageing.[78]

3.78 The committee is also aware of the Australian CTE Biobank based which was established at Macquarie University in 2022.[79]

Concerns regarding studies from sports brain banks

3.79 The Chief Medical Officer of the AIS, Dr David Hughes, raised a concern regarding methodological flaws—specifically, ascertainment bias—affecting many of the sports brain bank studies being undertaken around the world.

> The overwhelming majority of people donating their brains to sports brain banks are those with clinical symptoms of poor brain health in life. This skewed recruitment leads to an elevated level of CTE detection among that donor cohort.
>
> It is important … to understand that there are different types of brain donation banks. There are sport brain donation banks, which we've heard a lot about and which are affected by ascertainment bias, and there are non-sport brain donation banks, like the Sydney Brain Bank. There are stark

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[76] Sydney Brain Bank, *Welcome to the Sydney Brain Bank,* https://sbb.neura.edu.au/ (accessed 31 May 2023).

[77] Sydney Brain Bank, *Welcome to the Sydney Brain Bank* (accessed 31 May 2023).

[78] To access this article, please see: National Library of Medicine, *Prevalence of chronic traumatic encephalopathy in the Sydney Brain Bank,* https://pubmed.ncbi.nlm.nih.gov/35950093/ (accessed 31 May 2023).

[79] Dr Rowena Mobbs, *Submission 1*, p. 3.

> differences in the rates of CTE detected in sport brain banks versus non-sport brain banks. Sport brain banks frequently quote that CTE rates among their donor cohort are between 50 per cent and 99 per cent. Studies from non-sport brain banks in Australia, the USA and Europe have demonstrated CTE rates of 0.79 per cent, 0.6 per cent and zero per cent respectively.
>
> Given the high proportion of the Australian population that has played contact or collision sport for five years or more, these results suggest that CTE affects a small proportion of those in contact or collision sports.[80]

Sports code funded research

3.80 Evidence to the inquiry highlighted that major contact sporting codes in Australia are conducting and/or funding research initiatives in relation to sport-related concussion and repeated head trauma.

3.81 The AFL outlined its concussion and head trauma research program in its submission to the inquiry[81] and noted that the AFL Commission recently approved funding of up to $25 million over the next decade to support the AFL Brain Health Initiative—a longitudinal brain health research program that 'will track the brain health of players' from point of entry into the AFL's talent pathway competitions through to post AFL and AFLW careers.[82] On this initiative, Mr Andrew Dillon from the AFL told the inquiry:

> This program, which will also deliver regular controlled cross-sectional analysis, will deliver significant insights into the impacts of concussion over the playing careers and broader lifespan of players to better inform concussion and head-trauma management policies into the future.
>
> We frequently collaborate and share data with other sports, internationally and domestically, and we will continue to seek to collaborate with research and academic teams both nationally and internationally to understand more about concussion and its impact on Australian football players.[83]

3.82 The NRL submitted that it is investing in research on sport-related concussion and player safety, including by:

- Partnering with academic institutions, such as universities and research organisations, to fund and conduct research on sports-related concussion and player safety.
- Supporting independent research projects and initiatives aimed at improving the understanding of concussion and player safety in rugby league.

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80 Dr David Hughes, Chief Medical Officer, Australian Institute of Sport, *Committee Hansard,* 1 March 2023, p. 39.

81 AFL, *Submission 18,* pp. 35–37.

82 AFL, *Submission 18,* pp. 1, 2.

83 Mr Andrew Dillon, Executive General Manager, Football Operations, and General Counsel, Legal and Integrity, AFL, *Committee Hansard,* 26 April 2023, p. 2.

- The NRL provides funding for research grants to support research projects aimed at improving understanding of concussion and player safety in rugby league.[84]

3.83 Rugby Australia explained that it supports and collaborates with universities on a number of studies including:

- A collaboration with the University of Canberra to look at the efficacy of instrumented mouthguards as an objective measure of potential brain injury.
- Studies with Edith Cowan University and the University of Canberra that explore attitudes of rugby participants to inform Rugby Australia and assist it to tailor educational approaches.
- A Queensland University of Technology study using cameras and artificial intelligence to determine whether there is a correlation between tackle height and reported concussions and whether a change of tackle height may affect the rate of concussion.
- A collaboration with the Queensland Brain Institute investigating objective measures of brain injury following concussion in school aged male rugby players, including brain scans, and biomarkers.[85]

The need for further research

3.84 Several inquiry participants called for further research into various aspects of sport-related concussion and repeated head trauma.[86]

3.85 The Florey Institute of Neuroscience and Mental Health (The Florey) noted there is still much to learn about concussion in sports, and recognised there is a clear and pressing need for better evidence to inform management of concussion and improved concussion prevention in both community sport and professional sport. The Florey elaborated on what is needed in future research:

> It is our view that a holistic research program using a range of techniques and tapping into the expertise of a variety of clinicians and scientists is required. A longitudinal program of research using these advanced imaging techniques associated with cognitive assessment and outcomes is an

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84 NRL, *Submission 17,* [pp. 10, 11].

85 Rugby Australia, *Submission 12,* pp. 6, 7.

86 See, for example, Professor Terry Slevin, Chief Executive Officer, Public Health Association of Australia, *Committee Hansard,* 26 April 2023, p. 39; Dr Stephen Townsend, Senior Research Project Officer, School of Human Movement and Nutrition Sciences, University of Queensland, *Committee Hansard,* 22 February 2023, pp. 12, 13; Mrs Kathryn Gill, Co-Chief Executive, Professional Footballers Australia, *Committee Hansard,* 30 January 2023, p. 24; Professor Alan Pearce, Private capacity, *Committee Hansard,* 26 April 2023, p. 48; Ms Annitta Siliato, Executive Director, Concussion Legacy Foundation Australia, *Committee Hansard,* 26 April 2023, p. 59; Queensland Paediatric Rehabilitation Service, *Submission 28*, p. 3; Concussion Australia, *Submission 3,* p. 2; Dr David Maddocks, *Submission 55*, p. 4.

> important next step – and this must be properly resourced. Research into concussion needs consistent funding to progress through the pilot phase and into sizeable studies, including longitudinal follow-up, that can have valuable and enduring impacts for people engaging in both community and professional sports.[87]

3.86 The RACGP submitted that good quality evidence on the long-term impacts of concussion and repeated head trauma will help determine the most appropriate treatment and management strategies and recommended that 'significant funding' is allocated for clinical research into the long-term impacts of concussion and repeated head trauma in contact sports.[88]

3.87 Dr Doug King PhD noted that further studies are needed to establish whether there is a direct causal link between concussion and CTE, the age the nervous system is most susceptible to the effects of concussion, and whether proper management of concussion can reduce late-life neurodegenerative dementias.[89]

3.88 Orygen, a research and knowledge translation organisation focusing on mental ill-health in young people, argued that the current research focus on elite athletes needs to be balanced with greater research with semi-professional and community participants. It also suggested that increased research and data collection on the prevalence, monitoring and reporting of concussion and long-term impacts of concussion and repeated head trauma is also required, at all levels of sport.[90]

3.89 In its Concussion and Brain Health Position Statement 2023, the AIS noted that knowledge regarding the effects of repeated head trauma and concussion continues to evolve and that many questions remain unanswered. It submitted that well-structured scientific investigations are needed to address these knowledge gaps and encouraged co-design research models that incorporate the voices of athletes, as well as those of under-represented communities. It suggested that future research should be targeted to answer the following questions:

- What is the prevalence of CTE-NC in female, male, and para-sport athletes?
- What is the strength of the association between RHT, concussion, and development of CTE-NC?
- What is the strength of association between histopathological changes of CTE-NC and the clinical syndrome of Traumatic Encephalopathy Syndrome (TES)?
- Which athletes are susceptible to development of CTE-NC, and why?

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87 The Florey Institute of Neuroscience and Mental Health (The Florey), *Submission 29,* [pp. 4, 5].

88 RACGP, *Submission 22,* p. 4.

89 Dr Doug King, *Submission 79,* [p. 2].

90 Orygen, *Submission 39*, p. 3.

- What role do modifying factors play in susceptibility to the development of CTE-NC?
- What is the natural history of CTE-NC? Is it an inexorably progressive disease, similar to neurodegenerative diseases such as Alzheimer's disease?
- Are female athletes more susceptible to CTE-NC than males, for a set dose of RHT exposure?
- Are para-athletes more susceptible to CTE-NC than able-bodied athletes, for a set dose of RHT exposure?
- Are specific cultural cohorts more susceptible to CTE-NC than athletes from Anglo-Saxon background, for a set dose of RHT exposure?
- What is the sex-based differences in risk of and clinical picture of RHT and concussion in sport?
- What is the prevalence of RHT and concussion in First Nations Communities and culturally and linguistically diverse populations?
- What changes can be made to better capture nationwide data on RHT and concussion in sport?
- What sport-specific measures are efficacious in preventing RHT and concussion?
- What is the impact of RHT and concussion on developing brains of youth athletes and the long-term impact?
- What is the long term mental and physical health in those exposed to RHT and concussion?
- What is the effect of more conservative return to sport protocols on the acute and long term sequalae of concussion?
- What are the most effective therapeutic interventions for recovery from episodes of concussion?
- What rule/regulation modifications could be effective in reducing incidence of RHT in individual sports?[91]

3.90 The AIS submitted that these unanswered questions present an 'enormous challenge' to the medical and scientific communities, and that prospective, longitudinal, clinicopathological studies could help identify possible early clinical features, progression, and potentially help with interventions.[92]

Head trauma and women in sport

3.91 In recent years, a number of sports have established professional female leagues, such as the Australian Football League Women's (AFLW) and the National Rugby League Women's (NRLW). Despite this increase in elite women's sports, there is currently both a lack of research on how the female brain responds to concussion, as well as a lack of research investigating the long-term brain health of female athletes. The AIS considered that the role of biological differences in women, and any associated effect on predisposition to

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91 AIS, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 33.

92 AIS, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 33.

traumatic encephalopathy syndrome, CTE, and other neurodegenerative diseases, remains unclear.[93]

3.92 In her evidence to the inquiry, a former elite-level rugby union player, Ms Kirby Sefo, said the following:

> My hope for future conversations and decisions being made around concussion and repeated head trauma is that it is female-centric to the reality of women in sport. We're built differently, we're less researched, we're—at times—under-prioritised and marginalised. We are the lower income earners and we're also the partners or the mothers who carry an emotional and mental load far greater than any other member of our households. We need frameworks in place that support education to head trauma and concussion, financial subsidies, medical advice, mental health and wellbeing assistance, family support and guidance, and an overall general advocacy for women.[94]

3.93 In her evidence to the inquiry, Ms Catherine de Hollander, a PhD candidate examining the effects of impacts in female team collision sports, said:

> Women tend to have higher incidences of concussion, take longer to recover and experience more severe symptoms compared to males. But, despite these findings, women have only made up 19.9 per cent of the overall sample in concussion studies. This is concerning, as female participation in collision sports in Australia is increasing.[95]

3.94 In his submission to the inquiry, historian at the University of Queensland's School of Human Movement and Nutrition Sciences, Dr Stephen Townsend urged cautioned about the assumptions made regarding women's susceptibility to sports-related concussion and noted further research in this space is needed:

> I urge caution in the conduct and interpretation of SRC [sports-related concussion] research on women's contact sports. There is concern about the apparently heightened frequency and severity of mTBI [mild traumatic brain injury] in women. The unique causes and effects of mTBI for women in contact sport are obviously worthy of scientific research but we must be wary of hastily attributing this solely to physiology. There may be biomechanical and hormonal factors which increase mTBI risk for women … However, it is likely that social, cultural, and financial inequalities also play a role.[96]

3.95 When asked about the current gaps in evidence, neuroscientist Professor Alan Pearce called for more research into the effects of sport-related concussion on women, as well as more diversity in general in future research in

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93 AIS, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 32.

94 Ms Kirby Sefo, Private capacity, *Committee Hansard*, 22 February 2023, p. 34.

95 Ms Catherine de Hollander, Private capacity, *Committee Hansard*, 22 February 2023, p. 29.

96 Dr Stephen Townsend, *Submission 60*, [p. 6].

this space, including looking at the effects on people of colour, and First Nations populations.[97]

Head trauma and children in sport

3.96 During the inquiry, the Chief Medical Officer of the AIS, Dr David Hughes was asked whether he thought exposure to concussion for children at a young age could have long-term neurological consequences. He said:

> I don't think there's any evidence for that at this stage, but we all operate with an abundance of caution. As previous researchers have pointed out in this inquiry, in the age group 12 and under, children present commonly, particularly to the paediatric emergency departments, but less than 25 per cent of those concussions are related to organised sport.
>
> So, if you're going to stop children under the age of 12 from engaging in team sports where they may be susceptible to concussion, you've also got to stop them from climbing trees, riding bikes, skiing, riding horses and riding skateboards.[98]

3.97 Professor Karen Barlow from the Child Health Research Centre at the University of Queensland suggested that a higher proportion of concussions in children occur during sport—mostly in contact sports—and that more research was required. In her evidence to the inquiry, she said:

> I see my role here today is to … highlight the difficulties that children have with concussion, as 70 per cent of concussions occur during sport, most of them being contact sports. This is during a time of rapid brain development and psychosocial development. We really need to understand more.
>
> I've done some research showing that, even though children no longer have symptoms after a concussion, the brain is still recovering. That is really important, because most of our guidelines about returning children to play are around being symptom free. We know that, by around two years, the brain is back to normal, but we still do not know how long somebody who is asymptomatic takes to return to normal brain function.[99]

3.98 The Murdoch Children's Research Institute also highlighted the need for more evidence relating to child concussion and suggested extending available research evidence 'by conducting multisite, longitudinal studies that map children's recovery from concussion across into adulthood'.[100]

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97 Professor Alan Pearce, Private capacity, *Committee Hansard,* 26 April 2023, p. 48.

98 Dr David Hughes, Chief Medical Officer, Australian Institute of Sport, *Committee Hansard,* 1 March 2023, p. 42.

99 Professor Karen Barlow, Child Health Research Centre, University of Queensland; Child Neurologist, Queensland Children's Hospital, *Committee Hansard*, 22 February 2023, p. 12.

100 Murdoch Children's Research Institute, *Submission 40,* [p. 4].

Further research into the social aspects of concussion

3.99 Noting that medical research was vital to developing a better understanding of mild traumatic brain injury, and that researchers needed more funding and opportunities to study the pathophysiology, diagnostics, and treatment of these injuries, historian Dr Townsend from the University of Queensland submitted that science alone cannot solve this issue and that research into the social aspect of concussion is also required:

> Sports concussion is fundamentally a social problem because it's the result of choices. We can sustain an MTBI from a variety of circumstances, whether vehicle crashes, workplace incidents, slips and falls or assaults, and most of these circumstances would be classified as accidents. We cannot classify concussion in sport as an accident. Australians choose to play games which are designed to produce brain injuries. We choose to enact risky and self-sacrificial behaviours within those games. And we choose to downplay or conceal brain injuries when they occur.[101]

Concerns regarding research integrity and conflicts of interest

3.100 Several inquiry participants raised concerns about potential conflict of interests and other issues which can arise when sporting codes directly themselves fund research regarding the effects of sport-related concussion.[102]

3.101 Dr Stephen Townsend explained there are legitimate concerns about the independence of concussion research financed by sporting organisations:

> The governing bodies of contact sports see the concussion crisis as an existential threat, and they [are] desperate for research which suggests that SRC [sport-related concussion] is less common or less dangerous than is currently believed, or that their efforts to reduce SRC are working.[103]

3.102 Dr Townsend noted that whilst the scientific method and bioethical principles are meant to ward against research bias, mechanisms which any funding body can employ to manipulate findings still remain. He advised that such practices include recruiting partial researchers, demanding favourable inclusion or exclusion criteria for study participants, and suppressing the dissemination of unfavourable data.[104]

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101 Dr Stephen Townsend, Senior Research Project Officer, School of Human Movement and Nutrition Sciences, University of Queensland, *Committee Hansard*, 22 February 2023, pp. 12, 13.

102 See, for example, Dr Kerry Peek, New South Wales State Chair, Sports Medicine Australia, *Committee Hansard*, 30 January 2023, p. 6; Griffins Lawyers, *Submission 50*, p. 10; Community Concussion Research Foundation, *Submission 52*, pp. 1, 22; Mr John Hennessy, Private capacity, *Committee Hansard*, 26 April 2023, p. 54; Dr Rowena Mobbs, Neurologist and Senior Lecturer, Macquarie University, *Committee Hansard*, 30 January 2023, p. 11.

103 Dr Stephen Townsend, *Submission 60*, [p. 4].

104 Dr Stephen Townsend, *Submission 60*, [p. 5].

3.103 Dr Townsend made no specific suggestion that any contact sporting codes in Australia have engaged in these practices, but noted that these organisations have the tools and motivation to do so. He acknowledged that governing bodies of Australia's contact sports codes have every right to commission scientific research into sports concussion and should be encouraged to do so, but that the Australian Government must not assume that league-funded research projects are sufficient or independent.[105]

3.104 Dr Townsend recommended that the Australian Government fund truly independent research through the NHMRC, MRFF, and Australian Research Council (ARC).[106]

3.105 Similarly, Dr Reidar Lystad expressed concern about concussion research being driven purely by the sports sector due to conflicts of interest. He told the committee there have been 'several incidents' of interference from sports governing bodies in research projects they have financed, both in Australia and internationally, and urged caution going forward. Expressing similar sentiments to Dr Townsend, Dr Lystad also suggested that government should take a more active role in contributing to concussion research.[107]

3.106 Dr Doug King also raised concerns about research integrity and academic freedom:

> Although all sports associations are directly involved in repeated head impacts and concussions and a few financially healthy sports organisations do provide funding for research, there are concerns regarding how they distribute this funding and the requirements attached with this funding. Some organisations require that the research findings are provided to them before any results are publicly available or openly discussed. This may involve the removal of any 'emotionally charged' or 'detrimental terms that may not be suitable for the promotion of the game in a positive light. The ability to have academic freedom and the conducting of research rigor is there for limited and undermined by the actions of these organisations.[108]

3.107 Dr Alexandra Veuthey contended that independence and transparency issues are recurrent in this space, and have potentially lead to biased results and delays in the improvement of player safety. Dr Veuthey proposed that Australian sports governing bodies must ensure that internal research is free of perceived

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105 Dr Stephen Townsend, *Submission 60*, [p. 5].

106 Dr Stephen Townsend, *Submission 60*, [p. 5].

107 Dr Reidar Lystad, Member, Scientific Advisory Committee, Sports Medicine Australia, *Committee Hansard,* 30 January 2023, p. 7. On notice, Dr Lystad also provided a number of links to media articles covering alleged interference in research by sport governing bodies. For further information, see Dr Reidar Lystad, Answers to questions on notice, 30 January 2023 (received 27 February 2023).

108 Dr Doug King, *Submission 79,* p. 4.

bias and be complemented with more independent medical and technological studies. [109]

3.108 Dr Veuthey added that sports governing bodies should keep in mind that while research should not be kept secret, it should also not be utilised for self-promotion or simply to repair reputational damage.[110]

3.109 Internationally, the issue of research independence was highlighted in the UK House of Commons Concussion in Sport Report. Participants in that inquiry raised concerns that research funding was mainly from the sports themselves and that this allowed for the potential for findings to exhibit 'confirmation bias', where the results reflected what a commissioning organisation wanted to hear. Similar concerns regarding conflicts of interest and biased funding sources were raised in relation to the Concussion in Sport Group (CISG), which issues the consensus statement on concussion in sport and is funded by sport.[111]

3.110 Submitters to this inquiry also raised concerns about the integrity of the CISG.[112] For example, Dr Lystad explained:

> Concussion guidelines, policies, and protocols are often relying heavily on the influential Concussion in Sport Group (CISG) consensus statement. There are several concerns regarding the methodology and transparency of the most recent CISG consensus statement [McCrory et al, 2017].
>
> - The degree of selection bias for the CISG expert panel is unknown because the selection criteria are opaque, and it is unclear how many experts might have satisfied the selection criteria but were not invited. It is noteworthy that none of the world-leading experts on CTE neuropathology (i.e., Professor Ann McKee, Professor Willie Stewart, and Professor Michael Buckland) were members of the 2016 CISG expert panel.
> - There are concerns about conflicts of interest among the CISG expert panel members. The 2016 CISG expert panel comprised 36 individuals, of whom 32 had significant known conflicts of interest.
> - The level of (dis)agreement among the CISG expert panel members is not transparent. For instance, at least two 2016 CISG expert panel members (i.e., Dr Robert Cantu and Dr Charles Tator) have criticised the 2016 CISG consensus statement on chronic traumatic encephalopathy (CTE), yet no

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109 Dr Alexandra Veuthey, *Submission 56*, [p. 4].

110 Dr Alexandra Veuthey, *Submission 56,* [p. 4].

111 House of Commons Digital, Culture, Media and Sport Committee, *Concussion in sport: Third Report of Session 2021–22*, 22 July 2021, pp. 24–25. For further information on the Concussion in Sport Group's 2016 consensus statement on concussion in sport, please see: https://bjsm.bmj.com/content/51/11/838 (accessed 30 May 2023).

112 See, for example, Mr Leon Harris, *Submission 71,* pp. 6, 7; Headsafe, *Submission 68,* pp. 3–5; Dr Stephen Townsend, Senior Research Project Officer, School of Human Movement and Nutrition Sciences, University of Queensland, *Committee Hansard*, 22 February 2023, p. 20.

> dissenting or minority opinion have been recorded or published in the 2016 CISG consensus statement.[113]

3.111 Dr Veuthey also flagged concerns about the independence of the CISG and its guidelines:

> The Concussion in Sport Group (CISG)'s guidelines, drafted by medical experts active in the sports industry, are considered to be preeminent in Australia and internationally.
>
> However, these guidelines must be viewed with caution, since they are designed by experts on behalf of sports governing bodies, and raise problems in terms of independence. This issue is particularly sensitive when it comes to the link between head injuries and long-term medical risks, which the CISG's guidelines, unlike other guidelines, do not acknowledge.[114]

3.112 In its submission to the inquiry, the ASC noted that critics have accused sporting bodies of conducting a 'big tobacco' style manipulation of research outcomes. On this issue, the ASC submitted that:

> In considering provision of funding for research into concussion, sport organisations often find themselves in a 'damned if they do and damned if they don't' situation. Funding of concussion research is inherently controversial. While failure to fund scientific research can lead to allegations of disinterest or failure of duty of care, provision of research funding can be interpreted as undermining the essential neutrality of scientific investigation and thus unduly influencing the evidence base.[115]

3.113 Dr Paul Bloomfield, sports and exercise physician and former NRL Chief Medical Officer, who represented Sports Medicine Australia at a public hearing of the inquiry also flagged the potential conflict of interest which can arise when commercial bodies finance research in this space. He said:

> Another group that are funding a fair bit of research are commercial bodies with commercial equipment, and obviously there's a conflict there with regard to selling products, so the science needs to be good. That's what I'd also reinforce … But that reinforces the need for more government funding and more government led research.[116]

Financing future research

3.114 There were mixed views amongst submitters and witnesses about how further research regarding sport-related concussion should be financed.

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[113] Dr Reidar Lystad, *Submission 70,* pp. 2, 3. Citations omitted.

[114] Dr Alexandra Veuthey, *Submission 56,* [p. 1].

[115] Australian Sports Commission, *Submission 10,* p. 9.

[116] Dr Paul Bloomfield, New South Wales State Councillor, Sports Medicine Australia, *Committee Hansard,* 30 January 2023, p. 7.

3.115 As noted above, researchers including Dr Townsend and Dr Lystad highlighted that concussion research should not be solely funded by professional sporting bodies, and suggested government play a more active role in funding independent research. Dr Townsend specifically recommended that the Australian Government finance research through the NHMRC, MRFF, and ARC.[117]

3.116 Other submitters, including the Public Health Association of Australia, maintained that sporting bodies have a responsibility to support the financing of research given they make profits in circumstances where athletes may incur concussions. The Public Health Association of Australia emphasised that research must still be conducted independently from the sporting sector:

> … the research must be conducted at arm's length from industry and the researchers must be independent from the sporting associations, clubs and codes. Researchers need to be able to provide unbiased findings regarding how to effectively minimise the risk of concussion during play.[118]

3.117 Concussion Australia similarly submitted:

> Despite the perceived conflict of interest that exists (and perhaps also with respect to certain doctors), our position is that sporting associations and clubs should be involved in financing research due to the profits made in circumstances where athletes and former athletes may suffer from concussion.[119]

3.118 Concussion Australia proposed that sporting associations should financially contribute to a 'communal concussion research fund' that is administered by the Australian Government.[120]

3.119 Griffins Lawyers similarly recommended that a central fund for research into the prevention and management of head and neck injuries in football be established.[121]

3.120 Dr Annette Greenhow also supported centrally organised and administered research programs and funding, in order to coordinate the research agenda, deliver high quality research outputs, and maintain research and academic integrity and ethical standards. Dr Greenhow also expressed strong support for

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117 Dr Stephen Townsend, *Submission 60,* [p. 5]; Dr Reidar Lystad, Member, Scientific Advisory Committee, Sports Medicine Australia, *Committee Hansard,* 30 January 2023, p. 7.

118 Public Health Association of Australia, *Submission 58*, p. 7.

119 Concussion Australia, *Submission 3*, p. 3.

120 Concussion Australia, *Submission 3*, p. 3.

121 Griffins Lawyers, *Submission 50*, p. 7.

financial and in-kind contributions from sports associations and clubs in such research.[122]

3.121 With regards to the question of funding proportions, Orygen suggested that research funding should reflect the level of participation in community sports.[123]

3.122 The ASC noted that appropriately structured research projects are expensive—particularly so for the long-term prospective studies that are required to gain definitive information about concussion and brain health. Given this, the ASC considered that sporting bodies should be able to contribute to funding health research in sport—so long as the funding structure is such that the sports bodies do not have input into, or influence over, the manner in which the research is conducted or the way that results are presented. It suggested that a multi-modal funding model, incorporating government, sport organisations, and universities, was appropriate—as long as appropriate ethical safeguards were put in place.[124]

Committee view

3.123 As discussed in this chapter, the association between repeated head trauma and subsequent brain disease has been examined since the early 1900s and, in more recent times, has been investigated by numerous researchers both domestically and internationally.

3.124 There is clear evidence of a causal link between repeated head trauma and concussions and subsequent neurodegenerative diseases such as CTE. While important research questions remain regarding the degree of causation and the nature of long-term impacts, these questions should not be used to undermine the fundamental nature of that link.

3.125 The committee thanks the many witnesses who shared powerful personal accounts, both of their experience as athletes, and of the impacts of concussions on their loved ones. Their evidence highlights the human impact of this issue, and the urgency of action from government and sporting organisations.

3.126 The committee believes that continuing to explore the causative link between concussion and repeated head trauma and long-term health, including neurological consequences, is a key research priority going forward.

3.127 The committee recognises the important role that brain banks play in facilitating and enabling the work of researchers, both domestically and internationally. The committee considers that it is vital that these organisations continue to receive donations and that they are adequately supported to continue their

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122 Dr Annette Greenhow, *Submission 7*, p. 5.

123 Orygen, *Submission 39*, p. 3.

124 Australian Sports Commission, *Submission 10*, p. 9.

important work. The committee strongly supports any initiative which promotes and encourages people, both athletes and otherwise, to donate their brain to help progress research and eliminate the scourge of neurodegenerative disease.

3.128 Whilst the evidence continues to evolve, the committee echoes Dr Lystad's point that absolute resolution or 100 per cent certainty of a causal relationship between repetitive head trauma and neurodegenerative diseases, is not and cannot be, the minimum standard for public health action. The committee urges national sporting bodies, community sports clubs and governments alike to act now, and continue to adopt and apply precautionary measures whilst the evidence settles.

3.129 The committee acknowledges the surge in research in this space, particularly over the past two decades, but is cognisant that various other gaps in scientific evidence still remain. The committee considers that future research should, at least initially, focus on providing answers to the 18 questions posted by the Australian Institute of Sport in its Concussion and Brain Health Position Statement 2023. This includes specific research into the effects of concussions and repeated head trauma on at-risk populations, including women, children, and First Nations people.

3.130 In terms of research integrity and financing research, the committee supports existing efforts by Australian Government, through the NHRMC and the MRFF, to fund long-term studies of mild traumatic brain injury and concussion. The committee also supports the ASC's delivery of its Concussion and Brain Health Project 2021–24, which aims to improve the understanding of the relationship between sport-related concussion and long-term brain health. However, the committee considers that the Australian Government's research efforts in this space should be extended further and be scrutinised for their effectiveness, transparency and integrity.

3.131 The committee also notes the efforts of major sporting bodies to date to support and finance research into various aspects of sport-related concussions and repeated head trauma. The committee, however, is cognisant of the conflicts of interest that exist, real or perceived, with this type of funding model and has considerable reservations regarding the independence of sporting-body sponsored initiatives and the influence that these organisations may have on the research and subsequent results and conclusions.

3.132 The committee agrees with evidence suggesting that national contact sport governing bodies should be at least partly responsible for financing future research, given they profit in circumstances where athletes incur concussions. However, the committee is of the strong view that moving forward, government can, and should, play a greater role in supporting and coordinating research, as

well as ensuring integrity, independence and transparency of research and grant processes in this space.

3.133 Therefore, the committee considers that government should explore mechanisms to facilitate independent, consolidated and coordinated funding frameworks to uphold and protect the integrity of research regarding sport-related concussion and repeated head trauma into the future.

3.134 The committee considers that such comprehensive and independent research is vital to ensure that future sports people and their families do not have to experience the anguish and suffering that current and former generations have faced. The committee sincerely thanks those witnesses that appeared at the committee's public hearings and spoke about the struggles, challenges, and heartbreaks that they and their loved ones had faced due to sport-related concussions, repeated head trauma and neurodegenerative disease.

Recommendation 3

3.135 The committee recommends that the Australian Government consider establishing independent research pathways, including through a newly created body or through existing bodies, such as the National Health and Medical Research Council, that is dedicated to supporting and coordinating research into the short- and long-term effects of concussion and repeated head trauma incurred during participation in sport, including Chronic Traumatic Encephalopathy.

The committee envisages that, amongst other things, such pathways would enable well-structured scientific investigations—including prospective, longitudinal clinicopathological studies—to help identify clinical features, progression, and interventions.

Recommendation 4

3.136 The committee recommends that the Australian Government and sporting organisations continue to fund research into the effects of concussion and repeated head trauma on at-risk cohorts who incur these injuries during their participation in sport.

Recommendation 5

3.137 The committee recommends that the Australian Government consider measures to encourage Australians, in the event of their death, to donate their brain to a brain bank for scientific research into brain health and disease, including Chronic Traumatic Encephalopathy.

Recommendation 6

3.138 The committee recommends that the Australian Government consider a coordinated and consolidated funding framework for ongoing research regarding sport-related concussion and repeated head trauma.

This work should be undertaken in consultation with state and territory governments, sporting organisations, universities, and other scientific research bodies.

The committee recommends the governing bodies of sports associated with concussion and repeated head trauma support their codes to invest in the health and welfare of their players.

Chapter 4
Shifting the culture and increasing awareness

4.1 This chapter outlines how cultural factors and a lack of understanding about sport-related concussion and repeated head trauma can contribute to the under-reporting of incidents, concealing of symptoms and poor management of concussive injuries.

4.2 It also outlines the need for increased education and public awareness measures at all levels, including at the professional level, within the community, amongst the media and in the medical profession, to combat these issues.

Cultural issues, under-reporting and calls for education

4.3 Several inquiry participants called for cultural change within sporting organisations, highlighting that 'win at all costs' attitudes and cultures that prioritise sporting success over player welfare and safety are common at both the elite and community level.[1]

4.4 Dr Stephen Townsend, sports historian at the University of Queensland, summarised how the culture in many Australian sporting communities can contribute to, or exacerbate the issue of sport-related concussion:

> Contact sport meets a range of social and cultural needs for Australians, by providing athletes and supporters with opportunities to act out values such as strength, aggression, toughness, discipline, camaraderie, resilience, sacrifice, and bravery. Whilst these values are often worthy of celebration, in contact sport communities they produce attitudes and behaviours which heighten the risk of incurring, sustaining, or concealing a brain injury.[2]

4.5 Griffins Lawyers outlined how some athletes 'play on' through injuries due to stigma around admitting when they are hurt or wanting to 'prove themselves' to their team:

> It is well documented that athletes wish to "play on," and that historically there has been an expectation that they do play on, even in circumstances which should be approached as a medical emergency.
>
> Some athletes perceive there to be an inherent stigma in admitting they have been hurt, or they otherwise wish to prove their commitment to their team by continuing to play through injury. This perception can extend to an athlete's hesitance to ask for support either at the time that the injury is

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1 See, for example, Griffins Lawyers, *Submission 50*, p. 11; Dr Doug King, *Submission 79,* p. 4; Public Health Association of Australia, *Submission 58,* p. 8; Dr Rowena Mobbs, *Submission 1,* p. 9; Ms Aisha Stewart, *Submission 51,* p. 3; Ms Jamie Shine, General Manager of Head Trauma, Shine Lawyers, *Committee Hansard*, 22 February 2023, p. 5.

2 Dr Stephen Townsend, *Submission 60*, [p. 1].

> sustained, or later when they experience the longer-term effects of the concussive injuries.[3]

4.6 Further, several inquiry participants raised concerns about the under-reporting of concussions and concussive incidents,[4] which the Queensland Government explained can lead to athletes at all levels being underdiagnosed, untreated and potentially suffering greater long-term impacts on their health and wellbeing.[5]

4.7 The Australian Sports Commission (ASC) outlined the extent of under-reporting throughout the community:

> Many individuals with concussion do not seek medical guidance and do not present to hospitals for assessment. Under-reporting of concussions and failing to seek medical advice range from 17% to 82% across different sports. That large numbers of concussions are going undetected and therefore unmanaged, is concerning.[6]

4.8 Shine Lawyers highlighted the need for greater education about concussion, mild traumatic brain injury and Chronic Traumatic Encephalopathy (CTE) across the community:

> … there needs to be greater education by medical practitioners, schools, children, parents, sporting bodies about concussion, mild traumatic brain injury and CTE… Without correct identification and diagnosis, individuals are left feeling isolated, unheard and in pain whilst their worlds are falling upside down.[7]

Issues at the professional level

4.9 Former athletes from a range of sports provided personal accounts which highlighted how player safety and wellbeing can be impacted by cultural and competitive elements of sport.

4.10 Mr James Graham, a former professional rugby league player who played over 500 professional games in both Great Britain and Australia, stated that through

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3 Griffins Lawyers, *Submission 50*, p. 11.

4 See, for example, Professor Alan Pearce, *Submission 46*, pp. 2, 4; Queensland Government Department of Tourism, Innovation and Sport, *Submission 31*, p. 1; Dr David Maddocks, *Submission 55*, p. 2; Dr Benjamin Chen, Private capacity, *Committee Hansard*, 22 February 2023, pp. 22, 26, 27; Mr Brendan Swan, Chief Executive Officer, Concussion Australia, *Committee Hansard,* 22 February 2023, p. 27; Dementia Australia, *Submission 26*, p. 4; Ms Aisha Stewart, *Submission 51*, p. 3; Community Concussion Research Foundation, *Submission 52*, pp. 1, 2, 22; Dr Michael Makdissi, Chief Medical Officer, Australian Football League (AFL), *Committee Hansard*, 26 April 2023, pp. 2, 3; 5,6; Professor Melinda Fitzgerald, Chair, Expert Working Group, Mission for Traumatic Brain Injury, *Committee Hansard,* 1 March 2023, p. 32.

5 Queensland Government Department of Tourism, Innovation and Sport, *Submission 31*, p. 1.

6 Australian Sports Commission, *Submission 10*, p. 5.

7 Shine Lawyers, *Submission 6*, p. 13.

his career he observed players 'playing on' after being knocked out due a culture where it is 'ingrained' to not let your teammates down.[8]

4.11 Mr Graham explained that the 'psyche' of professional athletes, the 'internal and external pressure to perform' and cultures which put 'winning and performance over long term health' are all factors that need to be addressed when tackling the issue of concussion in sport.[9]

4.12 Miss Lydia Pingel, who played Australian football in the top women's league in Queensland, described one instance where she tried to play on after receiving a hit to the head. She explained her mentality when she experienced this incident, as well as the broader culture and perception around concussive injuries:

> I tried to run away and play on because that's what we do as athletes. We think that we're invincible.[10]
>
> A concussion was never taken as serious as any other type of injury like a knee, hamstring, ankle etc. There was no mandatory rehab, no monitoring or follow up care once you had a few days off, did lighter training and said you felt 'ok' and 'fine' to train and play. As a concussion is an invisible and self-reporting injury, it was easy to manipulate the club, coaches, physiotherapist, and vis versa especially if you were an 'important player' to be cleared to play and train because what also constituted the recovery period wasn't clear.[11]

4.13 Ms Julie Speight, Australia's first female track cycling Olympian, a state and national champion, and Commonwealth Games silver medallist, informed the committee of her experience throughout her professional cycling career:

> Over the course of my cycling career I was never prevented from racing due to concussion, my helmet was never inspected for suitability, and I was never advised by coaches to refrain from training. The mentality was to push on at all cost.[12]

4.14 Ms Kirby Sefo, a former Australian rugby sevens and Wallaroos player (Australia's national women's rugby union team) also highlighted how athletes may be motivated to play through injuries due to team selection pressures:

> … Most players, myself included, would never make the decision alone to take themselves off field. Often, particularly in the higher levels of rugby, this was due to the fact that taking yourself out of play or off field in a

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8 Mr James Graham, Private capacity, *Committee Hansard,* 30 January 2023, p. 51.

9 Mr James Graham, Private capacity, *Committee Hansard,* 30 January 2023, p. 48.

10 Miss Lydia Pingel, Private capacity, *Committee Hansard,* 22 February 2023, p. 37.

11 Miss Lydia Pingel, *Submission 8,* [p. 2].

12 Ms Julie Speight, *Submission 48*, [p. 1].

> session would be compromising for your position when it came to selection.[13]

4.15 Some research from professional sport bodies outlined the extent of under-reporting in elite competitions. The Australian Football League (AFL) Players' Association provided findings from a survey of both AFL and Australian Football League Women's (AFLW) players, which indicated that in the 2022 season:

- 9 per cent of AFL and 2 per cent of AFLW respondents indicated they experienced a concussion that they did not report.
- 9 per cent of AFL and 4 per cent of AFLW respondents continued playing or training after experiencing a concussion without receiving medical attention.[14]

4.16 In the National Rugby League (NRL) context, a survey conducted in 2020 found that 17 per cent of surveyed players declined to report a likely concussion during the 2018 and 2019 seasons, despite 85 per cent having received concussion education over the previous two seasons. Reasons that players provided for failing to report concussions primarily included 'not wanting to be ruled out of the game or training session' and 'not wanting to let down the coaches or teammates'.[15]

4.17 Broadly, professional Australian contact sport codes and players' associations acknowledged the issue of under reporting, and of athletes playing on through symptoms, though they suggested that these attitudes have shifted over the years.[16]

4.18 For example, Mr Paul Marsh, head of the AFL Players' Association outlined:

> … other injuries—use the shoulder as an example—are more obvious and more identifiable, and so to miss football on the back of an injury like that probably, historically, has been seen to be more acceptable, whereas a concussion is harder to see. But I do think that's changed. I think the culture within the game has seen a change there. There's lots of education that's going on. Players have spoken to me about this issue, and this is the one that they're now most scared of. I think the culture has changed, but there's no doubt, historically, that had been a reason for it.[17]

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13 Ms Kirby Sefo, Private capacity, *Committee Hansard*, 22 February 2023, pp. 32, 33.

14 AFL Players' Association, *Submission 41*, [p. 3].

15 Australian Sports Commission, *Submission 10*, p. 5.

16 See, for example, Dr Michael Makdissi, Chief Medical Officer, AFL, *Committee Hansard*, 26 April 2023, p. 4; Mr Paul Marsh, Chief Executive Officer, AFL Players' Association, *Committee Hansard*, 26 April 2023, p. 11; Mr Jamie Buhrer, Player Operations Manager, Rugby League Players Association, *Committee Hansard*, 30 January 2023, p. 28.

17 Mr Paul Marsh, Chief Executive Officer, AFL Players' Association, *Committee Hansard*, 26 April 2023, p. 11.

4.19 Dr Michael Makdissi, Chief Medical Officer of the AFL, similarly indicated that he has observed 'quite a shift' regarding the culture of players getting up and playing on after head knocks. Dr Makdissi acknowledged that the league is not there yet, and noted the importance of ongoing education efforts to continue shifting this culture.[18]

4.20 Dr Warren McDonald, Chief Medical Officer of Rugby Australia also advised he has seen a positive cultural shift in recent years, with people being more understanding that concussions are a serious injury that need to be treated as such.[19] Dr McDonald suggested that longer stand down periods may have previously led to a greater proportion of players failing to report head injuries:

> …there's evidence from our game, when we previously had a three-week mandatory standdown period, going back many years, that that actually, potentially, led players not to report their symptoms. We've got evidence that once that changed, players did come forward. To me, that's a far better situation than people avoiding the issue.[20]

4.21 Dr Sharron Flahive, Chief Medical Officer of the NRL echoed the concerns about under reporting, whilst also recognising the need to improve education in order to encourage players to self-report:

> There is research in rugby league that 18 per cent of players back in 2018 were not reporting symptoms of concussion, and in rugby union that number has been as high as 39 per cent.
>
> We do obviously need to improve the education in this area because we want to encourage the reporting of the players, so if we can enhance that side of the game that would be very beneficial to the management of concussion.[21]

Issues at the community level

4.22 The committee heard that cultural issues also exist at the community and local level of sport.[22] Neuroscientist Professor Alan Pearce outlined:

> … there's this real cultural issue, particularly at club level, to admit that a player is concussed. They want to keep showing that they're committed to

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18 Dr Michael Makdissi, Chief Medical Officer, AFL, *Committee Hansard*, 26 April 2023, p. 4.

19 Dr Warren McDonald, Chief Medical Officer, Rugby Australia, *Committee Hansard*, 1 March 2023, p. 7.

20 Dr Warren McDonald, Chief Medical Officer, Rugby Australia, *Committee Hansard*, 1 March 2023, p. 8.

21 Dr Sharron Flahive, Chief Medical Officer, National Rugby League (NRL), *Committee Hansard*, 1 March 2023, p. 8.

22 See, for example, Dr Stephen Townsend, Senior Research Project Officer, School of Human Movement and Nutrition Sciences, University of Queensland, *Committee Hansard*, 22 February 2023, pp. 17, 18; Concussion Australia, *Submission 3*, p. 4.

> their sport and they're tough and strong. While the conversation is changing, there's still very much a hesitancy to let your team-mates down.[23]

4.23 Researcher Dr Doug King also explained that many amateur clubs, officials, and coaches view winning as more important than player safety and welfare, given that they are judged upon on-field success rather than players' health.[24]

4.24 Ms Jamie Shine, General Manager of Head Trauma at Shine Lawyers, told the committee that there is a very clear lack of understanding when it comes to mild traumatic brain injury in the community.[25]

4.25 Professor Melinda Fitzgerald, Chair of the Expert Working Group at Mission for Traumatic Brain Injury also raised this issue:

> ... Anecdotally we hear that there is a lot of poorly managed concussion happening in the context of community associated sport, amateur leagues and so forth—even in our children. So there's that real lack of awareness and education at that grassroots level.[26]

4.26 HITIQ raised similar concerns about how a lack of awareness regarding concussion management can contribute to longer term issues:

> When a potentially concussive incident takes place, key decision makers are unaware of how to best manage the situation. Club administrators and guardians don't possess adequate resources to facilitate quality decision making, access to medical help is often delayed or non-existent and many local GPs are not sufficiently trained in the diagnosis and management of concussion. Poor management in the short term is likely to create more significant long term issues.[27]

4.27 Concussion Australia also explained the lack of appropriate awareness and understanding about concussion in the community and emphasised the need for education:

> Education is imperative in raising awareness about concussion and reducing repeated head trauma. Despite the awareness of concussion as a concept, we do not believe that an appropriate level of education has been reached across the community at large…
>
> … Given the volume of media reporting we also believe that the Australian public is aware of concussion as a concept. That reporting often does not

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23 Professor Alan Pearce, Private capacity, *Committee Hansard,* 26 April 2023, p. 49.

24 Dr Doug King, *Submission 79,* p. 4.

25 Ms Jamie Shine, General Manager of Head Trauma, Shine Lawyers, *Committee Hansard*, 22 February 2023, p. 1.

26 Professor Melinda Fitzgerald, Chair, Expert Working Group, Mission for Traumatic Brain Injury, *Committee Hansard,* 1 March 2023, p. 32.

27 HITIQ, *Submission 11*, pp. 7, 8.

> assist or educate grassroots clubs and parents to manage and understand concussion.[28]

4.28 Among many other inquiry participants who outlined the need for increased education and awareness about concussion at the community level,[29] the Queensland Department of Tourism, Innovation and Sport specifically noted the importance of athletes, parents, guardians, coaches, teachers and other support personnel being aware of the signs and symptoms of concussions; as well as knowing how to appropriately respond to cases of concussions.[30]

4.29 Professor Jack Anderson, a sports law specialist, similarly set out that going forward, education is vital in terms of helping parents and volunteers at the community level to identify the acute symptoms of concussions, making coaches and administrators at all levels aware of their duties with regard to player welfare, and informing players that they can and should self-certify.[31]

4.30 Dr Paul Bloomfield, sports and exercise physician and former NRL Chief Medical Officer, who represented Sports Medicine Australia, also emphasised the need for improved education about concussion in all sections of the community:

> An overriding issue is ongoing education, at all levels, particularly at the patient or player level, parent level, community sport level, coaches, schools and still also at the medical level. That includes general practitioners, emergency departments and even specialists.[32]

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28 Concussion Australia, *Submission 3,* pp. 4, 5.

29 See, for example, Dr Kerry Peek, New South Wales State Chair, Sports Medicine Australia, *Committee Hansard,* 30 January 2023, p. 6; Shine Lawyers, *Submission 6,* p. 2; Mr Jamie Crain, Chief Executive Officer, Sports Medicine Australia, *Committee Hansard,* 30 January 2023, p. 2; Dr Paul Bloomfield, New South Wales State Councillor, Sports Medicine Australia, *Committee Hansard,* 30 January 2023, pp. 5, 8 and 9; Ms Jamie Shine, General Manager of Head Trauma, Shine Lawyers, *Committee Hansard,* 22 February 2023, p. 1; Associate Professor Fatima Nasrallah, Queensland Brain Institute, University of Queensland, *Committee Hansard,* 22 February 2023, p. 16; Dr Stephen Townsend, Senior Research Project Officer, School of Human Movement and Nutrition Sciences, University of Queensland, *Committee Hansard,* 22 February 2023, p. 17; Ms Kirby Sefo, Private capacity, *Committee Hansard,* 22 February 2023, p. 35; Mrs Maree McCabe, Chief Executive Officer, Dementia Australia, *Committee Hansard,* 30 January 2023, pp. 2, 3; Mr Mark Falvo, Chief Operating Officer and Deputy General Secretary, Football Australia, *Committee Hansard,* 1 March 2023, pp. 13, 14; Concussion Australia, *Submission 3,* pp. 4, 5; Anna, *Submission 77,* [p. 1].

30 Queensland Government Department of Tourism, Innovation and Sport, *Submission 31*, p. 1.

31 Professor Jack Anderson, *The Future Of Footy And The Merits Of The Concussion Class Actions In The AFL*, Additional information received 1 May 2023, [p. 6].

32 Dr Paul Bloomfield, New South Wales State Councillor, Sports Medicine Australia, *Committee Hansard,* 30 January 2023, p. 5.

4.31 Several submitters who provided their lived experiences to the committee including Belinda Vardy, Mr Robin McGilligan, Mrs Kathy Strong, Ms Megan King, Ms Sandra King and Anna also advocated for increased education and public awareness regarding sport-related concussion.[33]

4.32 Some inquiry participants specifically called for public awareness campaigns to increase the community's understanding of concussion and repeated head trauma.[34] Neurologist Dr Rowena Mobbs was amongst these calls. She specifically urged the Australian Government to establish a public health campaign that teaches young children to understand and value their brain, older children about brain health for life and avoidance of harm, and adults including parents, coaches, commentators and spectators to recognising the signs of concussion and CTE.[35]

4.33 Dr Alexandra Veuthey PhD, an attorney specialising in sports law, submitted that educational campaigns should instruct players about the full risks of concussion, and ultimately contribute to changing their mindsets. Dr Veuthey considered the value and power of such campaigns:

> … educational campaigns have value when they target other stakeholders, such as medical staff and coaches. It goes without saying that such campaigns, even targeted at the highest level, have the potential to change sport globally, as professional athletes serve as role models to young people.[36]

4.34 Dr Adrian Cohen, Chief Executive Officer of Headsafe, pointed out that it is not sufficient to simply have educational material 'available', but that measures should be in place to ensure members of the community actually use, engage and comply with such materials.[37]

4.35 In relation to First Nations communities, Connectivity Traumatic Brain Injury Australia (Connectivity) noted that whilst limited research has been conducted

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[33] See, for example, Belinda Vardy, *Submission 78,* p. 5; Mr Robin McGilligan, *Submission 73,* p. 5; Mrs Kathy Strong, Private capacity, *Committee Hansard,* 30 January 2023, pp. 50, 53; Ms Megan King, Private capacity, *Committee Hansard,* 30 January 2023, pp. 50, 52; Ms Sandra King, Private capacity, *Committee Hansard,* 30 January 2023, p. 48; Ms Julie Speight, *Submission 48*, p. 3; Anna, *Submission 77,* [pp. 1, 5]; Name withheld; *Submission 81*, [p. 3].

[34] Dr Rowena Mobbs, Neurologist and Senior Lecturer, Macquarie University, *Committee Hansard*, 30 January 2023, p. 11; Belinda Vardy, *Submission 78*, p. 4; Name withheld; *Submission 81*, [p. 3]; Dementia Australia, Answers to questions taken on notice, 30 January 2023 (received 27 February 2023); Mr John Hennessy, Answers to questions taken on notice, 26 April 2023 (received 10 May 2023).

[35] Dr Rowena Mobbs, Neurologist and Senior Lecturer, Macquarie University, *Committee Hansard*, 30 January 2023, p. 11; Dr Rowena Mobbs, *Submission 1*, pp. 11, 12.

[36] Dr Alexandra Veuthey, *Submission 56*, [p. 6].

[37] Dr Adrian Cohen, Chief Executive Officer, Headsafe, *Committee Hansard,* 30 January 2023, pp. 15, 16.

regarding knowledge and perceptions of concussion among First Nations people, raising awareness of and dispelling misconceptions around concussion is urgently needed. Connectivity made clear that First Nations peoples should be consulted to help conceive, design and implement culturally appropriate educational materials and initiatives.[38]

The role of the media and other influential figures

4.36 Evidence to the committee highlighted the important role that the media plays in affecting cultural change regarding sport-related concussion; however, there were conflicting views amongst inquiry participants on how the media reports on these matters.

4.37 Dr Michael Makdissi, Chief Medical Officer of the AFL noted:

> … I think the media has a big role to play in how it's portrayed in the media and how those incidents are portrayed. Certainly in the US they've moved from repeatedly replaying a big impact to actually shifting to a commercial break when there's an impact where the player is removed from the ground and a head injury assessment is performed on the ground. I think we've all got a role to play in that shifting of the culture. We've moved, but we still need to continue to move.[39]

4.38 Dr Cohen of Headsafe similarly reflected on the media's pivotal role in community education and understanding of sport-related concussion. He raised concern around commentators trivialising and celebrating head injuries, but observed that there have been recent shifts away from these attitudes.[40]

4.39 Ms Speight encouraged members of the media to take care in how they reflect on cyclists that continue racing after a concussion:

> Media reporting on cycling races and coaching staff should take care not to praise the "toughness" or "bravery" of riders that get back up and continue racing after a concussion, but rather should warn of the dangers that continuing with a concussion may present for that rider's future health and well-being.[41]

4.40 Dr Eric Windholz, a senior lecturer in the Faculty of Law at Monash University with expertise in sports law, submitted to the inquiry in his private capacity. He highlighted that elite sports people are highly influential, and set the standard which many in community and school sport follow:

> ... Elite sport sets the standards that a lot of the community and school based sports follow. It sets the standards in both the rules and the practices, but it also sets the atmospherics. I remember an NRL grand final a couple years

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38 Connectivity Traumatic Brain Injury Australia (Connectivity), *Submission 24*, p. 4

39 Dr Michael Makdissi, Chief Medical Officer, AFL, *Committee Hansard*, 26 April 2023, p. 4.

40 Dr Adrian Cohen, Chief Executive Officer, Headsafe, *Committee Hansard*, 30 January 2023, p. 19.

41 Ms Julie Speight, *Submission 48*, [p. 4].

> ago where a player played out the game with a fractured cheekbone, if I remember correctly, and took on significant risks—for example, if there was a repeat knock that could have fractured and splintered the cheekbone. The team won and the player was hailed a hero. To me, that permeates down into all levels of sport. If we're thinking about the rule, 'If in doubt, sit them out,' if it's not abided by at the highest level of sport— they're the role models; they set the example for everybody else.[42]

4.41 Dr Stephen Townsend pointed out that language and terminology is important when discussing sport-related concussion. He advised that wherever possible, people should refer to concussion by terms which effectively convey the seriousness of the injury. He suggested that the term 'mild traumatic brain injury' should be more commonly used by media figures, athletes and coaches, in the same way that Anterior Crucial Ligament (ACL) injuries are commonly referred to in sporting contexts.[43]

4.42 Professor Pearce expressed similar sentiments around the importance of language when educating and changing the culture of concussion in sport. He raised particular concern around use of the term 'head knock' and explained that this terminology downplays the seriousness of concussion.[44]

4.43 Professor Pearce told the committee that the media has been important in driving cultural change in recent years by encouraging people to take concussions more seriously. He noted:

> … People have said that media sensationalised this issue, but I've never had that experience. What I've found is that people have actually started to read the papers and see the news and think, 'Oh, actually this is a bit more serious than I realised.' Male players, in particular, are starting to respect the injury a lot more than they did back in 2015.[45]

4.44 In contrast, other submitters argued that media reporting around sport-related concussions and related consequences is often sensationalist.[46]

4.45 The ASC outlined its view that media reporting on concussion and CTE is 'often conducted in a sensationalist manner that is not evidence-based'.[47] It added:

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42 Dr Eric Windholz, Private capacity, *Committee Hansard,* 22 February 2023, p. 4.

43 Dr Stephen Townsend, *Submission 60*, [p. 5].

44 Professor Alan Pearce, Private capacity, *Committee Hansard*, 26 April 2023, p. 50.

45 Professor Alan Pearce, Private capacity, *Committee Hansard*, 26 April 2023, p. 50.

46 See, for example, Australian Sports Commission, *Submission 10,* pp. 6, 7; Murdoch Children's Research Institute (MCRI), *Submission 40,* p. 4; Mr Jamie Crain, Chief Executive Officer, Sports Medicine Australia, *Committee Hansard,* 30 January 2023, p. 2; Mr Jamie Buhrer, Player Operations Manager, Rugby League Players Association, *Committee Hansard,* 30 January 2023, p. 23.

47 Australian Sports Commission, *Submission 10,* p. 6.

> While it is essential that athletes, sport organisations and the general public are aware of the risks of concussion, it is not helpful for concern related to concussion to be exaggerated or catastrophised in a manner that is not supported by scientific evidence…
>
> …Unbalanced and alarmist reporting in the media has the potential to discourage participation in team sports, at a time when large portion of Australians are insufficiently active… Causing excessive alarm and anxiety in relation to the long-term effects of concussion could also result in parents withdrawing their children from sporting activities, which can undermine efforts to increase physical activity to improve the health and wellbeing of all Australians. Such an outcome could result in overall worse health outcomes for the Australian population.[48]

4.46 Mr Jamie Buhrer, Player Operations Manager at the Rugby League Players Association, similarly reflected that media reporting can be 'alarmist' and lacking in evidence.[49]

4.47 Mr Jamie Crain, Chief Executive Officer of Sports Medicine Australia considered that media coverage 'largely pushes negative narratives and potentially catastrophises' concussions and potential risks.[50] He urged for caution and balance in education and community messaging:

> … we just need to be careful with the messaging: yes, there is a risk; yes, there is emerging evidence on this. We still want people to play sport but we just want them to do it safely and with awareness of what that risk is.[51]

4.48 The Murdoch Children's Research Institute (MCRI) raised particular concern regarding the effect of sensationalist messaging on children:

> Community messaging regarding child concussion and its consequences is often sensationalised and not underpinned by evidence, resulting in increased child and parent anxiety regarding participating in sport and return to activity after injury.[52]

4.49 The Concussion Legacy Foundation Australia noted that it is working towards delivering concussion education programs for journalists, journalism students, and media commentators to tackle these issues. It explained that its Concussion Reporting Certification initiative is designed as a continuing education tool for

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48 Australian Sports Commission, *Submission 10,* p. 7.

49 Mr Jamie Buhrer, Player Operations Manager, Rugby League Players Association, *Committee Hansard*, 30 January 2023, p. 23.

50 Mr Jamie Crain, Chief Executive Officer, Sports Medicine Australia, *Committee Hansard,* 30 January 2023, p. 2.

51 Mr Jamie Crain, Chief Executive Officer, Sports Medicine Australia, *Committee Hansard,* 30 January 2023, p. 9.

52 MCRI, *Submission 40,* p. 4.

working journalists to 'ensure appropriate concussion reporting as science and policy advances'. It explained that content includes:

> … the basics of concussion, how to properly describe concussions in media articles and commentating, what should happen during in-game concussion evaluations, and what to expect after a concussion is diagnosed.[53]

4.50 Professor Vicki Anderson, head of clinical sciences research at MCRI and head of psychology at the Royal Children's Hospital Melbourne acknowledged that while there is still some uncertainty around the risk factors and prevalence of CTE, it is important to strike a balance between providing people with accurate, up-to-date evidence and ensuring that messaging is not sensationalist.[54]

Health professionals and the health system

4.51 The committee heard that general practitioners (GPs) are often the first points of contact for social, amateur and professional contact sport players who have a suspected concussion. The Royal Australian College of General Practitioners (RACGP) explained that GPs may assess and manage concussion injuries in a variety of settings, including at the time of occurrence at sporting matches, at a general practice, and in community hospital departments.[55]

4.52 The Australasian College of Sport and Exercise Physicians (ACSEP) also explained that community sports participants with suspected concussion are often referred for medical assessment in the public system under Medicare and in public hospitals.[56]

Need for increased training and education within the medical community

4.53 Outside of sporting organisations and the media, several inquiry participants called for increased training and education within the medical community to improve how the acute and long-term effects of concussive injuries are dealt with in the health system.[57]

4.54 Shine Lawyers submitted that there is an urgent need for greater education in relation to concussion and mild traumatic brain injuries, starting with hospital

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53 Concussion Legacy Foundation Australia, *Submission 52,* [p. 2].

54 Professor Vicki Anderson, Theme Director, Clinical Sciences Research, MCRI, *Committee Hansard*, 26 April 2023, pp. 44, 45.

55 Royal Australian College of General Practitioners (RACGP), *Submission 22*, p. 3.

56 Australasian College of Sport and Exercise Physicians (ACSEP), *Submission 86*, p. 1.

57 See, for example, Dr Tim Butson, private capacity, *Committee Hansard*, 22 February 2023, pp. 23, 24; Mrs Kathy Strong, private capacity, *Committee Hansard,* 30 January 2023, p. 53; Professor Melinda Fitzgerald, Chair, Expert Working Group, Mission for Traumatic Brain Injury, *Committee Hansard,* 1 March 2023, p. 32; Headsafe, *Submission 68*, [p. 23]; Mr Vic Paice, Submission 74, [pp. 2, 3]; Mr John Hennessy, answers to questions taken on notice, 26 April 2023 (received 10 May 2023).

staff and GPs. It highlighted that many of its clients experienced problems when seeking advice and treatment for these issues in the health system:

> The experience of many of our clients is that if they do report their symptoms, very few people believe them, let alone provide appropriate referrals to providers who specialise or understand mTBI [mild traumatic brain injury] symptomology. The experience of these individuals is one of being unheard, gaslit and exhausted. GPs who identify the symptoms after often at a loss as to who to send their patients to for treatment.
>
> … Additionally, the greatest concern for our clients is the lack of treatment options available when they are desperate for help.[58]

4.55 Shine Lawyers specifically recommended multi-disciplinary concussion or traumatic brain injury centres to help deal with these issues and the complexities of these injuries:

> … currently there are very few people or places that individuals can go to (or that GPs know to refer to) for concussions, mTBI [mild traumatic brain injury] or CTE rehabilitation. These injuries are complex with a constellation of symptoms and require wholistic treatment by a range of specialists. For this reason, it is strongly recommended that multi-discipline concussions or TBI centres be set up in all capital cities in Australia.[59]

4.56 The ACSEP outlined that community sports participants with suspected concussion are often referred for medical assessment in the public system, which the ACSEP noted 'is not well equipped' to manage brain injuries, due to:

- clinics and emergency departments often being overwhelmed with patients;
- limited understanding of concussion at the primary care level; and
- poor access to expert secondary care.[60]

4.57 The Princess Alexandra Hospital Brain Injury Concussion Clinic in Queensland recommended increased educational opportunities for primary care practitioners and improved awareness of local referral options to specialists to help support concussion patients in the early stages, prevent persisting concerns and improve overall recovery.[61]

4.58 Professor Melinda Fitzgerald from Mission for Traumatic Brain Injury similarly highlighted the importance of educating clinicians on these matters, as well as appropriately resourcing them:

> Even research on educating our clinicians is important. I've been involved in some studies where we've asked clinicians—GPs in particular—whether they feel comfortable managing someone with concussion, and over half of

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58 Shine Lawyers, *Submission 6*, pp. 4, 5.

59 Shine Lawyers, *Submission 6*, p. 13.

60 ACSEP, *Submission 86*, p. 1.

61 Princess Alexandra Hospital Brain Injury Rehabilitation Service Concussion Clinic, *Submission 35*, [p. 4].

> them don't. They're not resourced sufficiently to be able to manage people with concussion in community, and there's also not a strong drive to go and see a medical professional.[62]

4.59 In relation to children, MCRI submitted that evidence-based guidelines are not adequately disseminated to health professionals, leading to unnecessary or inappropriate concussion management. MRCI noted further problems relating to child concussion management including variation in care, the ability to accurately diagnose concussion and increasing demands on health services.[63]

Lived experience perspectives

4.60 A number of lived experience testimonies outlined some of the challenges faced by individuals when seeking medical treatment and support. For example, the committee heard from Mrs Kathy Strong, who lost her husband Terry, a former grass-roots, semi-professional rugby league player who was diagnosed with high stage CTE post-mortem. She explained that when Terry become ill, she found it particularly difficult 'convincing the doctor there was something wrong with him'. She added:

> It was very, very difficult to get our family doctor to recognise that there was something wrong with him, and I had to do a lot of research on the internet. I actually went in and said, 'I think he could have this', and then he referred us on.[64]

4.61 Mr Peter 'Wombat' Maguire, who sustained multiple concussions within a local game of AFL in 1994, reported that among other challenges, he experienced medical practitioners not believing him when seeking treatment and support.[65]

4.62 Ms Sandra King, Mrs Jennifer Masters and Ms Annita Siliato, also informed the committee of difficulties their loved ones faced when seeking support and treatment from medical professionals.[66]

4.63 From the elite perspective, former professional soccer player Mr Joseph Didulica explained the range of impacts he continues to suffer after experiencing several concussions throughout his career. He described feeling like no-one provided him with answers or explanations about his brain, despite

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62 Professor Melinda Fitzgerald, Chair, Expert Working Group, Mission for Traumatic Brain Injury, *Committee Hansard,* 1 March 2023, p. 32.

63 MCRI, *Submission 40*, [p. 4].

64 Mrs Kathy Strong, Private capacity, *Committee Hansard,* 30 January 2023, pp. 44, 50 and 53.

65 Mr Peter 'Wombat' Maguire, Private capacity, *Committee Hansard,* 26 April 2023, p. 59

66 Ms Sandra King, Private capacity, *Committee Hansard,* 30 January 2023, p. 53; Mrs Jennifer Masters, Private capacity, *Committee Hansard,* 30 January 2023, p. 52; Ms Annitta Siliato, Executive Director, Concussion Legacy Foundation Australia, *Committee Hansard,* 26 April 2023, pp. 58, 59.

undergoing MRI scans, cognitive testing and seeing medical professionals both in Australia and across Europe.[67]

4.64 In the professional rugby context, former professional rugby league player Mr James Graham stated that former players need to be supported in many ways, but most importantly medically. He said that he often hears from other players that 'it's too hard', 'I can't afford it', 'I don't have the time', or 'I've tried and get messed around'.[68]

4.65 Mr Graham added that life looks completely different the day an athlete retires, with the biggest change being medical support:

> Whilst playing, we become institutionalised on how we're treated medically. We never have to book an appointment. There are no referrals and no waiting lists for surgery. If you're sick or you have a problem, you call the club doctor on their personal mobile phone, and the issue is addressed almost instantaneously. Rehab is outlined every single step of the way and adjusted with progress or setbacks.
>
> On top of this, as a professional athlete you have daily wellness apps you need to complete, weekly weigh-ins and marker scores, GPS and heart rate monitors worn in every training session and game, and perceived exertion scores. In a typical week, you would have approximately three interactions with a doctor and daily access to physios, wellbeing staff and sports scientists. Often they know something is wrong before you do. You're looked after so well and have so many resources at your disposal, and that all changes the day you retire.[69]

Suggestions to build capacity and support medical professionals

4.66 Submitters provided information on current relevant education and training opportunities for medical professionals in the field of concussion and traumatic brain injury management. The committee also received suggestions on several measures that would support medical professionals and help improve the management of sport-related concussion in the health system, particularly by GPs.

4.67 Professor Mark Morgan from the RACGP told the committee that medical students receive basic information about concussion management through clinical placements and case-based learning:

> Medical students get some basic information through clinical attachments to emergency departments and case based learning, but they're only halfway through their training to become GPs at the point of graduation from medical school. People heading in a path of general practice would be expected to do some emergency department work, where there would be a

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67 Mr Joseph Didulica, Private capacity, *Committee Hansard,* 26 April 2023, pp. 60, 61.

68 Mr James Graham, Private capacity, *Committee Hansard,* 30 January 2023, p. 48.

69 Mr James Graham, Private capacity, *Committee Hansard,* 30 January 2023, p. 48.

> greater concentration of seeing people with traumatic brain injury, so that would be another source of training.[70]

4.68 Professor Morgan added that some relevant training may also be provided on the job by GP registrars, or that it could fall under the many areas of ongoing GP professional development. He acknowledged that whilst the management of traumatic brain injury is very important, it does not form a major part of most GP work.[71]

4.69 Connectivity noted it is likely that a significant proportion of clinicians that operate outside of the sporting context would be unaware of offerings such as specialist training workshops or self-paced online training courses. It also explained there is currently no online concussion course that is broadly accredited for continuing professional development by an Australian health peak body organisation.[72]

4.70 The RACGP specifically recommended that standardised, evidence-based and easy-to-access concussion and head trauma guidelines are prioritised for development and made available to GPs at the point-of-care. It also recommended:

- investment in longer general practice consultations for people with concussion, repeated head trauma and other complex care needs; and
- first aid responders at sporting venues have increased training that focuses specifically on treating concussion and head injury.[73]

4.71 Professor Morgan from the RACGP explained that having rapid access to relevant information, and knowing where to look to get this information is more appropriate than further education programs for GPs, given that estimates indicate that on average a GP would see someone with a head injury or traumatic brain injury, just under once a year.[74]

4.72 In relation to other health system issues, the RACGP explained that GPs and emergency departments in regional, rural and remote areas are often under-resourced and may have difficulty in providing timely short-term care for people with concussion. It further outlined that people in lower socioeconomic groups may be disadvantaged if they do not have access to bulk billed appointments and affordable specialist care. RACGP contended that

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70 Professor Mark Morgan, Chair of Expert Committee for Quality Care, RACGP, *Committee Hansard,* 26 April 2023, p. 41.

71 Professor Mark Morgan, Chair of Expert Committee for Quality Care, RACGP, *Committee Hansard,* 26 April 2023, p. 41.

72 Connectivity, *Submission 24,* p. 3.

73 RACGP, *Submission 22,* pp. 4, 5.

74 Professor Mark Morgan, Chair of Expert Committee for Quality Care, RACGP, *Committee Hansard,* 26 April 2023, p. 40.

addressing the nationwide shortage of GPs more broadly would help resolve issues of patient inequity.[75]

4.73 The Department of Health and Aged Care (the department) outlined the community-based supports that are available to help people affected by concussion and repeat head trauma. It noted that the Australian Government is investing in community-based mental health services such as Headspace, Head to Health adult mental health centres, and other relevant services commissioned through local Primary Health Networks to increase access to mental health care that addresses a range of social, physical and emotional needs of Australians.[76]

Committee view

Improving education and awareness in the community

4.74 The committee is concerned to hear that cultures which prioritise on-field success over player safety and wellbeing are present in Australian sporting communities at all levels. The committee also holds concerns about a general lack of understanding in the community about the risks, identification and management of sport-related concussion and repeated head trauma.

4.75 The committee understands that these attitudes and the lack of community awareness contribute to sporting environments where players fail to self-report, conceal symptoms, and play on after experiencing a head injury or concussion.

4.76 Whilst the committee recognises that community attitudes and awareness have somewhat improved in recent years, it considers that further education and awareness raising measures are required to ensure that all players, coaches, parents, teachers and other sports participants can recognise the signs and symptoms of concussion, understand the basics of managing such injuries, and appreciate the potential risks.

4.77 The committee considers that further education and public awareness efforts are particularly vital at the community level, given most local sporting clubs lack the money, expertise and other resources that many professional sports organisations have at their disposal to help identify and appropriately manage such incidents.

4.78 The committee also notes that members of the media and high-profile sports figures are influential regarding community attitudes towards concussion and repeated head trauma in sport. These figures also play a significant role in shaping the culture and discourse around these matters going forward.

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75 RACGP, *Submission 22*, p. 5.

76 Department of Health and Aged Care, *Submission 5*, [pp. 4–6].

Recommendation 7

4.79 The committee recommends that the Department of Health and Aged Care in consultation with relevant stakeholders, consider how best to improve community awareness and education regarding concussion and repeated head trauma, with these measures being health lead. These initiatives would help individuals:

- **recognise the acute signs and symptoms of concussion;**
- **appropriately respond to and manage such injuries; and**
- **understand the short- and long-term risks of concussion and repeated head trauma.**

The committee recommends the development of awareness and education initiatives, with appropriate consideration given to dissemination strategies; the need to review or update existing materials; and ensuring tailored resources are available to different cohorts including, players, parents, coaches, teachers, other volunteers involved in sport and the general public.

Building capacity in the health system

4.80 The committee heard compelling evidence about the need to improve how health professionals (namely GPs and hospital emergency department staff) assess and manage patients suffering both the acute and longer-term effects of sport-related concussions and concussive injuries.

4.81 The committee recognises that variable definitions of concussion, diagnosis challenges, as well as other well-documented issues facing Australia's health system can create difficulties and inconsistencies in the treatment and management of such injuries.

4.82 However, given that GPs are often one of the first points of contact for both community and professional sportspeople with a suspected concussion, the committee considers that any measures that would help support GPs and other medical professionals to appropriately manage and assess these injuries are essential. The committee also recognises that the RACGP has particular expertise in this area.

Recommendation 8

4.83 The committee recommends that the Australian Government, in partnership with state and territory governments consider how best to address calls for:

- **the development of standardised, evidence-based, and easy-to-access concussion and head trauma guidelines for GPs;**
- **suitable general practice consultations for people with concussion, repeated head trauma and other complex care needs; and**
- **increased training for first aid responders at sporting venues that focuses specifically on treating concussion and head injury.**

Chapter 5
On-field harm minimisation strategies and return to play protocols

5.1 This chapter discusses a range of on-field or in-play measures that can be taken to prevent and/or reduce the risks of concussion and repeated head trauma in sport. Such strategies that will be discussed in this chapter include:

- rule modifications, including age minimums for children;
- skill development and strength and conditioning training;
- the use of head gear; and
- stand-down and return to play protocols.

5.2 This chapter will also outline evidence regarding the enforcement of compliance to these measures, before ending with the committee's views and recommendations.

The importance of prevention and risk reduction

5.3 The committee heard compelling evidence about the importance of prevention and risk reduction in relation to concussion and repeated head trauma in sport.[1]

5.4 The Public Health Association of Australia emphasised that a 'safety-first perspective' of preventing injury in the first instance keeps people independent and healthy, results in fewer people getting hurt, and reduces demand on hospital systems, general practitioners (GPs) and other medical services.[2]

5.5 The Australian Health Promotion Association similarly described the benefits of injury prevention:

> AHPA recommends a focus on preventing concussions and repeated head trauma in contact sports. Injuries are preventable. Health promotion and illness prevention save lives and money and delivers the best public return on investment in health.[3]

5.6 Child Neurologist Professor Karen Barlow, on behalf of the Queensland Paediatric Rehabilitation Service, also outlined the importance of prevention, as well as secondary and tertiary measures:

> The old adage that "prevention is better than cure" is certainly true in concussion. Yet in addition to primary prevention, secondary and tertiary

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1 See, for example, Australasian Injury Prevention Network, *Submission 21*, [p. 2]; Public Health Association of Australia, *Submission 58*, pp. 4, 5.

2 Public Health Association of Australia, *Submission 58*, p. 5.

3 Australian Health Promotion Association, *Submission 59*, p. 4.

(preventing further concussion in those at risk) prevention strategies are also key considerations to improve outcomes.[4]

5.7 Whilst it was made clear to the committee that prevention is multi-faceted and that a range of measures are required to reduce the risk of sport-related concussion, several inquiry participants outlined in particular the importance of on-field rule changes and skill development measures to prevent and reduce the impact of these injuries.[5]

Rule modifications

5.8 The Public Health Association of Australia submitted that rules are a key tool in the primary prevention of concussion and repeated head injuries and that they are 'the foundation of safe conduct in sports because they set expectations for behaviour and define infractions'.[6]

5.9 The Public Health Association of Australia added that the implementation of safer rules has been shown to decrease the incidence of concussion in sport. Injury epidemiologist Dr Reidar Lystad similarly outlined that the most effective and successful strategies to reduce head trauma and concussion rates in sports have involved policy and rule changes.[7]

5.10 Whilst these measures vary depending on the sport, the Public Health Association of Australia explained that such changes have included banning or limiting the use of certain drills or techniques, forbidding dangerous tackles, as well as other specific alterations, as explored further in the sections below.[8]

International examples of rule modifications to reduce and prevent concussions

5.11 The committee received evidence on a range of international examples where rules or regulations have been altered to reduce the impact or prevent concussion and repeated head trauma in sport.[9]

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4 Queensland Paediatric Rehabilitation Service, *Submission 28*, p. 3.

5 See, for example, Australian Health Promotion Association, *Submission 59*, p. 5; Public Health Association of Australia, *Submission 58,* p. 9; Professional Footballers Australia, *Submission 57*, p. 9.

6 Public Health Association of Australia, *Submission 58*, p. 8.

7 Public Health Association of Australia, *Submission 58*, p. 8; Dr Reidar Lystad, *Submission 70*, p. 5.

8 Public Health Association of Australia, *Submission 58*, p. 8.

9 See, for example, Professor Terry Slevin, Chief Executive Officer, Public Health Association of Australia, *Committee Hansard,* 26 April 2023, p. 43; Australian Sports Commission, *Submission 10*, p. 15; Geoff and Jean Cook, *Submission 66*, [pp. 1, 2]; Community Concussion Research Foundation, *Submission 52,* pp. 8, 9; Mr Leon Harris, *Submission 17*, [pp. 8, 9].

5.12 Many inquiry participants cited the example of the banning of 'body checking' (slamming into another player to keep them away from the puck) in hockey in Canada.[10]

5.13 Dr Reidar Lystad explained that according to academic studies, prohibiting body checking in Canadian youth ice hockey reduced concussion rates by 64 per cent for under 12s, 40 per cent for under 14s and 51 per cent in under 18s, with no subsequent increased risk of injury or concussion for children with less body checking experience.[11]

5.14 Dr Lystad also referred to other studies relating to American football, which suggested that rule changes to reduce or limit full contact tackle practice reduced head impact exposure by 42 per cent, and practice concussion rates by 57 per cent.[12]

5.15 In terms of football (soccer), several participants cited how some organisations and jurisdictions have introduced bans for 'headers' (using your head to redirect the ball) for certain age groups or competition levels.[13]

5.16 Dr Alexandra Veuthey PhD, an expert on the regulation of concussion in sport, explained that countries including the United States, England, Scotland and Northern Ireland have moved to ban and/or reduce headers in soccer for children.[14]

5.17 The Australian Sports Commission (ASC) also outlined international examples where headers have been banned or limited for children, though it suggested that the evidence regarding the efficacy of these measures is contested:

> There has been discussion in the medical literature regarding the possibility that heading the ball in soccer may contribute to concussion, and cause long-term detrimental effects on brain health.

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[10] See, for example, Dr Reidar Lystad, *Submission 70*, p. 5; International Waterski and Wakeboard Federation and Waterski and Wakeboard Australia, *Submission 76*, pp. 10, 11; Dr Annette Greenhow, *Submission 7*, p. 6; Queensland Paediatric Rehabilitation Service, *Submission 28*, p. 3; Dr Andrew McIntosh, *Submission 42*, p. 10; Professor Terry Slevin, Chief Executive Officer, Public Health Association of Australia, *Committee Hansard*, 26 April 2023, p. 44; Concussion Legacy Foundation, *Submission 16*, [p. 4]; Mr Leon Harris, *Submission 71*, [p. 9]; Australian Sports Commission, *Submission 10*, p. 15; Professor Karen Barlow, Child Health Research Centre, University of Queensland; Child Neurologist, Queensland Children's Hospital, *Committee Hansard*, 22 February 2023, p. 20.

[11] Dr Reidar Lystad, *Submission 70*, p. 5.

[12] Dr Reidar Lystad, *Submission 70*, p. 5.

[13] See, for example, Concussion Legacy Foundation, *Submission 16*, [p. 4]; Mr Leon Harris, *Submission 71*, [p. 9]; Professional Footballers Australia, *Submission 57*, p. 9; Australian Sports Commission, *Submission 10*, p. 15.

[14] Dr Alexandra Veuthey, *Submission 56*, [p. 6].

> … Whether banning soccer heading by children will lead to any change in health outcomes remains to be seen. The efficacy of banning heading in children's soccer (where heading is uncommon) is contested. The decision to ban or restrict heading in the US and the UK appears to be based on an approach of 'an abundance of caution' rather than any strong evidence that such restriction will impact short or long-term effects of concussion.[15]

Rule modifications in the context of Australian sports

5.18 The committee received some evidence about what rule modifications Australian sporting organisations have implemented to prevent or reduce the impact of concussions and repeat head trauma across various codes and levels of sport.

Australian football

5.19 The Australian Football League (AFL) submitted that it has made approximately 30 rule changes to its Regulations and Tribunal Guidelines since 2005 'to assist in the deterrence of conduct causing or giving rise to the risk of concussion and other head trauma, and to both encourage and enforce change of behaviour on field'.[16]

5.20 For junior players, the AFL outlined that it has adopted modified rules to regulate contact in a 'significant proportion' of junior competitions. The AFL explained that tackling and other related skills are introduced in 'an appropriate sequence' which includes:

> a) For under 8s:
>
> i) No tackling or holding of an opponent;
> ii) No pushing (fending off), bumping or barging another player;
> iii) No smothering, stealing the ball or knocking the ball from an opponent's hands;
> iv) No shepherding;
> v) No kicking off the ground;
>
> b) For under 9s and 10s:
>
> i) Modified tackling (wrap tackle only) introduced; and
> ii) No other contact allowed as per Under 8s.[17]

5.21 The AFL noted that the prevention of concussion and repeated head trauma remains a key priority of the league, but explained that 'no specific decisions have been made for further rule modifications in the sport for children and adolescents', although a review would be conducted in 2023. It suggested that any successful prevention program should adopt a broad approach and needs to be underpinned by a robust injury surveillance system to 'identify potential

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15 Australian Sports Commission, *Submission 10*, p. 15.

16 Australian Football League (AFL), *Submission 18*, pp. 10–13.

17 AFL, *Submission 18*, pp. 9–10.

high-risk game situations and to monitor the outcome of any changes made, including the identification of any undesired effects'.[18]

Rugby league

5.22 The committee is not aware of any recent on-field rule changes the National Rugby League (NRL) has implemented to specifically prevent or reduce the impact of head injuries, but understands that the league's 'laws of the game' stipulate that contact with the head or neck of an opposing player is illegal at all levels.[19]

5.23 Mr Jamie Buhrer of the Rugby League Players Association (RLPA) outlined that the RLPA is supportive of modifications that enhance player health and safety and suggested there is further opportunity to address exposure to contact by modifying the amount of contact in training:

> We've always been supportive of modifications for player health and safety… I know that we need to continue to explore around training; that's probably where the growth area is for rugby league—in the training environment, where all eyes are on the games, and we've got spotters, and commentators and even fans alike can understand that, when a concussion's taken place, they need to get off. Sometimes it's the training. I think, as a player association, we'd be open to modifying the amount of contacts in training. In the first instance, we need to get, from our perspective, the governing body, the clubs and the players all aligned on an approach. I think if we can actually develop an approach together, with ownership for all parties…[20]

5.24 In relation to community and school rugby league, the NRL highlighted its 'National SafePlay Code.' The NRL stated this code was developed to promote safety via a set of rule modifications for competitions involving players aged 6 to 15 years. It explained that rule modifications include:

> … the banning of tackling techniques that pose an unacceptable risk, as well as other techniques, such as palming (fending off with outstretched arm) an opposition player in the head or neck and slinging tackles.[21]

5.25 The NRL also explained League Tag, an alternative format of rugby league available to participants that removes tackling and replaces it with the act of removing a tag. The league stated it 'encourages participants to try rugby league

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18 AFL, Answers to questions taken on notice, 26 April 2023 (received 16 May 2023).

19 National Rugby League (NRL), Answers to questions taken on notice, 1 March 2023 (received 24 March 2023).

20 Mr Jamie Buhrer, Player Operations Manager, Rugby League Players Association, *Committee Hansard,* 30 January 2023, p. 32.

21 NRL, *Submission 17*, [p. 3].

with the opportunity to develop the basic skills, whilst further reducing safety concerns'.[22]

Rugby union

5.26 In the context of rugby union, Dr Warren McDonald, Chief Medical Officer of Rugby Australia, recognised that the greatest risk of the sport is in tackling. He explained that tackle heights have been reduced over the years and that this continues to be reviewed:

> Head contact has always been illegal in our sport, but we recognise that it does happen incidentally or accidentally in some circumstances. There has been a reduction in the tackle height within rugby over several years. Even as we speak, the height at which one should tackle is being reviewed again. We recognise that the greatest risk in our game is in the tackle situation, and the greatest risk is to the tackler, the person undertaking the tackle. The current demarcation is around the armpit. There is a move to reduce the tackle height down to around the sternum region. The concept there is to take the tackler's head, in particular, away from another player's head or shoulder so we don't end up with an untoward incident. That's where our sport is going. I believe it will be safer for doing so.[23]

5.27 Rugby Australia also outlined its 'Head Contact Process' which forms a part of the code's efforts to reduce the risk of head injury through 'strong and consistent on and off field sanctioning' for dangerous tackles, illegal head contact and potential acts of foul play.[24]

5.28 In terms of junior players, Rugby Australia explained how aspects of the game are introduced to children in a phased approach which includes modified rules for the purpose of increased player safety and welfare, including:

- No contact (tackling) until under 8s meaning all tackle laws apply from under 8s.
- Variations to lineouts and scrums including playing uncontested until under 10s.
- No lifts until under 12s with phased restrictions on the way players are lifted and how they bind until under 15s.[25]

5.29 Rugby Australia acknowledged there are some calls to delay tackling until players reach ages 12 to 14. It outlined its view that such measures would carry

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22 NRL, *Submission 17*, [p. 4].

23 Dr Warren McDonald, Chief Medical Officer, Rugby Australia, *Committee Hansard*, 1 March 2023, p. 12.

24 Rugby Australia, *Submission 12*, [pp. 27, 28].

25 Rugby Australia, *Submission 12*, [p. 26].

a greater risk to players as 'players would be learning to tackle too late and at a time when there is a greater variation across players in size and strength'.[26]

Soccer

5.30 At the elite level in Australia, the committee heard that the A-Leagues (including A-League Women, A-League Men and A-League Youth competitions) have implemented a rule to allow 'concussion substitutes'.

5.31 Professional Footballers Australia explained that a concussion substitute can occur if the referee stops a match for a potential concussive injury to a player. The team doctor is then required to make a clinical assessment of the player and if clear symptoms present, the team can apply to replace the player with an additional permanent concussion substitution.[27]

5.32 As noted in chapter three, the committee heard from Mr Joseph Didulica, a former goalkeeper who played in Australia's national league and believes he suffered his first concussion when he was five or six years old. Mr Didulica observed that the concussions would become more prevalent when he was a teenager, and as a goalkeeper he would suffer a knock to the head and would continue to play through the game.[28] Mr Didulica recounted the following incident which occurred prior to 2006:

> I remember one game where the ball hit me in the head hard. I continued on to half time and the coach said, 'You've got to go out there.' So I went out there not knowing where I really was. After five or six minutes I started to become nauseous, and I was looking for a place to chuck. I was oblivious to what was going on in the game. I walked 25 metres to a defender, because I didn't know what was happening. I stopped, and then the game stopped and I got taken off. The players were winning goals. After the game I was obviously concussed. It was 'Go home. There's a game next week.'[29]

5.33 The banning of headers remains a key issue for community and junior soccer players. On this matter, Mr Mark Falvo, Chief Operating Officer at Football Australia, told the committee that Football Australia's approach has firstly been to focus on understanding the frequency of headers in the game:

> Different football associations have begun to respond to this risk in different ways, and you're right: there are a few that have elected to ban heading of the ball outright. Our approach, which is very comprehensive, is to firstly understand the degree to which heading is occurring in a game … data suggests that the frequency of headers per match is very low. For example, in some matches in Australia for the ages of under 10s to 12s, the range of

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26 Rugby Australia, *Submission 12*, [pp. 26, 27].

27 Professional Footballer Australia, *Submission 57*, p. 4.

28 Mr Joseph Anthony Didulica, Private capacity, *Committee Hansard,* 26 April 2023, p. 60.

29 Mr Joseph Anthony Didulica, Private capacity, *Committee Hansard,* 26 April 2023, pp. 60, 61.

> heading frequency is zero to two headers per match, based on current data. That's something that we'll continue to monitor and revise.[30]

5.34 Mr Falvo noted that Football Australia has implemented other measures to reduce the frequency and impact of headers for junior players, including the introduction of a smaller ball:

> … we've taken active steps for some time now, dating back as far as 15 years, to modify the format of the game, principally through the introduction of small sided football for participants of the age of under 6 through to under 12. This reduces the space in which the game is played, reduces the number of players that are involved and, as a result, reduces the incidence of both contact with the ball, from a heading perspective, and also heavy impact, from a body-to-body point of view… This is an important risk mitigation measure that has been taken for some time…[31]

5.35 Mr Falvo added that other modifications at younger ages have included requiring kick-ins rather than throw-ins, and requiring goalkeepers to roll or pass the ball along the ground, rather than lofting it.

5.36 Mr Falvo also stated that Football Australia's current curriculum, which provides guidance on how to coach and teach the game, outlines that heading 'should occur with a deflated ball, a lighter ball or a smaller sized ball'. He also explained that further advice is under development to include information on exercises to strengthen neck muscles and other forms of training techniques to help prevent or reduce the impact of headers.[32]

5.37 When asked if Professional Footballers Australia would support modifications such as those implemented internationally regarding headers in soccer, Co-Chief Executive Mr Beau Busch told the committee that whilst evidence continues to develop, cautious approaches that protect player health are favourable:

> There are certainly measures you can take. But I think that our overarching view is that, if there is uncertainty and we can adopt a high standard that safeguards people whilst we understand more about concussion, then that's certainly what we would be in favour of. We would prefer to have been too conservative to protect health, particularly of young players that are coming through.[33]

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30 Mr Mark Falvo, Chief Operating Officer and Deputy General Secretary, Football Australia, *Committee Hansard*, 1 March 2023, p. 15.

31 Mr Mark Falvo, Chief Operating Officer and Deputy General Secretary, Football Australia, *Committee Hansard*, 1 March 2023, p. 13.

32 Mr Mark Falvo, Chief Operating Officer and Deputy General Secretary, Football Australia, *Committee Hansard*, 1 March 2023, pp. 13, 15.

33 Mr Beau Busch, Co-Chief Executive, Professional Footballers Australia, *Committee Hansard*, 30 January 2023, p. 32.

Cricket

5.38 Dr Alex Kountouris, Head of Sports Science and Sports Medicine at Cricket Australia, explained that Cricket Australia has introduced two key rule changes in recent years, including the introduction of concussion substitutes and mandating the use of helmets.[34]

5.39 Whilst the helmet mandate is discussed in further detail later in this chapter, Cricket Australia submitted that Australia was the first cricket playing nation to introduce a concussion substitute in an elite domestic cricket competition. It also explained that this rule had now been adopted by the International Cricket Council and applied across all elite cricket competitions.[35]

Calls for further action regarding rule changes

5.40 Some witnesses and submitters encouraged further action in terms of rule changes in Australian sports.[36]

5.41 Mr Leon Harris, Clinical Legal Educator and PhD candidate in the area of concussion in contact sports in Australia, raised concern that the modified policies that Australian contact sports codes have in place are not as adequate as those implemented internationally:

> The contrast with Australian sports is stark. In rugby league, "no players will be able to participate in tackle rugby league until midway through the under 7s season". In AFL, tackling is banned in Auskick until around the age of 11, although it appears a form of tackling is introduced around 9 years of age. In rugby union, tackling is introduced in under 8s.
>
> It is clear Australia does not have the same modified policies in contact sports played here that some countries have adopted in their contact sports. With increasing evidence the earlier a child start contact sport, the more likely it is they will suffer some sort of neurological condition later in life, the early ages at which Australian sports start contact is problematic.[37]

5.42 Further, the Concussion Legacy Foundation Australia broadly advocated for modified, non-contact versions of full contact sports until children reach the age of 14 years. Similarly, the Royal Australian College of General Practitioners (RACGP) noted that it is important that safe versions of contact sports continue to be encouraged and normalised.[38]

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[34] Dr Alex Kountouris, Head of Sports Science and Sports Medicine, Cricket Australia, *Committee Hansard*, 26 April 2023, p. 16.

[35] Cricket Australia, *Submission 20*, [p. 4].

[36] See, for example, Mrs Anita Frawley, Private capacity, *Committee Hansard*, 26 April 2023, p. 58.

[37] Mr Leon Harris, *Submission 71*, [p. 9].

[38] Concussion Legacy Foundation Australia, *Submission 49*, [p. 2]; Royal Australia College of General Practitioners (RACGP), *Submission 22*, p. 7.

5.43 Consultant neurologist Dr Rowena Mobbs also commented that modified games such as 'tag' or 'flag' versions for children should be more widely adopted. Dr Mobbs explained that these formats of sport offer alternative pathways where children can still obtain the vascular benefits of sport, whilst delaying head impacts. Dr Mobbs recommended that contact skills be commenced at a later age, and advised that commencement in adolescence is 'neurologically preferable' to earlier childhood.[39]

5.44 Several other submitters outlined the ongoing and crucial role that national sporting organisations have in regard to modifying rules going forward. For example, Professor Jack Anderson, an academic specialising in sports law, acknowledged that whilst many sports are predicated on risk-taking, he noted that 'it is the regulatory duty of a sports body to monitor, and update, by way of an evidence-based approach, the rules of its sport to avoid unnecessary risks'.[40]

5.45 Professor Terry Slevin, Chief Executive Officer of the Public Health Association of Australia, implored that sporting bodies must 'lead the charge' in terms of changing rules to reduce the prospect of head collisions, and added that more research and evidence is vital.[41]

5.46 The Public Health Association of Australia's submission reiterated that more research must be conducted to demonstrate the impacts of rule changes, but also encouraged that if a rule is believed to help reduce the incidence of sports-related concussion, then it should be implemented as a precautionary approach, regardless of any research deficit.[42]

5.47 Neuropsychologist Dr David Maddocks similarly advised that all reasonable steps to change rules should be taken to minimise risk. He also raised the importance of ongoing review and changes to rules where necessary:

> … all reasonable steps should be taken in activities that involve a significant risk of head impacts to minimise the incidence of such trauma. I believe that such steps have already been adopted in a number of contact sports and ongoing review and changes where necessary and reasonable should continue.[43]

5.48 Additionally, the Public Health Association of Australia emphasised that referees and other officials have a key role to play in terms of enforcing rule

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39 Dr Rowena Mobbs, *Submission 1*, pp. 12, 13.

40 Professor Jack Anderson, *The Future Of Footy And The Merits Of The Concussion Class Actions In The AFL*, Additional information received 1 May 2023, [p. 6].

41 Professor Terry Slevin, Chief Executive Officer, Public Health Association of Australia, *Committee Hansard,* 26 April 2023, p. 39.

42 Public Health Association of Australia, *Submission 58*, p. 8.

43 Dr David Maddocks, *Submission 55*, p. 2.

changes.[44] Further evidence relating to the enforcement and compliance of modified rules and return to play protocols is discussed in greater detail later in this chapter.

Skill development and strength and conditioning training

5.49 The committee received some evidence about how certain skill, strength and conditioning development through training can help prevent or reduce the impact of concussions and repeated head trauma in contact football codes and soccer.

5.50 The Public Health Association of Australia submitted that safe tackle training is a key prevention mechanism. It explained this is where players are taught safer ways to tackle, like avoiding head-to-head or elbow-to-head collisions, spear tackling and ensuring their own head is positioned upwards. The Public Health Association of Australia acknowledged that this already occurs in sports to some extent, but that it should be further promoted and encouraged at all levels of contact sports.[45]

5.51 The committee received some evidence outlining the programs and measures that Australian contact sports codes including the AFL, NRL and Rugby Australia have in place regarding safe tackling skill development.[46]

5.52 In relation to soccer, the committee heard that heading is a skill that needs to be specifically developed.[47] Professional Footballers Australia cited the research of physiotherapist and sports injury expert Dr Kerry Peek in this area, which outlines that heading technique is vital, yet does not always need to include ball to head contact. Dr Peek's research suggests that teaching good heading technique includes:

> … body positioning, tracking ball trajectory, timing of runs and jumps (which can all be practised in part without ball-head contact), introducing neuromuscular neck training to improve head-neck-body stability and reduce head impact magnitude on ball contact ...[48]

5.53 Professional Footballers Australia pointed out that Dr Peek is a strong advocate for neuromuscular neck training, which a recent study has found can reduce

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44 Public Health Association of Australia, *Submission 58*, p. 8.

45 Public Health Association of Australia, *Submission 58*, p. 9.

46 See, for example, AFL, *Submission 18*, pp. 16, 17; Dr Michael Makdissi, Chief Medical Officer, AFL, *Committee Hansard*, 26 April 2023, pp. 5, 6; NRL, *Submission 17*, [p. 5]; Rugby Australia, *Submission 12*, [pp. 12, 27].

47 Mr Beau Busch, Professional Footballers Australia, Co-Chief Executive, *Committee Hansard*, 30 January 2023, p. 32.

48 Professional Footballers Australia, *Submission 57*, p. 9.

head impact magnitude during heading in high-level football players aged 12 to 17 years.[49]

Protective head gear

5.54 The committee heard some evidence about the merits of helmets and protective head gear to reduce the impact of concussion and repeated head trauma in sport, though views on this matter were varied.

5.55 Neuropsychologist Dr David Maddocks cited concerns around 'risk compensation' behaviour whereby players feel more protected when wearing headgear and therefore go into collisions or contests harder. He explained this phenomenon and called for improved awareness about these risks:

> … improve public awareness of the 'pros' and 'cons' of helmets (hard hats) and "head gear" (soft shell), including the risk that individuals wearing helmets/head gear may take greater risks in the course of participation because of "risk compensation" (put simply, when wearing a helmet in contact sports, a participant might put their head where they normally would not put it due to a perception of reduced risk), which may lead to increased exposure to head impacts.[50]

5.56 The Public Health Association of Australia submitted that headgear is 'not the solution' for preventing concussions:

> Helmets and headgear are not [sport-related concussion] proof. They can significantly decrease the risk of other nonfatal and fatal head injuries, but are not the solution for preventing concussions. Wearing helmets and headgear can also give players a false sense of security, which can embolden them to hit harder than usual.
>
> Education about equipment limitations and how to safely make contact with another player is required to avoid a false sense of security and to ultimately protect players. [51]

5.57 The Australian Institute of Sport's Concussion and Brain Health Position Statement 2023 outlines that whilst research is ongoing, personal protective equipment, including helmets, have not yet been proven to prevent concussion:

> Personal protection equipment (PPE) such as helmets, soft-shell headgear and mouthguards have not been shown to prevent concussion, in studies to date. PPE can reduce other injuries such as lacerations, skull fractures and dental trauma. PPE research continues investigating the use of novel materials but at this stage PPE cannot be recommended for the purpose of preventing concussion.[52]

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49 Professional Footballers Australia, *Submission 57*, p. 9.

50 Dr David Maddocks, *Submission 55*, p. 3.

51 Public Health Association of Australia, *Submission 58,* pp. 8, 9.

52 Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023,* February 2023, p. 34.

5.58 The NRL's Coach Handbook for community codes 13 and over, similarly states there is no conclusive evidence that head gear prevents concussion:

> … Additional protective equipment such as head gear and shoulder pads can be worn to help with confidence or to protect against bumps and abrasions. Remember there is no conclusive evidence that headgear prevents concussion.[53]

5.59 In contrast, Dr Andrew McIntosh PhD, who specialises in biomechanics, ergonomics and accident investigation and safety, reported:

> There is a view that a form of risk compensation or behavioural adaptation will occur if athletes wear protective clothing... However, our observational studies in rugby and AFL have not provided evidence that wearing headgear is associated with a change in injury risk for the wearer or anyone else.[54]

5.60 Dr McIntosh submitted that there is potential for padded headgear to offer considerable protection in training and games:

> Padded headgear that reduces substantially the forces applied to the head during direct impacts has the potential to prevent concussion. This type of padded headgear will also reduce the forces in direct head impacts that would not normally cause concussion, but which some people believe are nonetheless hazardous. Therefore, effective padded headgear has the potential to offer considerable benefits when worn during training sessions involving contact, and/or games.[55]

5.61 However, Dr McIntosh acknowledged that current commercially available headgear is ineffective, and that athletes and families in Australia are offered a 'limited choice' in padded clothing, which they assume to be protective. He also noted that there are no mandatory safety standards for padded headgear and other protective equipment used in contact football, and suggested that more attention be directed to developing appropriate and effective headgear options:

> In my opinion, the opportunity to reduce the incidence of concussion and head impact exposure through the wearing of fit-for-purpose padded headgear has not received sufficient attention. Padded headgear can offer protection to the brain, if it is designed to meet appropriate biomechanical performance criteria. Current commercially available padded headgear is likely to be ineffective because it has not been designed to control the impact forces that occur in contact football.[56]

5.62 He added that improvements to protective equipment can be achieved through design and material selection, and that standards and technical specifications

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53 NRL, *Submission 17,* Attachment 2 (NRL Supporting documents; *Coach Handbook Community Coaches - 13+*), p. 85.

54 Dr Andrew McIntosh, *Submission 42*, p. 12.

55 Dr Andrew McIntosh, *Submission 42*, p. 12.

56 Dr Andrew McIntosh, *Submission 42*, pp. 11, 12.

are proven methods for improving personal protective equipment performance. Dr McIntosh highlighted the example of Cricket Australia implementing such standards:

> … Cricket Australia set a very positive example through its engagement with British Standards and the inclusion of minimum performance criteria for neck protectors in BS7928:2013+A1:2019 (Head Protectors for cricketers).
>
> Even in a relatively short time period, we were able to have a modified version of a popular commercially available headgear manufactured that outperformed the standard version.[57]

5.63 Dr McIntosh proposed that roundtable discussions with national sporting organisations, sporting goods suppliers, players, club and school officials, parents and experts are conducted to devise a coordinated approach and identify performance criteria for padded headgear.[58]

5.64 He noted that further research and development would be needed to assess the headgear, but that the ultimate outcome would be:

> … a range of headgear models on the market that are acceptable to players (usability/comfort/aesthetics/price), which offer a minimum agreed level of head protection … and for which there is a scientific evidence base.[59]

Evidence regarding head gear in different sports

5.65 Former Olympic and Commonwealth Games track cyclist Ms Julie Speight, who continues to suffer the effects of sport-related concussions, called for reforms to ensure cyclists are racing with safe and up-to standard helmets:

> As far as cycling is concerned, there is an awareness of the dangers of head injury but not for after-care of head injury or replacement of helmets. I believe that we need to take more care with our helmets… I propose that the government work with helmet manufacturers to provide reasonable costing to allow for racing cyclists to be able to purchase two helmets at the beginning of the racing season and a scheme whereby they can send damaged helmets back to the manufacturer and be able to buy a replacement at a reduced price. Certainly, helmet inspections prior to racing need to be rigorous, and if the helmet is found to be damaged it should be confiscated and the spare helmet used. The challenge is to be able to determine when the helmet has suffered a substantial blow and should be replaced, when it is doubtful that an eager rider will divulge this information if it means having to destroy his or her expensive helmet that may look fine.[60]

5.66 In terms of boxing, the committee heard that there is inconsistency in rules regarding the use of head guards between genders and level of competition,

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57 Dr Andrew McIntosh, *Submission 42*, p. 12.

58 Dr Andrew McIntosh, *Submission 42*, p. 13.

59 Dr Andrew McIntosh, *Submission 42*, p. 13.

60 Ms Julie Speight, *Submission 48*, [p. 3].

where elite men are the only cohort not required to wear head guards. Ms Dinah Glykidis, Chief Executive Officer of Boxing Australia, told the committee:

> In our sport, open elite men's is non-helmeted, without head guards. Everyone else—so under 18-year-olds—all must wear head guards, including our open women's… It's only in our open men's that they don't need to wear one. That's [based] off our international rules.[61]

5.67 The Western Australian Combat Sports Commission commented that the use of head gear in boxing is contentious:

> The use of padded head gear, particularly in the sport of boxing, is a contentious issue. Whilst padded head gear can prevent or minimise facial lacerations it is the CSC [Combat Sports Commission] understanding that numerous scientific research papers are either inconclusive or have concluded that head gear does not prevent or minimise concussion.
>
> … There are concerns over head gear providing a false sense of security and potentially leading to some contestants willingly accepting more hits to the head or developing poor head defence techniques as opposed to those not wearing head gear. It may appear to be counter intuitive but the removal of head gear, rather than the enforcement of head gear may be an alternative approach and has been adopted at Olympic level boxing.[62]

5.68 In the context of cricket, Cricket Australia reported that at an elite and community level, it is a requirement that all junior players wear cricket helmets while playing the sport. Cricket Australia acknowledged that 'whilst cricket helmets do not eliminate the risk of concussion, they do reduce the likelihood that that head trauma will result in concussion'.[63]

5.69 For other cricketers, Cricket Australia outlined that it makes recommendations regarding the use of helmets and neck protectors in community competitions, which includes recommendations that local associations adopt the same compulsory use of helmets as the elite-level cricket players.[64]

Stand-down and return to play protocols

5.70 Return to sport rules and regulations have changed significantly over the past two decades. Twenty years ago, over 50 per cent of players suffering concussion in some sports returned to play on the same day they suffered the injury or were not even removed from play at all. As submitted by the ASC, it is now very unusual for elite athletes to return to play in under six days, and several

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61 Ms Dinah Glykidis, Chief Executive Officer, Boxing Australia, *Committee Hansard*, 1 March 2023, p. 18.

62 Western Australia Department of Local Government, Sport and Cultural Industries, *Submission 36*, p. 6.

63 Cricket Australia, *Submission 20*, [p. 6].

64 Cricket Australia, *Submission 20*, [p. 6].

organisations, including the Australian Institute of Sport (AIS), have introduced protocols which make it highly unlikely for athletes to return in less than 12 days.[65]

5.71 The guidelines and practices that contact sports associations and clubs follow when concussions occur vary from sport to sport, and, although some associations and clubs support and endorse the AIS Concussion and Brain Health Position Statement 2023, it was noted by Concussion Australia that they can have conflicting material in their own guidelines.[66]

5.72 Within competitive sports globally there also exists a strong incentive to win, and compelling social, normative, and economic factors that can influence decision-making. In Australia, several professional players have asserted that the decision regarding their fitness to return to play should be theirs to make—irrespective of the risk disclosures by any club doctor. These players argued that bodily autonomy and their rights over health-related decisions should prevail, despite any contrary medical advice and scientific uncertainty regarding the long-term harm such decisions may have.[67]

Varying perspectives on appropriate return to play protocols

5.73 A number of inquiry participants provided the inquiry with their perspectives and views on the current return to play protocols and made a number of suggestions on how they thought these protocols could be improved. The following discussion canvasses a number of these perspectives and suggestions.

5.74 Some inquiry participants urged for consistency and uniformity in return to play protocols across all sports. For example, the Public Health Association of Australia urged for standardised guidelines at all levels of sport:

> The management of these injuries should not vary so widely. We urge that there be standard SRC guidelines which are mandatory for all sports at all levels to follow. These guidelines should be formed primarily by experts in the health field, including head trauma doctors, public health advisors, pediatricians, researchers, and neurologists. It is important that the expert body be independent of any sporting code affiliation to avoid conflict of interest. Sports association doctors should be consulted, but only to gain perspectives of on-field experience, not to weaken the guidelines. We believe this will ensure that the guidelines are up-to-date, consistent, and clear. The guidelines must be mandatory for all levels of sport, updated regularly and implemented with education campaigns.[68]

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65 Australian Sports Commission, *Submission 10,* p. 9.

66 Concussion Australia, *Submission 3,* [p. 1].

67 Dr Annette Greenhow, *Submission 7*, p. 4.

68 Public Health Association of Australia, *Submission 58*, p. 7.

5.75 Concussion Australia similarly recommended that a uniform set of guidelines is developed by independent medical practitioners for use in all Australian sports.[69]

5.76 The Chair of the Expert Working Group at Mission for Traumatic Brain Injury, Professor Melinda Fitzgerald, said:

> … recovery needs to be managed carefully to ensure that symptoms have completely resolved, even when exercising, before returning to the field of play. We need a different recovery path for every person. There's no one-size-fits-all approach. It's key that the people managing it speak with all ages, levels and locations with the education to guide this best-practice approach. If people return to play early, they're at greater risk of another concussion, and their recovery from that will take longer.[70]

5.77 The Community Concussion Research Foundation submitted that research suggested that it is dangerous to return to play inside the 'vulnerability window' of one month without the completion of multi-modality tests. It stated that a stand down period of 12 days was inadequate and that there was evidence that AFL players were returning to play with high levels of damaged brain cells—putting them at risk of long-term harm.[71]

5.78 Noting that players face incentives to avoid disclosing their symptoms, the Community Concussion Research Foundation also argued that these individuals need to be thoroughly evaluated by a health care provider experienced in working with concussions before being cleared to return to play.[72]

5.79 Injury epidemiologist and member of the Scientific Advisory Committee at Sports Medicine Australia, Dr Reidar Lystad, said:

> … most sporting codes rely heavily on the Concussion in Sport Group international consensus statement, which is, unfortunately, open to interpretation … and they've changed their position across their evolution within their five consensus statements. Initially they had stated that recovery was typically within seven days. That has been expanded to 10 to 14 days. And they do have some wording around children potentially having a prolonged recovery time, without providing any specific guidance further along those lines.
>
> My view is that the only workable way to reduce the lack of consistency across the sector in terms of concussion guidelines and protocols, which typically rely heavily on the international consensus statement, is for the

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69 Concussion Australia, *Submission 3,* p. 2.

70 Professor Melinda Fitzgerald, Chair, Expert Working Group, Mission for Traumatic Brain Injury, *Committee Hansard,* 1 March 2023, p. 30.

71 Community Concussion Research Foundation, *Submission 52*, p. 21.

72 Community Concussion Research Foundation, *Submission 52*, p. 21.

> government to take a more active role in governance of concussion in sport in this country.
>
> I would like the government to consider giving the Australian Sports Commission a mandate to take a governance role in this space. That includes developing and implementing an Australia-wide concussion guideline and policy applicable across sporting clubs.[73]

5.80 Professor Karen Barlow from the Child Health Research Centre at the University of Queensland said:

> I find at the moment that the rules around resting or not returning to contact sport after a concussion quite arbitrary and based on the sport than the actual injury. I'm quite perplexed by why that is.[74]

5.81 Neuroscientist Professor Alan Pearce highlighted the confusion that currently exists regarding return to play protocols, both across different sports and within the same sport, and argued that the government has a role to play:

> Anecdotally I get to speak to a lot of sports at the club level in particular. A lot of feedback coming to me is that they're confused. There is confusion between different sports. There's a bit of confusion even within a sport. I think if the government is able to have some form of policy or law that we get people to sit out, whether it's kids for a certain period of time or adults for a certain period of time, at least then the sports will be obligated, particularly at club levels, because they don't have the same infrastructure as the elite levels. At the moment, players are returning on the Tuesday after a Saturday concussion because they go to their local GP, who clears them to play.[75]

5.82 When asked whether there is a minimum time that is appropriate for a person to return to play after a concussion, a neurologist and senior lecturer at Macquarie University, Dr Rowena Mobbs, stated:

> … there is evidence at one month of brain abnormalities. In fact, there are some studies on mild traumatic brain injury with abnormalities at one year. Of course, we don't want kids out of sport for a year. It's tricky. In terms of adults, I would generally advocate a conservative path of four weeks off from play, inclusive of that weekend's games—none of this sort of 11- or 12-day approach where you can scoot in for the fortnight's games!
>
> For kids, it should be longer, and there's talk of six weeks. There was also talk, 30 years ago, in the concussion guidelines from NHMRC, of: 'If you have two concussions in a season, perhaps you should take that season off.'[76]

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[73] Dr Reidar Lystad, Member, Scientific Advisory Committee, Sports Medicine Australia, *Committee Hansard*, 30 January 2023, p. 8.

[74] Professor Karen Barlow, Child Health Research Centre, University of Queensland; Child Neurologist, Queensland Children's Hospital, *Committee Hansard*, 22 February 2023, p. 15.

[75] Professor Alan Pearce, Private capacity, *Committee Hansard*, 26 April 2023, p. 48.

[76] Dr Rowena Mobbs, Neurologist and Senior Lecturer, Macquarie University, *Committee Hansard*, 30 January 2023, p. 18.

5.83 In his submission to the inquiry, Dr David Maddocks, a neuropsychologist, highlighted some issues with having mandatory exclusion periods. He said:

> … the debate about mandatory exclusion periods has been going on for many years in contact sports. There is clearly intuitive appeal in setting a conservative period before which a player cannot return. I believe mandatory exclusion periods are reasonable to adopt. However, for completeness, I understand the reason why some sports did not previously implement a mandatory period was because it was believed that, at professional levels (with readily available expert medical opinion), each case could more appropriately be assessed clinically on a case-by-case basis to determine when a player was fit to resume. Further, a mandatory exclusion period could tempt players, trainers and coaches at lower levels of competition and parents (in the case of a child athlete) to believe that the player is safe to return as soon as the period has passed, when they might not be.[77]

5.84 Miss Lydia Pingel, a former player in Queensland Australian Football League Women's (QAFLW) and division one leagues who was medically retired after sustaining multiple concussions over a three-year period, recommended that there be a one month imposed stand down period after sustaining a concussion. She recommended this be the case regardless of whether the concussion was sustained during training or a game, and that, after three diagnosed concussions in a season, there be a mandatory 12 month medical stand down period.[78]

Specific protocols for children and young people

5.85 A number of inquiry participants specifically commented on return to play policies for children and young people, including whether this cohort takes longer to recover than adults, and whether they should return to schooling prior to sport.

5.86 For example, the Tasmanian Government submitted that children and young people's experience of concussion recovery is different to adults, with this cohort more likely to develop post-concussion symptoms and take longer to recover. It explained that a growing body of research indicates a slower rate of recovery in children and adolescents under 18 years, and that a more conservative approach to concussion is recommended. It added:

> Children and adolescents may be more susceptible to concussion due to a variety of factors, including decreased myelination, poor cervical musculature, and increased head to neck ratio. The role of cerebral blood flow alterations in the pathophysiology of concussion may be more significant in children than in adults.

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77 Dr David Maddocks, *Submission 55,* p. 3.

78 Miss Lydia Pingel, *Submission 8,* [p. 4].

> … Early targeted multidisciplinary management can reduce the risk of complications and speed of recovery for children and young people affected by concussion.[79]

5.87 The Murdoch Children's Research Institute (MCRI) asserted that concussion and repeated head trauma is 'inherently different in developing children compared to adults' and that the prevention of long-term effects require diagnosis, management and recovery protocols that are specific for children.[80]

5.88 MCRI highlighted research from over 90 000 children who were concussed, which indicated that children take twice as long to recover compared to adults, and with one in four children still experiencing symptoms one month post-concussion.[81]

5.89 MCRI also submitted that research indicates that less than 50 per cent of children with concussion present for medical attention and recover without intervention. It added that of those that seek medical attention, approximately 70 per cent are symptom free within 10 days and the remaining 30 per cent experience symptoms for longer (up to three months), with a small proportion experiencing symptoms after that time.[82]

5.90 Neurologist Professor Karen Barlow, on behalf of the Queensland Paediatric Rehabilitation Service, outlined that the impacts of concussion are greater in children due to the period of rapid developmental and psychological change which occurs in childhood.[83]

5.91 The Queensland Paediatric Rehabilitation Service presented different research which indicted that 50 per cent of children have symptoms that last at least a month, and that between 14 per cent to 33 per cent of children have symptoms lasting three months or longer, experiencing symptoms such as headaches, difficulty concentrating, remembering and paying attention in class, balance problems, dizziness, poor sleep, visual and mood disturbances.[84]

5.92 The Queensland Paediatric Rehabilitation Service submitted that it is unknown how long it takes for the brain to fully recover post-concussion, and that further research is needed to improve understanding of the best and safest way to get children back to school and play.[85]

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79 Tasmanian Government, *Submission 25,* pp. 5, 6.

80 Murdoch Children's Research Institute (MCRI), *Submission 40,* [p. 2].

81 MCRI, *Submission 40,* [p. 5].

82 MCRI, *Submission 40,* [p. 3].

83 Queensland Paediatric Rehabilitation Service, *Submission 28,* p. 1.

84 Queensland Paediatric Rehabilitation Service, *Submission 28,* p. 1.

85 Queensland Paediatric Rehabilitation Service, *Submission 28,* p. 2.

5.93 A 2018 Kidsafe WA childhood injury report, which investigated sporting inquiries suffered by children, found that children bear particular risks from a concussion:

> Children are especially susceptible to concussions and often present with varied symptoms due to physiological differences in their brains……. Following a concussion worse outcomes are seen in younger groups with an added risk of further injury if play is not stopped immediately. Second impact syndrome can occur when a brain that has not healed from a previous concussion experiences additional trauma. Most reported cases of second impact syndrome that have led to death or disability have occurred in younger athletes.[86]

5.94 Dr Reidar Lystad made the following comments regarding recovery periods for children:

> In terms of whether or not children take longer to recover, we know that at least one-third of children experience concussion symptoms at the four-week mark, which is an estimate that it's higher than it is for adults. So the answer is, yes, they probably do take longer to recover.[87]

5.95 When asked whether 12 days was enough time for children to recover before returning to play, Professor Barlow said that it probably wasn't, and suggested that 30 days would be more realistic before a child continues with contact sports.[88]

5.96 When answering the same question about minimum stand down periods, the Chief Executive Officer of Headsafe, Dr Adrian Cohen, said:

> It depends on the individual—in this case, the child—their history, the sport, the incident. And the codes themselves don't really do that; they just make blanket rules, which they have to. So we have to individualise it. They need to have guidelines that are enforceable, so that they can't skirt around the edges, and, as I talked about before, play one sport on one day and then go to another sport two days later because nobody knew that they were injured in the other one. So mandatory reporting of concussion should be high on the agenda.[89]

5.97 When asked whether children should be returning to school before sport after incurring a concussion, Dr Paul Bloomfield said:

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[86] Kidsafe WA, *Kidsafe WA Childhood Injury Research Report: Sporting Injuries*, April 2018, p. 2, www.kidsafewa.com.au/download/sporting-injuries-research-report/?wpdmdl=2473&refresh=64c0bb7f941471690352511 (accessed 27 July 2023).

[87] Dr Reidar Lystad, Member, Scientific Advisory Committee, Sports Medicine Australia, *Committee Hansard*, 30 January 2023, p. 8.

[88] Professor Karen Barlow, Child Health Research Centre, University of Queensland; Child Neurologist, Queensland Children's Hospital, *Committee Hansard*, 22 February 2023, p. 15.

[89] Dr Adrian Cohen, Chief Executive Officer, Headsafe, *Committee Hansard*, 30 January 2023, p. 18.

> … the return to sport should wait until a successful return to school. There are guidelines—mostly published by the Concussion in Sport Group—around return-to school protocols. There is staged return; but, again, depending on levels of symptoms, that can be as short as a day or as long as many weeks. But a successful return to school should occur before a return to sport.[90]

5.98 On this same issue, Dr Lystad said that return to learning should take precedent over the return to sport. Dr Lystad also referenced research he recently conducted into the effect of concussion on school performance. He explained the research showed significant impacts of concussion on school performance, including failure to achieve minimum standards of NAPLAN assessment and higher risk of incompletion of high school.[91]

5.99 The Tasmanian Government also explained that post-concussion symptoms can have an impact on all areas of a child's life, including participation in school, employment, other community activities, social withdrawal, and a high risk of mental health concerns such as anxiety and depression. In terms of return to school, the Tasmanian Government submitted that children and young people may need to take more regular breaks, rests and increased time to complete tasks.[92]

Guidelines for non-elite sport published by the UK Government

5.100 In April 2023, the United Kingdom (UK) Government released guidelines for non-elite, or grassroots, sport. This was the first ever UK-wide concussion guidance published to help people identify, manage, and prevent concussion affecting players in grassroots sport. Amongst other things, these guidelines stated the following:

- anyone with one or more visible clues, or symptoms, of a head injury must be immediately removed from playing or training and must not take part in any further physical sport or work activity—even if symptoms resolve—until an assessment can be made by an appropriate healthcare professional;
- return to education and work takes priority over return to sport;
- individuals with concussion should only return to playing sport which risks head injury after having followed a graduated return to activity and sport program;
- all concussions should be managed individually; however, there should be no return to competition before 21 days from injury; and

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90 Dr Paul Bloomfield, New South Wales State Councillor, Sports Medicine Australia, *Committee Hansard,* 30 January 2023, p. 7.

91 Dr Reidar Lystad, Member, Scientific Advisory Committee, Sports Medicine Australia, *Committee Hansard,* 30 January 2023, p. 8.

92 Tasmanian Government, *Submission 25,* p. 6.

- anyone with symptoms after 28 days should seek medical advice from their general practitioner.[93]

The position of the Concussion in Sports Group

5.101 In its 2017 consensus statement, the Concussion in Sport Group (CISG) outlined its approach to return to play after an athlete sustains a sport-related concussion. It provided a recovery process which followed a graduated stepwise rehabilitation strategy:

> After a brief period of initial rest (24–48hours), symptom-limited activity can be begun while staying below a cognitive and physical exacerbation threshold (stage 1). Once concussion-related symptoms have resolved, the athlete should continue to proceed to the next level if he/she meets all the criteria (eg, activity, heart rate, duration of exercise, etc) without a recurrence of concussion-related symptoms.
>
> Generally, each step should take 24 hours, so that athletes would take a minimum of 1 week to proceed through the full rehabilitation protocol once they are asymptomatic at rest. However, the time frame for [return to sport] may vary with player age, history, level of sport, etc, and management must be individualised.
>
> In athletes who experience prolonged symptoms and resultant inactivity, each step may take longer than 24 hours simply because of limitations in physical conditioning and recovery strategies outlined above. This specific issue of the role of symptom-limited exercise prescription in the setting of prolonged recovery is discussed in an accompanying systematic review.
>
> If any concussion-related symptoms occur during the stepwise approach, the athlete should drop back to the previous asymptomatic level and attempt to progress again after being free of concussion-related symptoms for a further 24 hour period at the lower level.[94]

The position of the Australian Sports Commission

5.102 Both the Concussion in Sport Australia Position Statement issued in 2019, and the updated AIS Concussion and Brain Health Position Statement 2023 (position statement) advocate for athletes to be removed from sport when there is any suspicion that a concussion has been sustained. This approach is reflected in the 'if in doubt, sit them out' catchphrase.[95]

5.103 The position statement also outlines a graduated return to sport process where it is highly unlikely that an athlete would return to play in less than 12 days

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93 UK Government, *If In Doubt, Sit Them Out: UK Concussion Guidelines for Non-Elite (Grassroots) Sport,* April 2023, p. 4. For further information, please see: www.sportandrecreation.org.uk/policy/research-publications/concussion-guidelines

94 Paul McCrory et al, 'Consensus statement on concussion in sport—the 5th international conference on concussion in sport held in Berlin, October 2016', *British Journal of Sports Medicine*, 2017, vol. 51, p. 844.

95 Australian Sports Commission, *Submission 10,* p. 4.

from sustaining a concussion and, in many cases, the duration for a return to sport would exceed this length of time.[96]

5.104 The timeframe for returning to play is modified for individuals who are aged 18 years and under. For these athletes, they must be symptom-free for a period of 14 days before a return to contact activities can be considered. This approach means that if a young person has symptoms that continue for 14 days after they initially incurred a concussion, they will not be eligible for return to sport for 28 days (that is, 14 days with symptoms plus 14 days without symptoms equals 28 days in total). The ASC noted that this cautionary approach is based on evidence that young people take longer to recover from a concussion.[97]

5.105 The degree of caution exercised is also modified if an athlete has a history of repeated head trauma—with the duration of time required before returning to play being increased, particularly where there have been recurrent concussions within short periods of time. Further, where an athlete has sustained multiple concussions, a medical practitioner provides counsel regarding the dangers of repeated head trauma, its potential long-term impacts, and the need for the athlete to consider their continued involvement in high-risk sports.[98]

5.106 Although advocating for a collaborative multi-disciplinary approach for concussion management, with shared decision making, the position statement outlines that any final return to sport decision should be made by an appropriately qualified medical professional.[99] Summarising its position on this issue, the ASC said the following in its submission to the inquiry:

> The best way to avoid both short-term and long-term effects from concussion is to treat each concussion seriously. Any individual with suspected concussion should be removed from the sporting environment and not be permitted to return to sport until cleared to do so by a qualified medical practitioner. Individuals with concussion should follow a graduated program for return to sport. They should not return to sport until they have fully recovered from the effects of the previous concussion.[100]

Longer stand down periods and their impact on reducing CTE

5.107 The ASC considered that it will be difficult to predict the effect that having more prolonged periods of stand down (such as 12 days) will have on the incidence of recurrent concussion and Chronic Traumatic Encephalopathy (CTE). It noted that the existing cases of CTE that have been reported in the media relate to

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96 Australian Sports Commission, *Submission 10,* p. 4.

97 Australian Sports Commission, *Submission 10,* p. 4.

98 Australian Sports Commission, *Submission 10,* p. 4.

99 Australian Institute of Sport, *Concussion and Brain Health Position Statement 2023*, February 2023, p. 27.

100 Australian Sports Commission, *Submission 10,* p. 6.

individuals who played contact sports in an era when they were either returned to play on the same day that they suffered a concussion or were not removed from play at all—and when cumulative concussions did not result in longer periods of stand down.[101]

5.108 The ASC concluded that it will likely take years, if not decades, to assess the efficacy of the more conservative guidelines. Commenting on calls made by others to impose even lengthier stand down periods, such as 28 days, the ASC said the following:

> There is no evidence base to support one stand down period over another, apart from a general principle that it is better to have a greater duration of time between exposures to head trauma risk.[102]

The various positions of Australian sporting codes

Australian football

5.109 The AFL submitted that an athlete's recovery following a diagnosed concussion is variable and, hence, management should be individualised. Given this, it currently implements a three-stage protocol for returning to play:

- First, a brief period of relative rest.
- Second, a period of recovery where progressive increases in physical and cognitive activity is encouraged. This period continues until the player no longer has concussion-related symptoms at rest, or with activity, and they have returned to 'normal' on their tests of balance and brain function.
- Third, a graded return to full activity with progressive addition of contact and monitoring for any recurring symptoms under maximal physical and cognitive load and fatigue, and confidence to return to play.[103]

5.110 Since 2021, the AFL and Australian Football League Women's (AFLW) concussion guidelines have prescribed minimum timeframes for the completion of each stage and have also mandated clearance points between each stage. The AFL stated that, as a result, the earliest a player can return to play in a match following a diagnosed concussion is on the 12th day after the day on which the concussion was sustained. Notwithstanding this, the AFL submitted that over the 2022 AFL and AFLW seasons, one in four players missed more than one game as a result of the management of their concussion.[104]

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101 Australian Sports Commission, *Submission 10,* p. 9.

102 Australian Sports Commission, *Submission 10,* p. 9.

103 AFL, *Submission 18,* p. 6.

104 AFL, *Submission 18,* pp. 6, 7.

Rugby league

5.111 The Australian Rugby League Commission (ARLC) recently approved changes to the NRL's head injury protocols, including the introduction of a mandatory 11-day stand-down period following a diagnosed concussion—regardless of whether the concussion was sustained during a game or at training. In announcing this change, the ARLC noted that it was approved following a 'review of the data and advice from a range of experts'.[105]

5.112 The Chief Medical Officer of the NRL, Dr Sharron Flahive, highlighted that not all concussions are the same. On this point she said:

> The most important part in this is that if that player has a history of a concussion with the last three months, a number of concussions in their career or a concussion that has prolonged symptoms following it or any complex concussion history, then that concussion is viewed very differently with regard to their return to play. The window closes down and we are more and more conservative in our management when it comes to what are called complex concussions.[106]

Rugby union

5.113 In its submission to the inquiry, Rugby Australia stated that if a player suffers a concussion, then a graduated return-to-play process—comprising six stages—must be adhered to. This process was updated in July 2022 to emphasise the individualisation of the rehabilitation process, as informed by each individual's risk profile, and only commences once a player is symptom free at rest.[107]

5.114 This risk profiling is informed by the number of concussions the player has had across the prior three months, 12 months, and their lifetime, as well as whether the player has experienced prolonged recoveries previously, or has exhibited unusual symptoms—including issues with mental health.[108]

5.115 Players who do not require a more conservative rehabilitation may be eligible to return to play on day seven; however, those who do require a more conservative approach will only be available for selection on day 12, at the earliest. Rugby Australia submitted that this approach means that the majority of players will not return to play before day 12.[109]

Various combat sports

5.116 Boxing Australia currently has a minimum 30-day mandatory stand down period following a concussion sustained during a competition. This period

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105 NRL, *Submission 17, Attachment 3*, [p. 1].

106 Dr Sharron Flahive, Chief Medical Officer, NRL, *Committee Hansard*, 1 March 2023, p. 8.

107 Rugby Australia, *Submission 12*, [p. 20].

108 Rugby Australia, *Submission 12*, [pp. 21, 22].

109 Rugby Australia, *Submission 12*, [p. 22].

progressively increases following further concussions and knockouts and prohibits an athlete from both competing and sparring.[110] Muay Thai Australia has also introduced concussion guidelines which require a 30-day stand down period, but from competition only.[111]

Limitations of 'self-regulation' and improving compliance with rules and return to play protocols

5.117 The committee heard compelling evidence about the limitations of national sporting organisations 'self-regulating' concussion safety policies and the need to improve adherence to many of the rules and protocols that have been discussed throughout this chapter.[112]

5.118 Australian Health Promotion Association submitted that multiple examples of voluntary codes of conduct or practice have shown to be insufficient in achieving widespread change. It further noted its support for the implementation of comprehensive and mandatory measures to prevent concussions and repeated head trauma.[113]

5.119 Dr Lystad similarly outlined that despite past efforts, there has been a general failure of self-regulation of concussion in sports. He reported that there has been inadequate implementation of concussion guidelines, policies and protocols in many sports in Australia. He explained:

> … Season after season, there are media reports of players being returned to the field of play on the same day after sustaining a head impact and suspected concussion. Players are sometimes being cleared to return to play despite video footage showing visible signs of concussion.[114]

5.120 The Community Concussion Research Foundation also argued that self-regulation by Australian sporting organisations had failed and added that these self-regulatory approaches among Australian sports had, in several cases, led to 'inconsistent application, haphazard enforcement and mixed messaging'.[115]

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110 Ms Dinah Glykidis, Chief Executive Officer, Boxing Australia, *Committee Hansard*, 1 March 2023, p. 17.

111 Concussion Australia, *Submission 3*, [p. 1].

112 See, for example, Shine Lawyers, *Submission 6*, p. 13; Mr Gregory Griffin, Principal, Griffins Lawyers, *Committee Hansard*, 26 April 2023, p. 30; Dr Adrian Cohen, Chief Executive Officer, Headsafe, *Committee Hansard*, 30 January 2023, p. 18; Mrs Belinda Vardy, *Submission 78*, p. 4; Dr Reidar Lystad, *Submission 70*, p. 2.

113 Australian Health Promotion Association, *Submission 59*, [p. 5].

114 Dr Reidar Lystad, *Submission 70*, p. 2.

115 Community Concussion Research Foundation, *Submission 52*, p. 10.

5.121 Dr Annette Greenhow, a lawyer and expert in the regulation of sport-related concussion in Australia, further explained the limitations of self-regulation within this sporting context:

> Sports associations and clubs are essential in providing and delivering sport in Australia. They are centrally rooted in their sport and typically thought to possess higher levels of expertise or technical knowledge about their sport. However, there are gaps and areas for improvement in how the sports have privately self-regulated SRC [sport-related concussion]. There are many competing or colliding interests to manage, coupled with the disruptions presented by SRC in some full [body] contact sports.[116]

5.122 Evidence from Professor Jack Anderson, a sports law expert, and former professional track cyclist Ms Julie Speight, highlighted that a particular test of adherence to return to play protocols arises in the case of big sporting events such as the Olympic Games or grand finals. For example, if a player suffers a concussion in a semi-final and then has to miss the grand final the following weekend.[117]

5.123 Additional lived experience accounts from former athletes, such as Miss Lydia Pingel, also demonstrated that whilst concussion protocols and guidelines may exist, they are not always followed or adhered to.[118]

5.124 Several other submitters with lived experience of the impacts of repeated head trauma in contact sport broadly called for measures to enhance the enforcement of concussion safety protocols, including Mr Peter 'Wombat' Maguire, Mr Robin McGilligan, Belinda Vardy, Mrs Kathy Strong, and Geoff and Jean Cook.[119]

5.125 Some inquiry participants outlined the need for government leadership or regulation to help address the issues surrounding self-regulation of concussion protocols by sporting codes.[120]

5.126 Dr Greenhow submitted that public oversight and leadership is needed to direct the sport-related concussion agenda, to champion the public interest, and take leadership in designing regulatory arrangements with the public's interest in mind. Dr Greenhow also suggested that legislative measures could be used, or

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116 Dr Annette Greenhow, *Submission 7*, p. 5.

117 Professor Jack Anderson, *The Future Of Footy And The Merits Of The Concussion Class Actions In The AFL*, Additional information received 1 May 2023, [p. 6]; Ms Julie Speight, *Submission 48*, [p. 3].

118 Miss Lydia Pingel, *Submission 8*, [pp. 2, 4]; Ms Julie Speight, *Submission 48*, pp. 1, 2.

119 See, for example, Geoff and Jean Cook, *Submission 66*, [pp. 1, 2], Mr Peter 'Wombat' Maguire, *Submission 47*, [p. 7]; Mr Robin McGilligan, *Submission 73*, [p. 5]; Belinda Vardy, *Submission 78*, p. 4.

120 See, for example, Dr Annette Greenhow, *Submission 7,* p. 6; Dr Annette Greenhow, Private capacity, *Committee Hansard,* 22 February 2023, p. 11; Mr Gregory Griffin, Principal, Griffins Lawyers, *Committee Hansard*, 26 April 2023, p. 30; Griffins Lawyers, *Submission 50,* [p. 11]; Dr Reidar Lystad, *Submission 70*, p. 3; Insurance Council of Australia, *Submission 30,* p. 2.

funding to sports could be tied to the implementation and compliance of concussion protocols.[121]

5.127 Griffins Lawyers outlined a similar case for public oversight:

> The many stakeholders seeking to influence the management of concussion in Australian sport emphasises the need for an impartial central public authority to manage concussion in accordance with an ethical framework and via an integrated systemic approach.[122]

5.128 Mr Gregory Griffin, Principal of Griffins Lawyers, added that a public authority should be responsible for the creation and enforcement of concussion guidelines and return to play protocols.[123]

5.129 Amongst other measures, Dr Reidar Lystad similarly proposed that a regulatory body be established to govern traumatic brain injury and repetitive head trauma in sport.[124]

5.130 The Insurance Council of Australia submitted that governments should play a central role in the implementation of clear, unambiguous and effective concussion and head trauma health and safety guidelines and procedures for sporting organisations to minimise and manage instances of concussion and long-term injury, as well as ensuring these guidelines and procedures are applied.[125]

5.131 Shine Lawyers asserted that consistent concussion protocols should be enforced and that penalties for failing to comply should be legislated.[126]

5.132 As mentioned earlier in this chapter, the Public Health Association of Australia highlighted that referees and other officials also play a key role in enforcing adherence to rule changes:

> Without enforcing adherence to the rule changes, concussion risk is not mitigated. If referees are too lenient, players may take advantage and become aggressive during play. Officials must be frequently re-trained about rule changes and the seriousness of head injuries. Another way to ensure implementation might be to review video playbacks of games and assess whether officials are enforcing safety rules. Officials who fail to enforce rules that affect player safety should be disciplined. Greater

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[121] Dr Annette Greenhow, *Submission 7*, p. 6; Dr Annette Greenhow, Private capacity, *Committee Hansard,* 22 February 2023, p. 11.

[122] Griffins Lawyers, *Submission 50,* [p. 11].

[123] Mr Gregory Griffin, Principal, Griffins Lawyers, *Committee Hansard*, 26 April 2023, p. 30; Griffins Lawyers, *Submission 50,* [p. 11].

[124] Dr Reidar Lystad, *Submission 70*, p. 3.

[125] Insurance Council of Australia, *Submission 30,* p. 2.

[126] Shine Lawyers, *Submission 6*, p. 13.

penalties for dangerous play should also apply to players and their coaches.[127]

5.133 Dr Annette Greenhow suggested that the remit of various existing agencies should be looked at to determine where the regulation or custodianship of these issues could sit in the future. She also noted that Sport Integrity Australia's remit was originally anti-doping, but has since been expanded into other areas.[128]

5.134 Mr Griffin also suggested that Sport Integrity Australia 'would be the ideal government agency to take control of the entire management of return to play protocols and concussion issues'.[129]

5.135 After attempting to make a complaint to Sport Integrity Australia, regarding gymnastics safety issues, Ms Aisha Stewart told the committee she was advised by the agency that they 'would like sports to educate players about the high risk of concussion, but they don't have any mandate to insist that that happens and they don't have any powers to penalise sports for not providing or deciding to withhold that information'.[130]

5.136 Whilst the committee did not hear directly from Sport Integrity Australia throughout the course of the inquiry, the committee understands that sport-related concussion safety issues are not within the scope of its mandate. Sport Integrity Australia's current role is to provide advice and assistance to counter the:

- use of prohibited substances and methods in sport
- abuse of children and other persons in a sporting environment
- manipulation of sporting competitions
- failure to protect members of sporting organisations and other persons in a sporting environment from bullying, intimidation, discrimination or harassment.[131]

5.137 Evidence provided by Mr Kieren Perkins OAM, Chief Executive Officer of the ASC, indicated that the ASC may not be best placed to enforce rule changes or concussion protocols given it is not a regulatory authority. However, Mr Perkins added that the ASC does play a critical role in 'guiding sporting organisations

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127 Public Health Association of Australia, *Submission 58*, p. 8.

128 Dr Annette Greenhow, Private capacity, *Committee Hansard*, 22 February 2023, p. 10.

129 Mr Gregory Griffin, Principal, Griffins Lawyers, *Committee Hansard*, 26 April 2023, p. 36.

130 Ms Aisha Stewart, Private capacity, *Committee Hansard*, 26 April 2023, p. 62.

131 Sport Integrity Australia, *Who we are*, www.sportintegrity.gov.au/about-us/who-we-are (accessed 6 July 2023).

and the sector in relation to a range of issues impacting sport, including sport related concussion'.[132]

Committee view

Rule modifications and skill development

5.138 The committee recognises that some national sporting organisations in Australia have taken some steps in recent years to amend rules and/or promote skill development to reduce the quantity or severity of head impacts in their game.

5.139 Whilst the committee welcomes these measures, evidence to the inquiry highlighted that bolder strategies have been implemented internationally to modify rules to keep participants safe, particularly in regard to children and adolescents. The committee is encouraged by evidence which indicates many of these measures have effectively reduced the exposure and impact of concussion and repeated head trauma in a range of sports.

5.140 The committee recognises that not all international precedents for rule modifications will directly apply to the Australian sporting context, and that evidence regarding the effectiveness of rule changes continues to emerge. However, on balance the committee considers that if it appears that a modified rule could help reduce the incidence of sport-related concussions, particularly for children and adolescents, a precautionary approach should be adopted and strong consideration be given to adopting the rule modification.

Recommendation 9

5.141 The committee recommends that national sporting organisations in Australia explore further rule modifications for their respective sports in order to prevent and reduce the impact of concussion and repeated head trauma. This work should prioritise modifications that protect children and adolescents, and take into account emerging evidence both domestically and internationally.

Return to play protocols

5.142 The committee is concerned that the disparate protocols currently in place across the various sports in Australia have created a high level of confusion within the community. The committee considers that the time frame required before a person returns to play should be determined by the severity of the head injury that they have sustained, and the person's history with head trauma and concussion—not the particular sport that they were playing when they incurred the injury.

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[132] Mr Kieren Perkins OAM, Chief Executive Officer, Australian Sports Commission, *Committee Hansard*, 1 March 2023, p. 38.

5.143 The committee also heard that the return to play guidelines that many codes currently have in place are insufficient, and that stand-down periods post-concussion should be longer than 11 or 12 days.

5.144 To reduce this confusion and increase certainty, the committee believes that the Australian Government should take a more proactive role in the governance of concussions and repeated head trauma in sport in Australia. Such an approach would reduce the inconsistencies that currently exist, and ensure all sportspeople are not risking their long-term health by returning to play prior to their full recovery.

5.145 The committee notes the UK Government has adopted a similar approach for non-elite sports by recently publishing a set of guidelines, which recommended that all concussions should be managed individually, but there should be no return to competition before 21 days from injury. The committee is of the view that a cautious approach be adopted across all levels of sport, and considers the guidelines to be an important resource for people to help identify, manage, and prevent concussions in grassroots sport. The committee supports the development of a similar publication by the Australian Government.

5.146 The committee also considers that it is vital that children and young people have adequately recovered before they return to play any form of contact sport, including training, and recognises that they likely need a longer period to recover from a concussive injury compared to adults. One witness suggested that a 30-day stand-down prior to returning to contact sport would be more appropriate. The committee supports this conservative approach for children and also agrees with inquiry participants that children should return to their schooling prior to recommencing their participation in sport after sustaining a concussion.

Recommendation 10

5.147 The committee recommends that the Australian Government, in collaboration with medical experts, develops return to play protocols, adaptable across all sports, for both children and adults that have incurred a concussion or suffered a head trauma. The committee envisages that protocols may include lengthier stand-down periods for children and individuals who have a history of repeated head trauma.

Enforcement and compliance

5.148 The committee heard that despite there being various concussion safety policies and return to play protocols in place across a range of sports, enforcing adherence and compliance to these rules remains a key challenge.

5.149 The committee is concerned by evidence from some submitters indicating that there is inadequate implementation of and adherence to concussion guidelines, policies and protocols in many sports in Australia.

5.150 In the committee's view, the value and efficacy of concussion protocols and guidelines are severely limited if they are not uniformly and properly adhered to by national sporting organisations across all levels of sport. Given that the current approach of self-regulation by national sporting organisations does not appear to be achieving widespread change, the committee considers that a different strategy is warranted.

5.151 The committee acknowledges that given the ASC is not a regulatory authority, it is not in a position to enforce rule changes or concussion protocols. However, as the ASC itself noted during the inquiry, the ASC does play a critical role in guiding sporting organisations and the sector more broadly on a range of issues impacting sport, including concussion and brain health.

5.152 As acknowledged in chapter 1, the regulatory role of the Australian Government is less straightforward given that sports in Australia are largely governed by private organisations. However, in light of the significant public health issues involved with sport-related concussion and head trauma, the committee is of the view that there is still a role for the Australian Government to play in monitoring, overseeing and/or enforcing the adherence to return to play protocols and other key concussion safety measures by sporting clubs and governing bodies.

Recommendation 11

5.153 The committee recommends that the Australian Government consider developing a national strategy to reduce the incidence and impacts of concussion, including binding return to play protocols and other rules to protect sport participants from head injuries. Consideration should be given to whether any existing government bodies would be best placed to monitor, oversee and/or enforce concussion related rules and return to play protocols in Australian sports.

Chapter 6
Remediation and support

6.1 This chapter provides an overview of the key sources of compensation and support that currently exist for players, including those provided through collective bargaining agreements, private insurance arrangements, government supports, hardship funds, and the legal system.

6.2 The chapter then highlights the deficiencies with the existing arrangements that were raised by inquiry participants, including the general exclusion of sportspeople from state and territory workers' compensation schemes, the absence of a national injury insurance scheme, inadequate supports provided by sporting organisations, inadequate private insurance, and barriers to legal remedies for concussion and repeated head trauma-related claims. The chapter concludes with the committee's view on these issues and its associated recommendations.

Key sources of compensation and support

6.3 This section provides an overview of the existing sources of compensation and support available to sportspeople in Australia.

Injury payments

6.4 For those sporting codes with organised players' associations, such as the National Rugby League (NRL) and the Australian Football League (AFL), it is common for collective bargaining agreements to be in place that provide payments where a player sustains an injury during training or match play, resulting in a loss of income. In some cases, these agreements can also cover a player's engagement in club and competition-endorsed activities. Importantly, for players who are not full-time professionals, including many women who participate in elite-level sporting competitions, some agreements also cover lost earnings from non-sport activities.[1]

6.5 Although the provisions governing these payments can be complex, they generally cover income from lost matches—sometimes subject to a reduction or cap—with retainers paid while players are under contract. Time limits generally apply to these payments, such as 104 weeks, and lost opportunities to earn prize money are not usually covered. Further, significant excesses can attach to the coverage, such as the initial 14-day period off work not being included.[2]

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1 Dr Eric Windholz, *Submission 2*, p. 3.

2 Dr Eric Windholz, *Submission 2*, p. 3.

Hardship funds

6.6 A number of sporting codes, such as the AFL and the NRL, have established hardship funds to assist their players. Payments from these funds are usually discretionary and are designed to alleviate hardship only—that is, they are not created to provide adequate compensation for their players.[3]

6.7 The below three sections provide a brief overview of the hardship funds currently in place to support players who have participated in the AFL and NRL competitions, as well as professional players of rugby union.

AFL Players' Injury and Hardship Fund

6.8 In early 2018, the AFL Players' Association established the AFL Players' Injury and Hardship Fund to support players that transition out of the game with career ending injuries and who require longer-term medical support, as well as those who suffer illness or financial hardship during their retirement. It is administered by the AFL Players' Association and is funded by the current playing group through a revenue sharing arrangement set out in the collective bargaining agreements.[4]

6.9 The fund provides a range of benefits to former AFL, AFLW, and Victorian Football League (VFL) players—some of which may support players with concussion and repeated head trauma-related injuries. These include:

- lifetime health care—reimbursement of medical costs, but not for those related to concussion or brain trauma;
- past player hardship—financial assistance for members experiencing financial hardship due to illness, injury or wellbeing issues;
- hospital excess reimbursement—reimbursement of any excess paid for a hospital stay or procedure conducted in hospital;
- football-ending injury payment—payment for players who exit the game due to an injury sustained during employment as an AFL footballer which prevents the player from playing at senior level in any competition thereafter;[5] and
- delisted injury player payment—payment for players who are unable to complete fulltime work in the first 6 months after their delisting due to a football injury which has been identified in the player's exit medical.[6]

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3 Dr Eric Windholz, *Submission 2*, p. 4.

4 AFL Players' Association, *Submission 41,* [p. 5]. For more information, see: www.aflplayers.com.au/players-home/alumni#injury-and-hardship-fund (accessed 22 May 2023).

5 The fund does not provide football-ending injury payments for female players competing in the AFLW.

6 Australian Football League (AFL), *Submission* 18, pp. 20, 21.

6.10 Since its establishment, the fund has financially supported 896 players to 2022.[7] The AFL Players' Association observed that there has been a significant increase in the number of football-ending injury applications related to concussion in recent years. For example, these accounted for 63 per cent of the successful football-ending injury applications in 2021 compared to four applications for concussion injuries prior to 2021.[8]

6.11 The AFL Players' Association submitted that it is seeking to improve the fund and has put forward a number of proposals, including:

- making all benefits available to AFLW alumni members;
- expanding the lifetime healthcare program by increasing reimbursement limits and the range of eligible treatments;
- introducing preventative physical and mental health and wellbeing programs; and
- providing greater support for the increasing number of AFLW alumni members.[9]

6.12 The General Manager of Legal and Regulatory at the AFL, Mr Stephen Meade, also commented on these proposals to expand the supports available to former players:

> We are progressing with a proposed significant expansion of the financial support that is available to former players and we're currently discussing those proposed arrangements with the AFL Players Association as part of the collective bargaining agreement arrangements, so there is some support and we are very much moving towards providing an increased level of support to those who need it.[10]

NRL's Injury Hardship Fund

6.13 The NRL's Injury and Hardship Fund was established to provide payments and support to players who experience financial hardship as a result of suffering a career ending, or other serious injury, while performing obligations under their contracts. This includes players who have been forced to retire due to concussions and repetitive head trauma.[11]

6.14 The fund may assist players to maintain their private health insurance and cover gap payments to enable their access to necessary medical treatments that could

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7 AFL Players' Association, *Submission 41,* [p. 5].

8 AFL Players' Association, *Submission 41,* [p. 5].

9 AFL Players' Association, *Submission 41,* [p. 6].

10 Mr Stephen Meade, General Manager, Legal and Regulatory, AFL, *Committee Hansard,* 26 April 2023, p. 6.

11 Rugby League Players' Association, Answers to question on notice, 30 January 2023 (received 10 March 2023).

enable the return to meaningful employment.[12] The fund is accessible to both current and retired players; however, applications generally must relate to injuries suffered after 31 October 2017.[13]

6.15 The fund is financed by arrangements agreed between the Rugby League Players' Association and NRL as part of their collective bargaining agreement, and funds not expended during a season, or term of agreement, are rolled over.[14]

Rugby Union Players' Association's Hardship Fund

6.16 In 2007, the Rugby Union Players' Association established a hardship fund to provide past player members and their family members with financial assistance in the event of serious hardship. Past players are able submit applications for financial assistance on a range of issues, including psychological support and wellbeing counselling. Rugby Union Players' Association noted that, while current players also have access to confidential clinical psychology sessions, funding limitations have restricted its ability to provide the same level of support to former members.[15]

Private health and other insurance

Health insurance

6.17 Collective bargaining agreements commonly place contractual obligations upon players to take out and maintain, at their own expense, top level private health insurance for the terms of their playing contracts. Clubs and leagues generally pay any excess medical costs, after private health insurance and Medicare contributions, incurred for treatment associated with an injury incurred during training or match play. Commonly, these obligations on clubs and leagues continue for specific periods after a player's contract is terminated—generally between six and 18 months.[16]

Total and permanent disability insurance

6.18 A number of sports provide their players with total and permanent disability (TPD) insurance, and some superannuation plans also provide TPD insurance

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12 Rugby League Players' Association, Answers to question on notice, 30 January 2023 (received 10 March 2023).

13 NRL, Answers to questions on notice, 1 March 2023 (received 24 March 2023). The Rugby League Players' Association has the power to grant a pay out from the fund to a retired player who suffered an injury before October 2017 only in exceptional circumstances; however, this can include long-term complications from head injuries and concussions.

14 Rugby League Players' Association, Answers to question on notice, 30 January 2023 (received 10 March 2023).

15 Rugby Union Players' Association, Answers to questions on notice, 1 March 2023 (received 23 March 2023).

16 Dr Eric Windholz, *Submission 2*, p. 3.

coverage. Eligibility for TPD insurance payments varies from plan to plan; however, it generally depends on two factors: the permanency of employment at the date of disability; and the degree and permanence of the acquired impairment. And like most insurance contracts, TPD insurance also commonly involves the incurrence of a waiting period.[17]

6.19 These requirements can result in the exclusion of players on short-term contracts as well as those with various debilitating long-term injuries and who may be suffering the severe effects—but not necessarily total and permanent disability—of incurring concussions and repeated head trauma.[18]

Medicare, the National Disability Insurance Scheme, and other government supports

6.20 Like other Australians, professional sportspeople can access Australia's public hospital system and the Commonwealth's universal health insurance scheme, Medicare. This is an exception to the general principle that Medicare does not cover medical expenses arising out of work-related activities, which are normally covered under the various workers' compensation schemes. Affordable and timely support through the public health system and Medicare, however, is not guaranteed, and people commonly experience long wait times for treatment at public hospitals and can also incur significant gap payments.[19]

6.21 Depending on their disability, professional players may also be able to access the National Disability Insurance Scheme (NDIS) and others forms of social security should their injuries result in them being unable to support themselves.[20] Importantly, however, a person must be under the age of 65 to apply for support under the NDIS. This requirement can preclude players who develop severe and disabling symptoms later in life, and those individuals with symptoms that may not be severe by their mid-60s, but which continue to worsen over time—including a number of neurodegenerative diseases.[21]

Torts and crimes compensation through the courts

6.22 Players can also seek compensation through legal action in tort[22] and crimes compensation legislation—if a player is injured as a result of a criminal act, or

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17 Dr Eric Windholz, *Submission 2*, p. 4.

18 Dr Eric Windholz, *Submission 2*, p. 4.

19 Dr Eric Windholz, *Submission 2*, pp. 3, 4.

20 Dr Eric Windholz, *Submission 2*, p. 4.

21 Shine Lawyers, *Submission 6*, p. 11.

22 A tort is a legal wrong which one person or entity, the tortfeasor, commits against another person or entity and for which the usual remedy is an award of damages. For more information, see: www.alrc.gov.au/publication/traditional-rights-and-freedoms-encroachments-by-commonwealth-

omission, of another person.[23] For example, where there has been fault on behalf of a club or sporting body, an injured player may be entitled to pursue a common law claim for negligence. Such claims can attract significant compensation—for example, in Victoria, the current caps on common law damages are $660,970 for pain and suffering damages and approximately $1.5 million for economic loss.[24]

6.23 Further, Victoria does not cap medical expenses under common law and claims for negligence and other compensation, such as for the provision of gratuitous care, may be claimed.[25] Notwithstanding this, these legal processes are commonly slow, cumbersome, and costly, and have an uncertain outcome. They are generally only relied upon when existing insurance arrangements are inadequate.[26]

Current and former class actions

6.24 Both domestically and internationally, there has been an emerging trend of litigation from former athletes suffering the long-term effects of concussions and repeated head trauma. Domestically, a class action was lodged by Margalit Injury Lawyers in the Supreme Court of Victoria earlier this year on behalf of all professional AFL players who sustained concussion-related injuries through head strikes while playing or training between 1985 and 14 March 2023.[27]

6.25 Upon lodgement, more than 60 former players had come forward to join the class action, which is seeking about $2 million per player, plus medical expenses. It was estimated by Margalit Injury Lawyers that total costs to the AFL could be close to $1 billion.[28] A second class action was also subsequently filed in the Supreme Court of Victoria by Griffins Lawyers against the AFL and four clubs

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laws-alrc-interim-report-127/17-immunity-from-civil-liability/what-is-a-tort/ (accessed 22 May 2023).

23 Dr Eric Windholz, *Submission 2*, p. 4.

24 Margalit Injury Lawyers, *Submission 45*, p. 7.

25 Margalit Injury Lawyers, *Submission 45*, p. 7.

26 Dr Eric Windholz, *Submission 2*, p. 4.

27 Australian Associated Press, 'Landmark class action chases up to $1bn compensation for alleged long-term concussion damage to AFL players', *The Guardian*, www.theguardian.com/sport/2023/mar/14/landmark-class-action-chases-compensation-for-alleged-long-term-concussion-damage-to-afl-players (accessed 22 May 2023).

28 Australian Associated Press, 'Landmark class action chases up to $1bn compensation for alleged long-term concussion damage to AFL players', *The Guardian*, www.theguardian.com/sport/2023/mar/14/landmark-class-action-chases-compensation-for-alleged-long-term-concussion-damage-to-afl-players (accessed 22 May 2023).

on behalf of former players who allegedly suffered brain injuries after sustaining repeated concussions during gameplay since 1990.[29]

6.26 A number of class actions have also been initiated in various international jurisdictions. For example, in the United States of America, there were a series of class actions brought by players against the National Football League (NFL), resulting in a $1 billion settlement. In these actions, players alleged that the NFL had 'failed to take reasonable actions to protect players from the chronic risks created by concussive and sub-concussive head injuries and fraudulently concealed those risks from players'.[30]

6.27 In the United Kingdom, a class action is currently underway across the various rugby codes. In this action, players are alleging that 'rugby's governing bodies negligently failed to protect them from concussion and non-concussion injuries that caused various neurological disorders, including early onset dementia, Chronic Traumatic Encephalopathy (CTE), epilepsy, Parkinson's disease and motor neurone disease'.[31]

Deficiencies of existing insurance, compensation, and support arrangements

6.28 Connectivity Traumatic Brain Injury Australia (Connectivity) an Australia-wide not-for-profit working to improve outcomes for people with traumatic brain injury explained to the committee that support for players affected by concussions is variable. Connectivity explained that the level of support often depends on the level of competition of the sport that is being played (such as community vs professional), resources available to the sporting club (club policies, medical support staff such as team doctors, physiotherapists), as well as the financial resources of the player themselves.[32]

6.29 This section discusses a number of issues raised by inquiry participants regarding the existing insurance, compensation, and support available to players – both past and present. Evidence to the committee highlighted inadequacies in funding and other supports provided by national sporting organisations, issues regarding exclusions from workers' compensation schemes, inadequate private insurance arrangements, an absence of a national injury insurance scheme, and limitations with seeking compensation and remedies through the legal system.

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29 Lawyerly, *Second concussion class action filed by former AFL players*, www.lawyerly.com.au/second-concussion-class-action-filed-by-former-afl-players/ (accessed 3 June 2023).

30 Margalit Injury Lawyers, *Submission 45*, p. 3.

31 Margalit Injury Lawyers, *Submission 45*, p. 3.

32 Connectivity Traumatic Brain Injury Australia, *Submission 24*, p. 2.

Inadequate support provided by sporting organisations

6.30 The committee heard from various inquiry participants about the serious inadequacies in support, financial and otherwise, provided by sporting organisations, to former players and their families, who have been affected by concussions and repeated head trauma in their sport.[33]

6.31 Concussion Australia considered that sporting organisations, as well as others, have failed to adequately support their former players and that their foremost concern was legal liability:

> At this stage all sporting associations (and stakeholders at large: governments, parents, coaches, society) have failed to support former players living with concussion. From a financial perspective, the people who are most affected are those who never made large sums of money as professionals yet remain affected by concussions they sustained during their career.
>
> The pending concern of associations and clubs in our view remains with legal liability compared to supporting current and former athletes with concussion and concussion related injuries.[34]

6.32 Neuroscientist Professor Alan Pearce, who has assessed hundreds of individuals with concussion and repeated head trauma at all levels of sport over the past 15 years, indicated there is very little long-term support available to retired athletes at all levels. He highlighted that many retired players noted they were promised to be 'looked after' by their clubs but were subsequently forgotten or ignored.[35] He also pointed out that for community level players, there is no formal support and many of these individuals suffer in silence. Professor Pearce also explained that supports for former professional athletes are also limited:

> For retired professional players, player associations may provide a triage service whereby a distressed retired player will call and the player association will provide several providers for the player to access (paid for by the association). However financial support is finite and when a player has used their allocation, they are unable to continue support, unless life threatening, as in the case of a number of high-profile retired athletes who have attempted to self-harm or suicide.[36]

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[33] See, for example, Shine Lawyers, *Submission 6,* p. 12; HITIQ, *Submission 11,* p. 7; Community Concussion Research Foundation, *Submission 52,* pp. 1, 17, 20 and 21; Mr Peter Jess, Private capacity, *Committee Hansard,* 26 April 2023, p. 51; Professor Alan Pearce, *Submission 46,* p. 2, 4; Ms Julie Speight, *Submission 48,* [pp. 2, 3]; Mr James Graham, Private capacity, *Committee Hansard,* 30 January 2023, p. 49; Mrs Kathy Strong, *Submission 5,* p. 4; Anna, *Submission 77,* [pp. 1, 2 and 4].

[34] Concussion Australia, *Submission 3,* p. 3.

[35] Professor Alan Pearce, *Submission 46*, p. 4.

[36] Professor Alan Pearce, *Submission 46*, p. 4.

6.33 Mr Alan Blackwood, Policy Director at Young People in Nursing Homes National Alliance (YPNHNA) considered that compensation and support provided by major sporting codes 'fall well short of anything meaningful'. Mr Blackwood noted that, invariably, those that are severely injured rely on charity and donations through their own networks for support and that this is inexcusable in the realm of professional sport:

> … Recovery efforts continue to rely on charity. With people that are severely injured, invariably you'll see a GoFundMe page pop up and there will be an outpouring of support from friends and club mates, but it's never enough. It's very tokenistic and really doesn't go any way towards funding any sort of recovery. It's actually inexcusable that in a realm of professional sport, as we've been hearing in this inquiry, people who sustain profound injuries are forced to rely on charity or underfunded code schemes.[37]

6.34 Miss Lydia Pingel, a former AFLW player in the top women's league in Queensland, who continues to suffer a range of impacts after being medically retired from the sport due to multiple concussions, observed that the long- and short-term supports available to affected players is majorly lacking:

> … support is basically non-existent for the short and long term of past and present players affected by concussion and repetitive head trauma particularly if you are not a paid professional athlete. I have completely navigated and researched this space on my own and through my own efforts. This needs to change because concussion doesn't discriminate in age, gender or level playing/competing at, it is not an exclusive injury that only the elite suffer.[38]

6.35 Ms Kirby Sefo, a former Australian Rugby sevens and Australian Wallaroos player, who also continues to deal with the ongoing impacts of repetitive head injuries throughout her professional career, also explained the lack of support she received after retiring. Ms Sefo observed there can be disparities in post-retirement support available to professional female athletes, compared to their male counterparts.[39]

6.36 In her testimony to the inquiry, Mrs Anita Frawley, widow of the late AFL player Danny Frawley, raised the question:

> What could be more of higher priority for the competition than looking after the individuals on whose shoulders the success of the game now stands?[40]

6.37 Mrs Frawley advocated for a health and support scheme for those that are potentially suffering CTE and dealing with its consequences. She told the

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37 Mr Alan Blackwood, Policy Director, Young People in Nursing Homes National Alliance (YPNHNA), *Committee Hansard,* 26 April 2023, p. 32.

38 Miss Lydia Pingel, *Submission 8,* [p. 3].

39 Ms Kirby Sefo, Private capacity, *Committee Hansard,* 22 February 2023, p. 35.

40 Mrs Anita Frawley, Private capacity, *Committee Hansard,* 26 April 2023, p. 58.

committee 'we must wrap our arms around' those suffering, as well as their families to provide hope for the future. She concluded her evidence by emphasising that care must be prioritised:

> We must act now to reduce the instances of this happening to other families in the future. For me, this is not about blame or justice-seeking; it's simpler than that. It's just about care—caring for the human beings that have given their lives to the sport they loved. Only by prioritising care will our sporting bodies honour the responsibility to protect and support our athletes during their careers and long after they have retired.[41]

6.38 Mrs Katherine Tuck, who tragically lost her late husband and former professional AFL player Shane Tuck in 2020 after his battle with CTE, also referred to the broad lack of support for former footballers who have suffered the effects of head trauma, and noted how this extends 'detrimentally' to the families of these individuals.

6.39 In her submission to the inquiry, Mrs Tuck detailed the limitations and insufficiencies in support provided by Shane's former club, the AFL and the AFL Players' Association throughout his retirement. Mrs Tuck acknowledged that whilst the past two years have seen a better focus on concussion policies for current AFL players, she flagged that the avenues for past players and their families to seek help and information, remain unclear. Mrs Tuck shared her sense of isolation throughout this process, and urged change so that other families of players affected by head trauma do not have the same experience.[42]

6.40 Mr John Hennessy, who is on the board of the Community Concussion Research Foundation but appeared before the committee in his private capacity, flagged the lack of care for affected retired AFL and AFLW players and acknowledged the devastating impacts this can have on families:

> There's little care for retired players, many of whom are falling through the cracks with no workers compensation, no income protection, and, in many cases, some heart-wrenching stories of personal anguish and of families being destroyed, domestic violence et cetera. There is no support for many of those players from the AFL or AFLW. The care is not there.[43]

6.41 Mr Hennessy also highlighted the significant disparities that exist between the corporate income of the AFL and the amount that was being spent to support retired players:

> The AFL is the most-watched sport in Australia. The corporate income of the AFL, not including club income, in 2022 was $944 million and, of that, they spent $1 million on servicing the 5,000 retired players, just over half of whom have long-term injuries. The TV rights have increased massively from

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41 Mrs Anita Frawley, Private capacity, *Committee Hansard*, 26 April 2023, pp. 57, 58.

42 Mrs Katherine Tuck, *Submission 91*, p. 3.

43 Mr John Hennessy, Private capacity, *Committee Hansard*, 26 April 2023, p. 52.

> $156 million in 2011 to $642 million projected in 2025. The AFL pays no income tax but imposes a massive cost on the Australian community.
>
> The culture of the AFL is to protect the brand, protect the game, maximise the public appeal of the game. It comes at a tremendous cost. Lives are being destroyed; player care is sacrificed.[44]

6.42 Dr Alexandra Veuthey, an expert in the regulation of concussion in sport noted that players' associations, along with other foundations and medical centres have supports available for players affected by concussion and repeated head injuries, but proposed that these support networks must be developed and better publicised.[45]

Exclusion from state and territory workers' compensation schemes

6.43 In each Australian state and territory, workers' compensation mechanisms exist to provide compensation to employees who are injured in the course of their employment. These statutory schemes provide 'no fault' compensation primarily by way of lump sum compensation, income support, and payment of medical treatment and expenses.[46]

6.44 While legislation varies between each jurisdiction, athletes are generally ineligible to receive workers' compensation for injury sustained in the course of playing professional or semi-professional sport, including for the long-term impacts of concussion and repeated head trauma.[47] It is understood that the history behind this deliberate exclusion was due to financial considerations, with clubs and governing bodies unable to afford such workers compensation premiums.[48]

6.45 A number of inquiry participants were critical of these exemptions. For example, Dr Eric Windholz, a senior lecturer in the Faculty of Law at Monash University with expertise in sports law and the application of regulatory theory to professional sport, gave evidence in his private capacity. He said:

> Professional sporting organisations are employers and their players are employees. Under work health and safety law, employer sporting organisations have a statutory duty to do what is reasonably practicable to prevent injuries to their employees. But eliminating all injuries is not a realistic expectation, especially in contact sports, so we need to consider the insurance arrangements that exist to support injured players. My submission is that existing insurance arrangements for professional players

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44 Mr John Hennessy, Private capacity, *Committee Hansard,* 26 April 2023, p. 52.

45 Dr Alexandra Veuthey, *Submission 56*, [p. 3].

46 Margalit Injury Lawyers, *Submission 45,* p. 5.

47 Margalit Injury Lawyers, *Submission 45,* p. 5.

48 Shine Lawyers, *Submission 6*, p. 8.

> are inadequate, are inequitable, and in some cases may operate in breach of workers compensation laws.[49]

6.46 Dr Windholz also highlighted that the current arrangements stand in 'stark contrast' to those in place in New Zealand where its accident compensation scheme makes no distinction between sports-related and non-sports related injuries.[50] He further noted that in the Australian context:

> … the exclusion of professional players from workers' compensation is an exception to the principle of universality that underpins the schemes. It has attracted widespread academic criticism, being variably described as 'manifestly unjust', 'anachronistic', and 'anomalous'.[51]

6.47 The founder of Headsafe, Dr Adrian Cohen, highlighted the inconsistent approach to insurance arrangements across dangerous occupations in Australia. He said:

> Crane drivers, bomb disposal experts and cross-country truckers are covered by workers compensation because of their 'dangerous professions' but not professional footballers.[52]

6.48 Margalit Injury Lawyers said in its submission to the inquiry:

> Athletes most commonly enter professional sports as children, teenagers, or young adults. This is often before the age of 25, before the brain has fully matured. Heavy expectations, socially and from family members, can be well entrenched by the time the athlete embarks on a professional sporting career. In many cases, the prospect of a professional sporting career is associated with an expectation of financial security and for some, an escape from poverty.
>
> These pressures, coupled with the young age at which a person becomes involved in sport, may make it difficult for a professional athlete to appreciate the true risk and long-term impact of concussion related injury.
>
> To then combine the above risk factors with the known power imbalance of an employment relationship, as well as the enormous cultural pressure to assist one's team to win, leaves professional athletes particularly vulnerable. In such circumstances, it is entirely appropriate that these professional athletes are afforded legal protection by way of a statutory compensation scheme.[53]

6.49 The Young People in Nursing Homes National Alliance (YPNHNA) submitted that for people sustaining catastrophic sporting injuries, Australia's existing insurance system offers little hope:

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49 Dr Eric Windholz, Private capacity, *Committee Hansard*, 22 February 2023, p. 2.

50 Dr Eric Windholz, *Submission 2*, p. 2.

51 Dr Eric Windholz, *Submission 2*, p. 6. Citations omitted.

52 Headsafe, *Submission 68*, [p. 14].

53 Margalit Injury Lawyers, *Submission 45*, p. 5.

> … this hodgepodge of funding and insurance arrangements for catastrophic injury means that Australians who sustain catastrophic brain and spinal cord injuries from sporting activity have worse outcomes than those who sustain equivalent injuries at work or on the road.[54]

6.50 Professional Footballers Australia highlighted the growing concern for the health and safety of past players, whose careers span back decades, and the ineffective compensation arrangements that exist currently:

> While there remains a growing call for professional players to be covered by workers compensation, there is equally growing concern for the health and safety of past players; players whose careers span back decades, before insurance protection agreements were in place, and when medical care and the understanding of concussion or signs of concussion were not comprehensively developed or understood. The only avenue available to players who are negatively and chronically impacted by past concussion is to pursue legal action through the courts; something that is costly, distressing and pits the considerable resources of sporting organisations against those of an individual.[55]

6.51 Dr Windholz also argued that exclusions from workers' compensation schemes in a number of Australian jurisdictions may be ineffective and in breach of the law:

> Every state and territory has its own workers compensation scheme. They are broadly similar but they have important and significant differences. Each scheme purports to exclude professional sportspeople from their scheme, with some exceptions, as was mentioned—jockeys, boxers in some jurisdictions. In my analysis of the schemes, though, I have concluded that the exclusions may be ineffective in a number of jurisdictions.
>
> In New South Wales and Tasmania the exemptions are effective to exclude professional sportspeople only if their contracts remunerate them only for participating in the sport—training, travelling, participating in the sport. If their contracts remunerate them for activities other than participating in their sport, for example promotional, marketing, community activities, I have concluded that the exemption from workers compensation is not effective.
>
> So if players have contracts that cover both participating and promoting, then my argument is that they should be covered by workers compensation and if the clubs have not taken out workers compensation policies they are in breach of the law.[56]

Inequitable for taxpayers

6.52 A number of inquiry participants highlighted that, due to being excluded from state and territory workers' compensation schemes, costs are imposed on the

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54 YPNHNA, *Submission 27*, p. 4.

55 Professional Footballers Australia, *Submission 57*, pp. 7, 8.

56 Dr Eric Windholz, Private capacity, *Committee Hansard*, 22 February 2023, p. 9.

Australian taxpayer and society more broadly. For example, Margalit Injury Lawyers said:

> A failure to appropriately protect, support, and compensate professional athletes not only poses risk to the player, but to society. As it stands, Medicare and the NDIS foot the vast majority of costs associated with such injuries. It is our submission that such costs of treatment ought to be borne by a statutory compensation scheme, contributed to by the employer clubs and sporting bodies that stand to profit from such sporting activities.[57]

6.53 Dr Windholz argued that, in the absence of workers' compensation schemes, the primary medical insurance obligation transfers to Australia's universal health care insurance scheme, Medicare—shifting the obligation from the employing sporting organisation and state governments to taxpayers and the federal government.[58]

6.54 Mr Leon Harris submitted that the impacts that neurodegenerative disease has on its sufferers, their families and friends, and the broader health care system were 'enormous'. He noted that, during 2018–19, it was estimated that almost $3 billion of health and aged care expenditure was directly attributable to the diagnosis, treatment, and care of people with dementia, and that contact sports participants were up to four times more likely to develop such a condition.[59]

Suggestions made by inquiry participants to address the issue

6.55 A number of inquiry participants made various suggestions to address this problem. For example, Margalit Injury Lawyers called for the establishment of a statutory no-fault compensation scheme, at either the state or federal level, for concussion-related injuries sustained by professional sportspeople. It proposed that such a scheme would provide for 'reasonable medical and like expenses, weekly payments, and an impairment benefit lump sum payment'.[60]

6.56 In its submission to the inquiry, Shine Lawyers highlighted that the deliberate exclusion from workers' compensation schemes was, historically, due to financial considerations—with clubs and governing bodies being unable to afford the associated premiums. It questioned whether this approach remained appropriate in contemporary Australia, where sporting clubs and bodies have commercialised, and recommended that an investigation be undertaken regarding the affordability of sports people being permitted back into workers' compensation schemes.[61]

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57 Margalit Injury Lawyers, *Submission 45*, p. 5.

58 Dr Eric Windholz, Private capacity, *Committee Hansard*, 22 February 2023, p. 2.

59 Mr Leon Harris, *Submission 71*, [p. 5].

60 Margalit Injury Lawyers, *Submission 45*, p. 8.

61 Shine Lawyers, *Submission 6*, pp. 8, 9.

6.57 Dr Cohen of Headsafe highlighted the potential benefits resulting from the government taking a leadership role in compensation and insurance, while also seeking contributions from other major stakeholders:

> … you've got a public health issue that crosses education and crosses sport that needs to be funded and there are examples in other areas of insurance where the government has taken the lead in this as a fund or a pool but making those major stakeholders like the sports actually contribute.
>
> The good thing about that from their point of view is that they don't have to say, 'This is our problem,' or 'We caused it.' They get to say, 'We recognise there's a problem here, and we want to contribute to the solution.' So instead of blaming us for this, they can put their hand up and say, 'We'll put money into it,' because if you try and make them pay for it themselves, either the sport will go bankrupt or they will be unable to cover it with an insurance burden.[62]

6.58 Dr Cohen suggested that a good example of how to effectively insure sports participants, both amateurs and professionals alike, was provided by the no-fault accidental injury compensation scheme run by the Accident Compensation Corporation (ACC) in New Zealand.[63] This scheme provides financial compensation and support to citizens, residents, and temporary visitors who suffer personal injuries—includes sports injuries—while in New Zealand. It covers medical treatment; income replacement; social and vocational rehabilitation; and ancillary services considered part of rehabilitation, such as transportation and accommodation.[64]

6.59 Notwithstanding these supports that the scheme provides, Dr Doug King PhD noted the following:

> Any reported concussion in excess of a year duration is declined from any support or rehabilitation services under the ACC scheme as people are deemed to have had recovered from a concussion by then. In regard to the long-term support for players who report ongoing issues such as early onset dementia or other related neurological problems, there is no system in New Zealand that is funded to directly support this cohort with these issues.[65]

6.60 Dr Windholz argued that insurance and compensation arrangements for professional sportspeople should be 'no less than that provided to other Australian workers'. He contended that the starting point should be their inclusion in workers' compensation schemes—with exemptions conditional upon alternative compensation mechanisms that are no less generous than those

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62 Dr Adrien Cohen, Chief Executive Officer, Headsafe, *Committee Hansard,* 30 January 2023, p. 20.

63 Headsafe, *Submission 68,* [p. 14].

64 Dr Doug King, *Submission 79*, p. 1.

65 Dr Doug King, *Submission 79*, p. 3.

applying to other Australian workers and which provide long-tail coverage for concussion and other long-term—and long-latency—injuries.[66]

6.61 Dr Windholz noted that precedents exist around which such a system could be built. For example, he submitted that state and territory workers' compensation schemes provide for employers applying to the relevant regulator for a license to self-insure. To be eligible for such self-insurance, employers generally must meet minimum requirements regarding size, financial strength, and claims management and rehabilitation capability; and also have a satisfactory work health and safety record and re-insurance cover.[67]

6.62 Dr Windholz also suggested that this approach could occur at the national level, noting that self-insurance is available under the national Comcare scheme. He argued that this scheme could be extended to sporting organisations to provide a national workers' compensation option for the various national sporting codes. He also proposed the potential of linking self-insurance to ASC recognition, and thereby 'integrating and leveraging the role of the ASC as the lead Australian Government agency responsible for supporting sport and building its governance capability'.[68]

Inadequate private insurance arrangements

6.63 In response to professional players being excluded from workers' compensation schemes within Australia, many have been encouraged to put in place their own private insurance arrangements—either individually or as collective players' groups. A number of inquiry participants responded by highlighting the shortfall with this approach.

6.64 For example, Shine Lawyers outlined a number of drawbacks for players looking to take out total and permanent disability insurance and/or income protection insurance, including:

- brokers are generally required to negotiate the terms of an insurance contract or product to ensure that they include brain trauma in their coverage;
- insurance policies need to be current at the time of an injury—they do not assist individuals when symptoms develop if the policy has concluded;
- there is an additional responsibility on players to seek advice, which many will not do or may not be able to afford;
- tailored policies can come at a cost, which some may not be willing to incur or be able to afford;

66 Dr Eric Windholz, *Submission 2*, p. 8.

67 Dr Eric Windholz, *Submission 2*, p. 8.

68 Dr Eric Windholz, *Submission 2*, p. 8.

- a number of insurance policies now specifically seek to CTE, and most exclude mental health injuries from their coverage;
- income protection policies often only apply for a period of two years and individual ones only go to 65 years — such policies are unlikely to assist those people with a late diagnosis or with their treatment, care, and support beyond this age;
- many players do not recognise the need to include a trauma policy and would need advice on whether the contract specifically covered these injuries;
- disclosures about previous concussions may prevent future cover for this type of injury and failure to disclose could subsequently lead to benefits being denied; and
- policies do not cover children or those not working.[69]

6.65 In their evidence to the inquiry, the RLPA noted that, although players are covered by death and total and permanent disablement insurance policies taken out by the NRL, these policies do not cover head trauma. The RLPA also submitted that, based on their discussions with the NRL and various insurers, it would be 'very challenging' to secure insurance for concussions and head trauma.[70]

6.66 Margalit Injury Lawyers highlighted the deficiencies of existing insurance policies within the AFL for death and permanent disablement:

> Often, these insurance policies do not adequately compensate players suffering from the long-term effects of concussion related injury, as benefits may not be available to players after their contract has concluded, or concussion may not be included in the death and permanent disablement policy.[71]

6.67 Professional Footballers Australia submitted that under the professional league's collective bargaining agreement, various insurance policies must be in place. Notwithstanding this coverage, it said:

> While these policies provide temporary relief, they do not support players affected by the long-term impacts of concussion and repeated head trauma. Moreover, the level of coverage these arrangements offer players is a question of financial capacity for the sport to precure a policy and the leverage of players. As such these arrangements are often a source of conflict and tension between athletes and governing bodies, making them far from certain and reliable.[72]

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69 Shine Lawyers, *Submission 6*, pp. 10, 11.

70 Rugby League Players' Association, Answers to question on notice, 30 January 2023 (received 10 March 2023).

71 Margalit Injury Lawyers, *Submission 45*, p. 6.

72 Professional Footballers Australia, *Submission 57*, p. 7.

6.68 The General Manager of Head Trauma at Shine Lawyers, Ms Jamie Shine, submitted that insurers are denying legitimate claims for compensation, and compared the existing situation to that of the tobacco industry's historical denial of the links between smoking cigarettes and the subsequent development of cancer.[73]

6.69 Dr Windholz commented:

> … when one gets to the part-time professional player for whom the greater risk from injury is to their non-sport income (which is the case with many women players), private insurance arrangements can be expensive and with significant excesses.
>
> Moreover, private health insurance is tied to the length of the playing contract. Numerous examples exist of players struggling with injury long after their (comparatively) short careers – and any insurance payments - have ceased. This has been especially acute for players suffering long-term chronic injuries to joints such as knees and backs, or depressive conditions associated with those injuries and the end of their careers.[74]

6.70 Margalit Injury Lawyers also highlighted that many injured athletes may not even know they are suffering from the long-term effects of a concussion injury incurred during their playing careers and are therefore unaware that they may have a right to seek compensation:

> Tragically, many injured players engage in self-blame and do not (or cannot) recognise that difficulties suffered by them in their lives arise from underlying medical conditions caused by concussions in sport.[75]

Absence of a no-fault national injury insurance scheme

6.71 In their submission to the inquiry, the YPNHNA argued that the absence of a no-fault national injury insurance scheme represented a 'major gap' in Australia's system of care for people who have sustained catastrophic injuries on the sporting field or while pursuing other activities.[76]

6.72 YPNHNA noted that the establishment of a National Injury Insurance Scheme was recommended by the Productivity Commission in 2011 and submitted that such a scheme should be the 'focal point for funding the treatment and care of severe head trauma from sporting accidents'. It considered that a general injury stream could cover catastrophic sporting injuries and provide injury

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[73] Ms Jamie Shine, General Manager of Head Trauma, Shine Lawyers, *Committee Hansard*, 22 February 2023, p. 3.

[74] Dr Eric Windholz, *Submission 2*, pp. 4, 5.

[75] Margalit Injury Lawyers, *Submission 45*, p. 4.

[76] YPNHNA, *Submission 27*, p. 3.

management to the same standard as the various state and territories' no-fault motor vehicle injury schemes.[77]

6.73 In his evidence to the inquiry, Mr Blackwood from YPNHNA said:

> We call for the immediate implementation of the general injury stream of the National Injury Insurance Scheme to enable people who suffer traumatic brain injury and other catastrophic injuries to obtain the medical and other supports they need. The fact that we still do not have this scheme promised by government in 2013 to provide cover for all injuries like this is a travesty.
>
> Instead, the lottery of injury in which how and where you sustain that injury determines the medical rehabilitation and social support you receive is still very much in play. This is particularly the case in sport and recreation, where significant risks to players' health and wellbeing can exist, but we have nothing in place to respond to the injuries that they may sustain.[78]

6.74 The Productivity Commission recommended that the National Injury Insurance Scheme be separate from NDIS for a number of reasons, such as:

- reducing the cost of the NDIS through a fully funded insurance accident scheme;
- making use of existing expertise and institutions of accident compensation schemes;
- using incentives to deter risky behaviour and reduce local risks that can contribute to accidents; and
- covering a broader range of health costs associated with catastrophic injuries, such as acute care and rehabilitation services.[79]

6.75 Mr Blackwood also explained why the NDIS was not an adequate alternative for people who become injured:

> The problem with the NDIS is that it doesn't fund rehabilitation, so people go from a stint in hospital with acute care for their brain injury, then almost leapfrog rehabilitation and go to disability support. There's a lot that's lost in the middle. That's really why the NDIS is not fit for purpose for people with brain injury from the point of injury, because it misses the rehabilitation. We need something that's going to actually fill that gap.[80]

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77 YPNHNA, *Submission 27*, p. 3. For further information on the Productivity Commission's recommendation, please see: www.pc.gov.au/inquiries/completed/disability-support/report

78 Mr Alan Blackwood, Policy Director, YPNHNA, *Committee Hansard*, 26 April 2023, p. 31.

79 The Treasury, *National Injury Insurance Scheme*, https://treasury.gov.au/programs-initiatives-consumers-community/niis (accessed 3 June 2023).

80 Mr Alan Blackwood, Policy Director, YPNHNA, *Committee Hansard*, 26 April 2023, p. 36.

Barriers to seeking compensation and remedies through the court system

Effective legal defences

6.76 Inquiry participants highlighted that defendants in legal actions, such as sporting bodies, are often able to rely on a number of effective legal defences to avoid paying compensation. Amongst others, these defences can include:

- obvious risk—at law there is no duty to warn of 'obvious risk', which is usually defined to be a risk that would have been obvious to a reasonable person in the position of the plaintiff;
- voluntary assumption of risk—a defendant may avoid liability by establishing that the plaintiff voluntarily assumed the risk;
- dangerous recreational activity—a defendant is not liable for harm suffered by a plaintiff caused by the materialisation of an obvious risk of a dangerous recreational activity;
- exclusion clauses and waivers—defendants can limit their exposure to future claims by incorporating exclusion clauses and waivers into their contracts with their player base;
- causation—defendants can also allege that a plaintiff's symptoms are caused by other factors, such as drug and alcohol consumption;
- time limitations on legal action—generally plaintiffs have a limited timeframe in which they can bring a claim after a tortious act has been committed; and
- no objective evidence of brain injury—traumatic brain injuries are known as the 'invisible injury' and, in some cases, cannot be detected by medical imaging.[81]

6.77 The General Manager of Head and Trauma at Shine Lawyers, Ms Jamie Shine, argued that the legal landscape in Australia is 'stacked against the plaintiff or the injured person'.[82] On this issue, she said:

> We've brought in legislative defences that are available to defendants which I feel abrogate their responsibility and mean that they don't necessarily have to take proactive steps to investigate, inform or warn. Provisions like the dangerous recreational activities mean that, for professional and amateur footballers playing football, there is no obligation on the defendant to take steps to protect them, and it's making it almost impossible for injured players to get money so that they can fund the treatment, care and support that they need both now and into the long term.[83]

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81 Shine Lawyers, *Submission 6*, pp. 9, 10.

82 Ms Jamie Shine, General Manager of Head Trauma, Shine Lawyers, *Committee Hansard*, 22 February 2023, p. 2.

83 Ms Jamie Shine, General Manager of Head Trauma, Shine Lawyers, *Committee Hansard*, 22 February 2023, p. 2.

Uncertainty of outcome due to lack of legal precedent

6.78 It was argued by inquiry participants that, due to the effectiveness of the legal defences available to sporting organisations, only a couple of cases had commenced in Australia to date.[84] In its submission, Shine Lawyers highlighted the importance of further developing tort law with regards to concussions and repeated head trauma:

> The objective of torts law is to provide financial support to an injured plaintiff to cover their loss of income earning capacity and to fund their care, treatment, and support. Additionally, these claims are important as they create consequences for defendants and act as a deterrent. These consequences seek to ensure that defendants take health and safety issues seriously, act proactively to assess risks, and take steps to minimise the likelihood of harm to others. They also seek to spread the loss, so it is not all borne by the government.[85]

6.79 Concussion Australia observed that, although there are several claims currently underway in the courts related to concussion and concussion-related injuries, there is minimal case law in this space which makes it a complicated and uncertain area of law.[86]

6.80 Dr Annette Greenhow, a lawyer and legal academic focusing on sports law and the regulation of concussion, also spoke to this issue when responding to a question regarding the state of Australia's legal system in relation to concussions and repeated head trauma. On this, she said:

> … based on my research, there is no Australian precedent that has definitively identified a duty of care owed by a sports governing body to a player for a concussion related injury. There certainly has been … some discussion about a claim that involved a former NRL player, but that did not make its way through the court system.
>
> As far as other jurisdictions are concerned, of course, you've got the United States and the National Football League case in 2011 that started and was settled. So, there again, based on the role of the sports governing body in the United States, that case did not make it through to a hearing; it was a negotiated and mediated resolution.
>
> In Canada, it's a different system again. Nonetheless, there have been some claims that have been made, but, again, to the best of my knowledge there is nothing that has set a definitive—or certainly in the Australian system it would only be something to be regarded, but certainly not a precedent set, per se.[87]

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84 See, for example, Shine Lawyers, *Submission 6,* p. 8.

85 Shine Lawyers, *Submission 6,* p. 8.

86 Concussion Australia, *Submission 3,* p. 3.

87 Dr Annette Greenhow, Private capacity, *Committee Hansard,* 22 February 2023, p. 6.

6.81 The Rugby Union Players Association also discussed this issue during the inquiry, and in its response to question regarding the legal precedent in Australia it said:

> There are currently no reported decisions in Australia which set a precedent for the liability of sporting codes, teams and/or governing bodies for concussions and head traumas in sport.
>
> Until such time as either the AFL class action[s], or the case of Zantuck, progresses through the Courts to determine the issue of liability, there remains no legal precedent in Australia regarding liability for concussion and head trauma in sport.[88]

Committee view

6.82 The committee understands that support for players affected by concussions and repeated head trauma is variable, and depends on several factors such as the level of competition being played, the financial resources of the player themselves, as well as the resources available to, or made available by, sporting clubs, governing bodies and players' associations.

6.83 Fundamentally, key national sporting organisations could further enhance their commitment and their duty of care to athletes across the country, providing athletes with more support or resources to respond more effectively to life-changing challenges.

6.84 It was clear to the committee that significant reforms and improvements are needed to ensure that individuals from all levels of sport, are adequately supported, remediated and compensated in the event that they suffer from the ongoing impacts of concussion and repeated head trauma as a result of their participation in sport.

Inadequate supports from sporting organisations

6.85 The committee acknowledges that over recent years, major national sporting organisations in Australia and players' associations have made various efforts to extend and improve the supports available to former professional players who have been significantly impacted by the effects of sport-related concussion and repeated head trauma.

6.86 However, the committee was concerned to hear about the inadequacies of existing supports offered by national sporting organisations. The committee agrees with various inquiry participants and considers that current measures that national sports organisations have in place to provide financial, medical and other broader supports and guidance for affected players and their loved ones affected by concussion and repeated head trauma, often fall short.

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[88] Rugby Union Players Association, Answers to questions on notice, 1 March 2023 (received 23 March 2023). For further information on the Zantuck case, see: Ty Zantuck v Richmond Football Club & Ors [2022] VSC 405.

6.87 The committee is also conscious of the significant disparities in the supports available to professional athletes, compared to players in the broader community.

6.88 The committee understands that local sporting clubs and organisations do not have the level of resources to support their athletes compared to professional bodies. However, the committee is of the view that the lack of support available to community level athletes still needs to be addressed.

6.89 The committee considers that professional sporting organisations can, and must play a key leadership role in supporting and encouraging individuals affected by sport-related concussion at the community level, to seek and get help. Specifically, the committee believes that Australian national sporting organisations should explore ways to clarify and increase community awareness about where and how local athletes can obtain information and seek support if they are suffering from the impacts of sport-related concussion.

6.90 The committee also considers that recommendation 15 below, will address the need for enhanced supports for community level players and families impacted by sport-related concussion and repeated head trauma.

Recommendation 12

6.91 The committee recommends that professional sporting codes and players associations consider ways for a best practice model to provide ongoing support, financial and otherwise, to current and former players affected by concussions and repeated head trauma.

Exclusion of professional sportspeople from workers' compensation schemes

6.92 The committee acknowledges the current situation where professional sportspeople in Australia are generally excluded from workers' compensation schemes in each state and territory. The committee considers that professional sportspeople should be covered by adequate insurance arrangements.

6.93 The committee considers that the arguments originally advanced in support of the exemptions, as highlighted during the inquiry, may be less relevant in contemporary Australia where professional-level sport has become corporatised and commercialised.

6.94 According to one submitter, the exclusion of professional sportspeople from workers' compensation schemes in a number of jurisdictions may be ineffective, and as a result, some sporting organisations operating in these jurisdictions may be in breach of their legislative requirements regarding workers' compensation obligations.

6.95 Regardless, the committee is of the opinion that the existing situation is unsatisfactory and inequitable.

Recommendation 13

6.96 The committee encourages professional sports organisations to ensure their athletes have insurance coverage for head trauma. The committee also encourages state and territory governments to engage with professional sporting organisations to explore how the general exclusion of professional sports people from various state and territory workers' compensation schemes could be removed.

The committee envisages that such a review should, amongst other things, assess the financial impact such a reform would have on the various sporting organisations across Australia.

Absence of a no-fault injury compensation scheme covering the whole community

6.97 The committee notes that the absence of a no-fault injury compensation scheme in Australia was raised as a key issue during the inquiry. The committee agrees with inquiry participants that the absence of such a scheme represents a gap in Australia's system of care for people who, amongst other things, sustain concussions and head trauma while playing sport.

6.98 As a result of this absence, people who sustain these injuries while participating in sport who wish to seek compensation and support have to do so through other methods, such as the legal system. As highlighted during the inquiry, and discussed earlier in this chapter, seeking redress through legal action is highly uncertain, costly, and commonly results in inadequate outcomes due to the numerous legal defences that can be effectively utilised.

6.99 The committee considers that a no-fault accident injury insurance scheme may be the solution to providing adequate care and support for people who participate in sport and who suffer concussions, brain trauma, and any resulting long-term neurodegenerative conditions.

6.100 The committee is of the opinion that the scheme currently administered by the Accident Compensation Corporation in New Zealand represents a good example of how to effectively insure sports participants, and others, who sustain injuries. As highlighted during the inquiry, this scheme provides financial compensation and support to citizens, residents, and temporary visitors who suffer personal injuries—including sports injuries—while in New Zealand. Such a scheme could be adapted to provide the longer-term supports required for any latent and chronic health issues arising from concussions and repeated head trauma.

6.101 The committee also notes that a similar scheme covering catastrophic injuries, the National Injury Insurance Scheme, was recommended by the Productivity Commission in 2011 and that this scheme's implementation was also advocated for during the inquiry.

Senator Janet Rice
Chair

Additional comments from Coalition Senators

1.1 Australia is a proud sporting nation, with high participation rates, the ability to host major events that inspire the nation, and athletes capable of winning medals on the world stage. Sport is deeply integrated into the Australian culture, providing numerous social, developmental, physical, and mental health benefits. Enhancing community-level sports participation and international success has been a central goal of recent Australian governments.

1.2 The Coalition was proud to launch Sport 2030 when in Government, which focused on encouraging Australians to be more active, more often, whilst driving sporting excellence, safeguarding the integrity of sport, and strengthening the sports industry.

1.3 In line with this vision, the Coalition committed to a significant investment of $250 million over four years to support community sports infrastructure nationwide. This investment aims to capitalise on the growing recognition of women's sports following recent success on the international stage and will foster enduring benefits by encouraging all Australians to get involved in grassroots sports.

1.4 As stated by numerous witnesses throughout the inquiry, sport brings people and communities together. It also provides significant health and mental health benefits, which are not only positive for the individuals involved but assist the overall healthcare system by potentially reducing avoidable interactions.

1.5 In discussing the serious nature of concussion related injuries, this report does not seek to discourage or dissuade sports participation. Rather, it aims to provide an outline of the possible next steps to ensure that the safety of athletes, particularly regarding CTE and concussions, are in place so that sport in Australia can continue to flourish.

1.6 The paramount consideration for professional sports must be the safety and well-being of athletes. Although international and domestic research around CTE and repeated head trauma continues to develop, there remains a need for continued advancement. The Coalition is firmly committed to supporting increased funding and research initiatives in this field. Furthermore, enhancing the sharing of data and information is imperative, particularly for youth participation in sport. Situations where a head injury or similar incident goes unreported after a Friday game can pose significant risks if the affected individual participates in a different sport on Saturday. By establishing better data sharing arrangements, this ensures that community coaches and volunteers are knowledgeable about the overall health and welfare of their athlete.

1.7 To ensure that community sport can continue to thrive, it is important that all relevant medical practitioners are aware of and regularly trained in concussion

management and protocols. Additionally, community education about concussion will also contribute to improving overall outcomes.

1.8 The Coalition acknowledges the incredible testimony provided by many individuals regarding their experience, or an experience of a loved one who has had head trauma following a professional sporting career. While some National Sporting Organisations offer post-career support, including mental and physical health assistance for retired athletes who have sustained injuries, there is more work to be done.

1.9 Professional and elite athletes accept a level of risk when participating in contact sport and Private Health Insurance plays a pivotal role in supporting athletes throughout their careers. Any alterations to insurance models should very carefully consider existing arrangements. The intricacies of the relationship between athletes, their clubs, and national bodies concerning insurance are substantial and were not intimately traversed during this inquiry. Any future reforms must carefully consider perverse outcomes, including ensuring that any changes do not create additional barriers, including financial ones, for individuals participating in community sports.

1.10 Coalition Senators would like to thank all individual witnesses who gave their time and shared personal stories with the committee. Their testimony was invaluable in understanding the impact of concussions and repeated head trauma in contact sport.

1.11 Coalition Senators would also like to thank the many sporting bodies, organisations, health professionals and peak bodies for providing their professional advice and the Secretariat for their work throughout this inquiry.

Senator Wendy Askew **Senator Slade Brockman**

Senator Maria Kovacic **Senator Kerrynne Liddle**

Additional comments from Senator Lidia Thorpe

1.1 We all love sports. We love playing sports, watching sports, and talking about sports. It connects us as communities, brings joy and in so many aspects is invaluable for our physical and mental health.

1.2 Not all impacts of these sports on our health are positive though, as we have heard from the extensive accounts of head trauma and concussion in contact and other types of sports presented in this inquiry. These impacts have slipped under the public radar for way too long. It can affect everyone, no matter the level of sport, age or gender; and while we know they are strongly under-reported, these head injuries are extremely prevalent in this country.

1.3 The extent and effects of concussion have been ignored or down-played for decades, as we have developed a culture of 'toughing it out', to keep going and not let our teams down, and downplay this injury. As a result, Australia lags far behind the United States and Europe in its concussion prevention and management, to the detriment of players and their families and friends.

1.4 I had initiated this inquiry due to the many stories I directly heard from players and concerns of stakeholders that there is a lack of acknowledgement of concussion and repeated head trauma and their long-term neurological impacts, including the possibility of CTE – and that we require urgent action in this field.

1.5 I therefore wish to thank the Senate for its unanimous support in making this important inquiry a reality and the committee secretariat for your hard work and deep care throughout its conduct, resulting in a thorough report with many important recommendations.

1.6 I thank all submitters and witnesses to this inquiry, including but not limited to stakeholders, experts and the sports for their deep engagement and insights.

1.7 Most of all I wish to thank those players and families who came forward to courageously share their personal stories and losses. My heart broke at hearing your stories. It is for you this inquiry took place and I so hope that it will result in much needed action by governments, sporting codes, the healthcare sector and wider community.

1.8 While I support the findings of the committee, I am disappointed in the lack of commitment and acceptance of responsibility visible in the recommendations put forward. What players and their loved ones need is firm commitment to change the way concussion is recognised, prevented and managed in this country. I therefore wish to outline some points insufficiently addressed by the committee, and to put forward a set of additional recommendations.

Concussion research

1.9 Chapter 3 outlines concerns regarding research integrity and conflicts of interest in concussion research. It raises concerns about the independence of concussion research financed by sporting organisations, which might result in biased findings, omission of evidence and watered-down conclusions and recommendations.

1.10 This situation is partially founded in a culture where certain concussion researchers, some of whom are highly criticised for their research methodology and maintain a close connection to the sporting codes, are the ones being engaged for research or winning tenders time and again, while other reputable researchers struggle to get any contracts.

1.11 Acknowledging the challenge in influencing the research conduct directly instigated through the sporting codes, it is therefore all the more important that the Australian Government commits to funding further, independent research into concussion, and goes past the wording of 'consider establishing independent research pathways', as in committee recommendations 3, and actually commits to the establishment of a national sports research body.

1.12 The same applies to recommendation 6, where the government should not just consider, but commit to a coordinated and consolidated funding framework for ongoing research regarding sport-related concussion and repeated head trauma.

1.13 Given the sporting bodies' responsibility to progress research, and in an attempt to steer away from them directly funding research with potential conflicts of interest, they should contribute to funding the national sports research body responsible for transparent and independent research. In addition to this, the federal government should boost its funding commitments.

Recommendation 1

1.14 National sporting organisations to financially contribute to a national sports research body.

Recommendation 2

1.15 That the Australian Government and sporting organisations increase funding for research into the effects of concussion and repeated head trauma on at-risk cohorts who incur these injuries during their participation in sport.

Recommendation 3

1.16 The *Australian Research Council Act 2001* to be amended to include diversity targets and a declaration of conflicts of interest in the requirements funding rules prepared by the Australian Research Council for each funding scheme.

1.17 To enable further research, the availability of concussion and other sports injury data is absolutely essential and I strongly support the creation of a National Sports Injury Database as per recommendation 1 of the committee's report for this purpose. There is, however, a need to require national sporting organisations (NSOs) to submit inquiry data.

Recommendation 4

1.18 That national sporting organisations have compulsive record-keeping of concussions and identified sub-concussive events at all levels of competition, and share this data with the National Sports Injury Database.

1.19 This system should ideally also apply to schools, hospitals, GP clinics, allied health clinics and places of work.

Concussion awareness

1.20 The inquiry clearly demonstrated a lack of concussion awareness in the community and a down-playing of its seriousness by the sports. The final report, however, fails to present a recommendation to address this matter within the sports and ensure not only awareness of concussion's possible long-term effects but also how to address and manage it immediately on and following impact.

Recommendation 5

1.21 All national sporting organisations and their respective state and regional member associations must meet minimum competence on concussion and repetitive head trauma. Similar to CPR training, there should be compulsory education for all those involved with athlete preparation, coaching or management. Registered players should complete a concussion module annually to recognise the signs and symptoms of concussion and its basic management.

Return to play-protocols

1.22 In the course of the inquiry, it became clear that different sports apply different return-to-play protocols, even when referring to the same research as the basis for it. This causes much confusion and risks players returning to play too early. We have heard a range of suggestions that current stand-down periods are inadequate and lengthier 21 or even 30-day stand-down periods should be considered.

1.23 The committee's recommendation 10 partly addresses this matter, but refers only to the government considering binding protocols and developing 'adaptable' return-to-play protocols, which lacks commitment in a space that requires national leadership due to a lack of a unified, binding approach.

Recommendation 6

1.24 That the Australian Government, in collaboration with medical experts, develops consistent return-to-play protocols, nationally binding across all sports, for both children and adults that have incurred a concussion or suffered a head trauma.

1.25 Ideally, these protocols would be endorsed by the Australian Medical Association, the Royal Australasian College of Physicians, the Royal Australasian College of Surgeons, and the Australian Institute of Sport to demonstrate a truly national approach that understands sport but remains independent of it.

Support for athletes and workers compensation

1.26 The exclusion of athletes from workers compensation coverage and the lack of particularly long-term financial and other support for affected athletes was one of the key findings of this inquiry.

1.27 Sporting codes are clearly failing in their duty of care for players, and as such, the committee's recommendation 12, while a step in the right direction, does not go far enough in clarifying the expectation of professional sporting codes to look after their players. Such a recommendation is essential as it will also contribute to sporting codes taking head injuries and their short- and long-term consequences more seriously and ensuring athletes do not return to play too quickly.

Recommendation 7

1.28 The committee recommends that professional sporting codes and players associations provide the necessary supports, financial and otherwise, both in the short- and long-term, to current and former players affected by concussions and repeated head trauma.

1.29 The committee acknowledges that in the absence of workers compensation and adequate supports through the sporting codes, adequate insurance arrangements are needed for professional sportspeople and that 'a no-fault accident injury insurance scheme may be the solution to providing adequate care and support for people who participate in sport and who suffer concussions, brain trauma, and any resulting long-term neurodegenerative conditions'. It further 'notes that a similar scheme covering catastrophic injuries, the National Injury Insurance Scheme, was recommended by the Productivity Commission in 2011 and that this scheme's implementation was also advocated for during the inquiry.'

1.30 Yet the committee failed to include a recommendation to this extent. Governments are always hesitant to commit to radical action, yet it is often those actions that count most. A no-fault accident injury insurance lies at the heart of

the support many athletes and their loved ones said would have made a real difference to them. Such a scheme would also extend beyond professional sports and could benefit so many people who have had their lives turned around by serious concussions and head injuries.

Recommendation 8

1.31 That the Australian Government develop and implement a no-fault accident insurance scheme for those who participate in sports.

1.32 We owe it to all those who have lost their lives, the lives of their loved ones, or the ability to live their lives to their fullest to no longer ignore the impacts concussion and repeated head trauma can have. The evidence has been emerging for decades and we can no longer look away or waste time in addressing it.

1.33 I sincerely urge this and future governments to take concussions and repeated head trauma seriously and take immediate and committed action.

Senator Lidia Thorpe

Appendix 1
Submissions and additional information

Submissions

1 Dr Rowena Mobbs
- Attachment

2 Dr Eric Windholz
3 Concussion Australia
4 Dr Benjamin Chen
5 Mrs Kathy Strong
6 Shine Lawyers
7 Dr Annette Greenhow
8 Miss Lydia Pingel
9 Department of Health and Aged Care
10 Australian Sports Commission
- 10.1 Supplementary submission

11 HITIQ
12 Rugby Australia
13 National Health and Medical Research Council
14 MindMirror
15 Australian Institute of Health and Welfare
16 Concussion Legacy Foundation
17 National Rugby League Ltd
- 3 Attachments

18 Australian Football League
19 Netball Australia
20 Cricket Australia
21 Australasian Injury Prevention Network
22 The Royal Australian College of General Practitioners Ltd (RACGP)
23 Brain Injury Australia
- 3 Attachments

24 Connectivity Traumatic Brain Injury Australia
25 Tasmanian Government
26 Dementia Australia
27 Young People in Nursing Homes National Alliance
- Attachment

28 Queensland Paediatric Rehabilitation Service
29 The Florey Institute of Neuroscience & Mental Health
30 Insurance Council of Australia
31 Queensland Government Department of Tourism, Innovation and Sport

32 Australian College of Nurse Practitioners (ACNP)
33 NeuralDx Ltd
34 Levin Health
35 Princess Alexandra Hospital Brain Injury Rehabilitation Service Concussion Clinic
36 Western Australia Department of Local Government, Sport and Cultural Industries
37 Dr David Munro PhD
38 Prof Robert Vink
39 Orygen
40 Murdoch Children's Research Institute
41 AFL Players' Association
42 Dr Andrew McIntosh
43 Dr Michael Czajka
44 Confidential
45 Margalit Injury Lawyers
46 Professor Alan Pearce
47 Mr Peter (Wombat) Maguire
- 47.1 Supplementary submission

48 Ms Julie Speight
49 Concussion Legacy Foundation Australia
50 Griffins Lawyers
51 Ms Aisha Stewart
52 Community Concussion Research Foundation
53 Mr John Hennessy
54 Mr Peter Jess
- 54.1 Supplementary submission

55 Dr David Maddocks
56 Dr Alexandra Veuthey
- Attachment

57 Professional Footballers Australia
58 Public Health Association of Australia
59 Australian Health Promotion Association
60 Dr Stephen Townsend
61 Brain Foundation
62 Mrs Alison Quigley
63 Mr Michael Lipman
64 Dr Charlie Carter
65 Mr Dexter Dunworth
66 Geoff & Jean Cook
67 Mr Dennis Holland
68 Headsafe

69 Dr Jeff Rogers
70 Dr Reidar Lystad
71 Mr Leon Harris
72 Mr Arthur Needham
73 Mr Robin McGilligan
74 Mr Vic Paice
75 *Name Withheld*
76 International Waterski and Wakeboard Federation and Waterski and Wakeboard Australia
77 Anna
78 Belinda Vardy
79 Dr Doug King
80 Robert Heron
81 *Name Withheld*
82 *Name Withheld*
83 *Name Withheld*
84 Mr Brendan Swan
85 Norma
86 Australasian College of Sports and Exercise Physicians
87 NSW Government
88 Confidential
89 Confidential
90 Confidential
91 Mrs Katherine Tuck
92 Baseline

Additional Information

1 Professor Karen Barlow, additional information in relation to the inquiry into Concussions and repeated head trauma in contact sports; received 17 February 2023
2 Kirby Sefo, Opening statement tabled at public hearing on 22 February 2023
3 Professor Jack Anderson, additional information in relation to concussion, Australian sport, and the law; received 1 May 2023
4 Dr Stephen Townsend, additional information - Reading Concussion in Australian Sporting Newspapers, 1843-1954 - receieved 2 February 2023
5 Dr Rowena Mobbs, additional information - UK Concussion Guidelines for Non-Elite Sports April 2023 - receieved 4 May 2023
6 Margalit Injury Lawyers, additional information in relation to head injuries and various compensation schemes; received 12 May 2023
7 Griffins Lawyers, additional information - 1994 NHMRC Football injuries of the head and neck book; received 24 April 2023
8 Griffins Lawyers, additional information - 1995 NHMRC Head and neck injuries in football - Guidelines for prevention and management; received 24 April 2023

9 Griffins Lawyers, additional information - 2003 letters from the Australisian College of Sports Physicians and Australian Association of Neurologists to the NHMRC, calling for revision of its boxing and football injury publications; received 24 April 2023

10 Griffins Lawyers, additional information - study by McCrory, Davis, Makdissi regarding Second Impact Syndrome or Cerebral Swelling after Sporting Head Injury; received 26 April 2023

11 Ms Aisha Stewart, additional information on Gymnastics Australia and USA Gymnastics acceptance of risk statements; received 21 April 2023

12 Mrs Anita Frawley, additional information - National Federation of State High School Associations CTE brochure; received 26 April 2023

13 AusCycling, additional information - Concussion Policy; received 25 April 2023

14 Mr John Hennessy, opening statement and additional information regarding AFL research inadequacies; received 21 April 2023

15 Levin Health, additional information on concussion and cannabinoids; received 25 April 2023

16 National Health and Medical Research Council, additional information - decision to rescind 1994 Head and Neck Injuries in Football: Guidelines for Prevention and Management, received 6 July 2023

17 Dr David Maddocks, additional information - Consensus statement on concussion in sport: the 6th International Conference on Concussion in Sport - Amsterdam, October 2022 - received 26 July 2023

18 Dr Reidar Lystad, additional information - Risk of impaired school performance in children hospitalized with concussion: a population-based matched cohort study, Lystad et al - received 31 May 2023

19 Dr Annette Greenhow, additional information - 1994 and 1995 NHMRC publications regarding head and neck injuries in football and 2003 Australian Law Reform Commission recommendation - received 2 August 2023

Answers to Questions on Notice

1 Answers to questions taken on notice by Dr Adrian Cohen at a public hearing on 30 January 2023; received 7 February 2023

2 Answers to questions taken on notice by Sports Medicine Australia at a public hearing on 30 January 2023; received 27 February 2023

3 Answers to questions taken on notice by Dementia Australia at a public hearing on 30 January 2023; received 27 February 2023

4 Answers to questions taken on notice by the Rugby League Players Association at a public hearing on 30 January 2023; received 10 March 2023

5 Answers to questions taken on notice by Dr Rowena Mobbs at a public hearing on 30 January 2023; received 19 February 2023

6 Answers to questions taken on notice by Dr Reidar Lystad at a public hearing on 30 January 2023; received 27 February 2023

7 Answers to questions taken on notice by Abbott Australasia at a public hearing on 30 January 2023; received 7 March 2023

8 Answers to questions taken on notice by the Professional Footballers Association at a public hearing on 30 January 2023; received 21 March 2023

9 Answers to questions taken on notice by Dr Tim Butson at a public hearing on 22 February 2023; received 3 March 2023

10 Answers to questions taken on notice by Ms Catherine de Hollander at a public hearing on 22 February 2023; received 4 March 2023

11 Answers to questions taken on notice by Dr Benjamin Chen at a public hearing on 22 February 2023; received 6 March 2023

12 Answers to questions taken on notice by Dr Eric Windholz at a public hearing on 22 February 2023; received 9 March 2023

13 Answers to questions taken on notice by Concussion Australia at a public hearing on 22 February 2023; received 14 March 2023

14 Answers to questions taken on notice by Mrs Aleksandra Ballingal at a public hearing on 22 February 2023; received 15 March 2023

15 Answers to questions taken on notice by Associate Professor Fatima Nasrallah at a public hearing on 22 February 2023; received 15 March 2023

16 Answers to questions taken on notice by the Queensland Brain Institute at a public hearing on 22 February 2023; received 15 March 2023

17 Answers to questions taken on notice by Connectivity & Ms Jamie Shine at a public hearing on 22 February 2023; received 15 March 2023

18 Answers to questions taken on notice by Dr Stephen Townsend at a public hearing on 22 February 2023; received 11 April 2023

19 Answers to questions taken on notice by Boxing Australia at a public hearing on 1 March 2023; received 23 March 2023

20 Answers to questions taken on notice by the Rugby Union Players Association at a public hearing on 1 March 2023; received 23 March 2023

21 Answers to questions taken on notice by the National Rugby League at a public hearing on 1 March 2023; received 24 March 2023

22 Answers to questions taken on notice by Football Australia at a public hearing on 1 March 2023; received 24 March 2023

23 Answers to questions taken on notice by HITIQ at a public hearing on 1 March 2023; received 27 March 2023

24 Answers to questions taken on notice by the Department of Health and Aged Care & Australian Sports Commission at a public hearing on 1 March 2023; received between 13 April and 26 April 2023

25 Answers to questions taken on notice by Mr John Hennessy at a public hearing on 26 April 2023; received 10 May 2023

26 Answers to questions taken on notice by Cricket Australia at a public hearing on 26 April 2023; received 12 May 2023

27 Answers to questions taken on notice by NeuralDx at a public hearing on 26 April 2023; received 11 May 2023

28 Answers to questions taken on notice by AFLPA at a public hearing on 26 April 2023; received 8 May 2023

29 Answers to questions taken on notice by RACGP at a public hearing on 26 April 2023; received 11 May 2023

30 Answers to questions taken on notice by Young People In Nursing Homes National Alliance at a public hearing on 26 April 2023; received 11 May 2023

31 Answers to questions taken on notice by Murdoch Children's Research Institute at a public hearing on 26 April 2023; received 12 May 2023

32 Answers to questions taken on notice by AFL and Dr Makdissi at a public hearing on 26 April 2023; received 16 May 2023

33 Answers to questions taken on notice by Rugby Australia at a public hearing on 1 March 2023; received 11 April 2023

34 Answers to questions taken on notice by the NHMRC at a public hearing on 1 March 2023; received 11 April 2023

35 Answers to questions taken on notice by the Department of Health and Aged Care & Australian Sports Commission at a public hearing on 1 March 2023; received 19 May 2023

36 Answers to questions taken on notice by Levin Health; received 10 May 2023

Appendix 2
Public hearings

Monday, 30 January 2023

Rydges Bankstown
Stirling & Typhoon Room, Cnr Hume Highway and Strickland Street
Bass Hill

Sport Medicine Australia

- Mr Jamie Crain, Chief Executive Officer
- Dr Kerry Peek, NSW State Chair, Physiotherapist and Sports Injury Prevention Researcher
- Dr Reidar Lystad, Member of Scientific Advisory Committee
- Dr Paul Bloomfield, NSW State Councilor, Sport and Exercise Physician, Club Doctor Manly Sea Eagles

Dementia Australia

- Mrs Maree McCabe AM, Chief Executive Officer

Headsafe

- Dr Adrian Cohen, Chief Executive Officer

Macquarie University

- Dr Rowena Mobbs, Neurologist and Senior Lecturer

Rugby League Players Association

- Mr Jamie Buhrer, Player Operations Manager

Professional Footballers Australia

- Mr Beau Busch, Co-Chief Executive
- Mrs Kathryn Gill, Co-Chief Executive

Abbott Australasia

- Dr Beth McQuiston, Abbott Diagnostics
- Dr Chris Davlantes, Abbott Point of Care
- Mr Paul Davies, Director, Government Affairs

Mrs Kathy & Mr Michael Strong, Private capacity

Ms Enid Taylor and Mrs Jennifer Masters, Private capacity

Ms Sandra and Ms Megan King, Private capacity

Mr James Graham, Private capacity

Wednesday, 22 February 2023

Royal on the Park Brisbane
Dehavilland Room
152 Alice St
Brisbane City

Dr Annette Greenhow, Private capacity

Dr Eric Windholz, Private capacity

Shine Lawyers

- Ms Jamie Shine, General Manager of Head trauma

University of Queensland

- Professor Pankaj Sah, Director, Queensland Brain Institute
- Associate Professor Fatimah Nasrallah, Group Leader, Queensland Brain Institute
- Professor Karen Barlow, Research Director, Child Health Research Centre
- Dr Stephen Townsend, School of Human Movement and Nutrition

Concussion Australia

- Mr Brendan Swan, Chief Executive Officer

Dr Benjamin Chen, Private capacity

Dr Tim Butson, Private capacity

Mrs Aleksandra Ballingall, Private capacity

Ms Catherine de Hollander, Private capacity

Miss Lydia Pingel, Private capacity

Ms Kirby Sefo, Private capacity

Wednesday, 1 March 2023

Parliament House
Committee Room 2S1
Canberra

Mrs Hayley Shaw, Private capacity

National Rugby League

- Dr Sharron Flahive, Chief Medical Officer

Rugby Australia

- Dr Warren McDonald, Chief Medical Officer

Football Australia

- Mr Mark Falvo, Chief Operating Officer & Deputy General Secretary
- Professor Rob Duffield, Head of Research & Development

Boxing Australia

- Ms Dinah Glykidis, Chief Executive Officer
- Dr Peter Stickler, Medical Committee Member

HITIQ

- Mr Michael Vegar, Founder and Managing Director

Rugby Union Players Association

- Mr Justin Harrison, Chief Executive Officer

Mission for Traumatic Brain Injury

- Professor Melinda Fitzgerald, Chair, Expert Working Group

National Health and Medical Research Council

- Mr Alan Singh, Executive Director, Research Translation Branch

MindMirror

- Mr Matthew Lingard, Regional Director
- Professor Paul Middleton
- Dr Will Davies

Department of Health and Aged Care

- Professor Brendan Murphy AC, Secretary
- Mr Travis Haslam PSM, Acting First Assistant Secretary, Office for Sport
- Dr Masha Somi, Chief Executive Officer, National Health and Medical Research Office
- Dr Andrew Singer AM, Principal Medical Advisor

National Sports Tribunal

- Mr John Boultbee, Chief Executive Officer

Australian Sports Commission

- Mr Kieren Perkins OAM, Chief Executive Officer
- Dr David Hughes, Chief Medical Officer

Wednesday, 26 April 2023

Jasper Hotel
489 Elizabeth Street
Melbourne

Australian Football League

- Mr Andrew Dillon, Executive General Manager Football Operations, Legal & Integrity
- Dr Michael Makdissi, Chief Medical Officer
- Mr Stephen Meade, General Manager Legal & Regulatory

AFL Players' Association

- Mr Paul Marsh, Chief Executive Officer
- Ms Megan Comerford, General Manager - Legal

Cricket Australia

- Mr Alex Kountouris, Head of Sports Science and Sports Medicine
- Dr John Ochard, Chief Medical Officer

AusCycling

- Mr Kipp Kaufmann, Executive General Manager
- Dr Kevyn Hernandez, Chief Medical Officer

NeuralDx Ltd

- Dr Roger Edwards, Chief Executive Officer

Levin Health

- Dr James Stewart, Medical Advisory Board

Young People in Nursing Homes National Alliance

- Mr Alan Blackwood, Policy Director

Margalit Injury Lawyers

- Ms Michel Margalit, Managing Principal
- Mr Nicholas Boag, Senior Associate

Griffins Lawyers

- Mr Greg Griffin, Principal
- Ms Katherine Barreto, Associate

Australasian Injury Prevention Network

- Dr Lauren Fortington, Treasurer

Public Health Association of Australia

- Professor Terry Slevin, Chief Executive Officer

Royal Australian College of General Practitioners

- Professor Mark Morgan, Chair of Expert Committee for Quality Care

Murdoch Children's Research Institute

- Dr Vicki Anderson, Theme Director, Clinical Sciences Research

Professor Alan Pearce, Private capacity

Community Concussion Research Foundation

- Mr Peter Jess, Chief Executive Officer

Mr John Hennessy, Private capacity

Mrs Anita Frawley, Private capacity

Ms Renee Tuck, Private capacity

Ms Annitta Siliato, Executive Director, Concussion Legacy Foundation Australia

Mr Peter (Wombat) Maguire, Private capacity

Mr Joseph Didulica, Private capacity

Ms Aisha Stewart, Private capacity