**Community Concussion Research Foundation Ltd January 2023**

**Submission to Senate Inquiry into TBI/concussion in Contact Sports**

1. **CCRF Introduction**

The Community Concussion Research Foundation Ltd (CCRF) is a not-for-profit registered charity established by founder Peter Jess in 2021 with the following objectives:

* Promote the prevention or control of chronic traumatic encephalopathy (CTE), traumatic brain injuries (TBI) and concussions within a sport setting.
* Create a Community Concussion Research facility
* Collaborate with local and international researchers
* Work with peak sporting bodies to facilitate the implementation and running of concussion rehabilitation and return to play protocols
* Partner or collaborate with other organisations to pursue related, similar or compatible activities relating to prevention and control of TBI, CTE, and concussion.

The CCRF emphasises the importance of providing a safe playing space for all participants in collision-based sports, whether that be at the grass-roots or elite levels. Additionally, CCRF will use best practice science and medical advice to develop proactive intervention, mitigation and prevention strategies to create safer sporting environments.

*The CCRF Board members*: Andrew Plympton (Chair), Professor Mark Cook, Peter Jess, Damien Meredith, Brian Roe, Jenny Bromley, John Hennessy, Matt Gray.

*CEO*: Peter Jess.

We applaud the establishment of this Senate Inquiry into concussions and repeated head trauma in contact sports as they have become significant public health issues. Some are saying we have a TBI epidemic in Australia. We acknowledge the very positive health benefits that people gain through participation in sporting activity. However some sports have excessive risk and are dangerous for participants. Most contact sports have some incidence of traumatic brain injury (TBI) but in Australia by far the highest incidence occurs in those contact team sports defined by frequent high-intensity collisions, where a key objective of the sport is to collide with the opponent in an aggressive, violent manner: Australian football (AFL) and rugby (both forms) are by far the most prominent in this regard. TBI (Concussion and CTE) is the number one problem for collision sports around the world. It is the Silent Killer that destroys families. Unfortunately, the management of TBI in Australia is like the Wild West: it is seriously out of control.

1. **Public Health Policy**
* Australia’s success at controlling the COVID-19 pandemic underscores the country’s long history of taking a collective approach to public health. We have long been recognised [as a world leader](https://apps.who.int/iris/bitstream/handle/10665/326043/9789241516204-eng.pdf?ua=1) in this area. Australians haven’t shirked accepting legislation and enforcement to drive behaviour. Whether it is making seat belts and motorbike helmets compulsory, introducing smoking bans in public places, ending family fireworks, vaccinations or preventive health activities such as breast cancer screening, Australia is a global leader in public health. Legislation to curtail the ownership of firearms in Australia resulted from a massacre, combined with outstanding political leadership from then Prime Minister John Howard. Similarly, plain packaging on cigarettes in Australia has required political muscle and tenacity in the face of opposition from Big Tobacco.
* The compulsory wearing of seatbelts in motor vehicles, combined with random breath testing and other measures have reduced road deaths from 30 per 100,000 population in 1970 to 4.3 per 100,000 in 2020. When science established a clear link between [smoking and poor health outcomes](https://www.theguardian.com/news/2005/jun/02/thisweekssciencequestions.cancer), the role of public health was to get this message out to the public and implement measures to minimise smoking rates. In recent decades, Australia has progressively implemented a comprehensive suite of tobacco control measures. In the 1950s, 75% of Australian men smoked. Since then the proportion of adults who are daily smokers has fallen sharply to 28% in 1990 and then to 10% in 2021.
* Public health has played a major role in the increased health and longevity we take for granted in the modern world. Community resistance tends to have social traction only until there is evidence that the intervention actually works.
* Why is it so important to address injuries as a public health problem? Because injuries often strike down otherwise healthy children and young adults, they are a leading cause of premature death. There is a growing awareness that injuries are predictable and *preventable*. Injuries can be predicted because they occur more often in some population groups than others.
1. **Context**
* Australia is a sport-obsessed country where, according to AusPlay, 71% of men and 55% of women in Australia participate in some sport related activity. About 20% of Australians participate in collision sports in Australia.
* The professional AFL competition attracts the highest attendances of any sport in Australia and its income from TV rights has increased massively from $250 million per season in 2013-17 to $420 million per season currently and to $643 million per season for the period 2025-31. In addition, the AFL gains very significant income from a variety of other sources, including gambling. The AFL is in the entertainment industry and to maximise the dollars it needs to have its best players on the park and, for the future, ensure there are enough younger players coming through the pipeline.
* In 1990 Australian football and soccer had about the same number of participants nationally. In 2019 (pre-covid), soccer (1.8 million) had **double** the number of participants compared with Australian Rules Football (0.9m). Basketball (1.1m) also has more participants than Australian football. Rugby League and Union combined have about 0.5 million participants. Interestingly, Touch Football (non-contact) now has more participants than (combined) rugby. (Source: SportAus Ausplay). The AFL states players are ‘tackle ready’ at 11 years of age.
* In the USA the number of people over the age of 6 playing NFL (tackle) football has dropped by about 60% since 2006. **Flag football** is now the preferred ‘NFL’ game for players aged 4-17 as parents prefer their children to play the much safer sport. The key characteristics of Flag football are:
* **Flag is now the fastest growing team sport in the USA**. It has more players than regular tackle football. Flag is also now being played by adults.
* **No physical contact is allowed**. Instead of tackling the player to the ground, the defensive team must remove a flag from the ball carrier. No helmet is required.
* Tackle football sustains **23 times** the number of high severity head impacts vs Flag football.
* US research: every 2.6 years of playing tackle football (from juniors up) doubles the risk of chronic traumatic encephalopathy (CTE). **The longer you play the greater the risk**.
* Athletes who began playing tackle football before age 12 developed CTE cognitive and behaviour symptoms 13 years earlier on average than those who started playing later in their teenage years.
* In Australian rules football, play is continuous for 20-minute segments or longer, unlike in American football, which has stoppages after every down.

Interestingly, Ross Lyon (current AFL St Kilda coach) has stated: ‘I think the bump is dead. I would prefer my players not to bump’.

1. **Traumatic brain injury (TBI)**
* Public awareness and understanding of TBI is improving but still generally lacking.
* The human brain is the most sophisticated organ on the planet.
* Humans are born with all the brain cells they will have for the rest of their life.
* The brain is not fully matured until about age 25. Young developing brains are more susceptible to damage from hits to the head/whiplash.
* TBI is defined as injury to the brain caused by an external force. It can result in concussion and/or chronic traumatic encephalopathy (CTE).
* A piece of brain tissue the size of a grain of sand contains 100,000 neurons (or nerve cells). However, damage to neurons can have a great impact.
* A **concussion** occurs when the human brain hits the skull, even if the person’s head doesn’t collide with an object. Whiplash alone can generate a concussion. After all, it doesn’t take much to deform jelly. The force of the impact with the skull can cause the brain to twist or even rebound against the other side of the skull, stretching and damaging brain cells, causing bruising, broken blood vessels and/or nerve damage. Loss of consciousness only occurs in about ten per cent of concussions. According to Dr. Alan Pearce, a neuroscientist at La Trobe University and the [Australian Sports Brain Bank](https://www.brainbank.org.au/): ‘If you get an impact that strikes the head and then you get nauseous, confused, blurred vision, headaches or you lose your balance and you're seeing stars — that's generally a concussion. But no two people's symptoms are ever the same. Just because a football player's concussion symptoms have cleared up, it doesn't necessarily mean their brain has recovered from the impact. Lasting damage to the brain can occur if you don’t rest long enough afterwards to let the brain fully heal. **Second Impact Syndrome,** incurring a second brain injury before recovering from a first, can cause more catastrophic damage. A second impact is more likely to cause severe brain damage than a first, even if the victim does not lose consciousness. Between 10% and 20% of adults who are diagnosed with concussion have symptoms that persist for more than three months. **Early return to play comes with an incredible amount of risk’.**
* Many sportspeople receive hard knocks to the head and do not suffer concussions. It is not possible to identify in advance which people will be affected. Also, some people take much longer to recover than others. This is why regular quantifiable testing is essential to determine suitability for return to play (RTP).
* There is another type of dangerous head impact that flies under the radar: **Subconcussions** occur when the head is directly or indirectly impacted, but is not followed by symptoms of concussion — and they can be particularly dangerous long-term because people don't realise they've happened. That means they don't take necessary precautions after the impact. When these less severe sub-concussive head impacts happen repeatedly it may lead to long-term health issues. “Eventually the brain may no longer be able to function properly and you start to see mental-health issues and cognitive problems." This is referred to as **Chronic Traumatic Encephalopathy (CTE)**. CTE is a neurodegenerative disease that, over time, causes nerve cells in the brain and parts of the nervous system to deteriorate and die. There is no treatment for CTE and it can only be fully diagnosed after death. Brains with CTE can accumulate a protein called ‘tau’ which clumps together in the tissues of the brain, interrupting critical information flow and death to neurons. Research in the United States has proved conclusively that there is a link between repeated sporting concussions and the disease known as CTE, which causes early onset dementia and a range of other issues.
* The damage CTE causes to the brain can, however, be assessed through regular trans-magnetic scanning (TMS) which analyses 68 parts of the brain for structural integrity and functioning.
* When discussing brain damage the focus needs to be on traumatic brain Injury, including concussion and CTE. A focus on the term concussion is potentially unhelpful. Concussion is one of the more obvious symptoms of brain injury but the long-term impacts of acquired brain injury may occur in the absence of historic concussions
* TBI is a major cause of death and disability: TBIs affect the lives of people of all ages. Anyone can experience a TBI, but data suggest that some groups are at greater risk of dying from a TBI or experiencing long-term health problems after the injury. Most concussions in teenage years happen playing sport. A TBI during childhood may affect brain development**.** TBI affects children differently than adults. Children require 2-3 times less impact force to sustain a concussion than adults. Children take longer to recover from concussion .An injury of any severity to the developing brain may:
* Disrupt a child’s development
* Limit their ability to participate in school and other activities, like sports
* As a result of a TBI, children may experience changes in their health, thinking, and behaviour that affect learning, self-regulation, and social participation, all of which are important to becoming a productive adult.
* Any athlete with suspected or confirmed concussion should remain in the company of a responsible adult and not be allowed to drive. They should be advised to avoid alcohol and check medications with their doctor. Specifically, they should avoid aspirin, non-steroidal anti-inflammatory drugs, sleeping tablets and sedating pain medications. There is no single test that can determine whether someone has sustained a concussion.
* The sooner you start playing and the longer you play dangerous contact sports, the greater the chance you will suffer traumatic brain injury. It is not the level of the sport that was played but how often it was played. It is not how hard people are being hit but how often. The more often you tackle or are hit the more likely you are to suffer permanent brain damage and tragic decline. Concussion protocols (return to play) may help those who are concussed but they are not going to head off the growing prevalence of CTE in sports participants. In these cases it is not concussion but the accumulative impact of ongoing sub-concussive hits that can damage the brain irreparably. But the focus of the football codes is on concussions and so they can say they follow international best practice concussion protocols. Chris Nowinski (Concussion Legacy Foundation founder): ‘younger patients presenting with severe dementia is another sign of the growing toll contact sports have on the brain. They are the canary in the coalmine’.
* Why is TBI called The Silent Epidemic? Simply put, many people do not know they suffer from a traumatic brain injury. Since they cannot see the injured area, they assume they are fine. That is why doctors and other professionals refer to it as a silent epidemic. Concussions range from mild to quite severe. A generation ago, most doctors believed that concussions were little more than inconveniences. We now know that a concussion can cause life-long damage.
* “You are not ok to return to your sport once you no longer have symptoms”. Symptom resolution is NOT considered a realistic return to play guide. It does not indicate physiological healing of the brain. Let’s think of it like a fracture – the pain from the fracture is gone after 10 days, but that doesn’t mean the bone has sufficiently healed. Most symptoms go away within 7-10 days. But recovery of the brain can take 4-6 times longer than that. Having a concussion renders you 4 to 6 times more susceptible to having a second one.
* Brain injury is common. According to the Australian Bureau of Statistics, over 700,000 (3%) Australians have a brain injury, with daily “activity limitations” and “participation restrictions”. Three in every four of these people are aged 65 or under. As many as two out of every three acquired their brain injury before the age of 25. Three-quarters of people with a brain injury are men. Each year in Australia it is estimated that 200,000 (1%) suffer from a TBI, with about 20,000 hospitalised following their injury indicating a moderate to severe TBI.
* According to the Australian Medical Association, the rate of sport-related concussion has grown, with the number of players hospitalised with concussion increasing by 38.9% in a 9-year period. It’s not just its immediate effects that are concerning, serious long-term problems are now more widely recognised. When under-reporting is taken into account this figure would grow significantly.
* A national study of Australian children’s use of health services in 2018 has revealed significant rates of concussion among teenage boys. The study by the Australian Institute of Family Studies found only around 1 per cent of girls at age 14- 15 needed medical attention for a concussion, compared to 3.8 per cent of boys, who were more at risk as a result of injuries sustained during contact sports.
* “The arithmetic on this is as stark as it is simple”, says Nick Rushworth Executive Officer of Brain Injury Australia. “The last time something approximating national incidence data was collected was in 2004-2005. In that year, 23,000 people were hospitalised with a traumatic brain injury (TBI). The rough rule of thumb is around 80 per cent of those TBIs are going to be designated ‘mild’. And all but around, say, 10 to 20 per cent of the 18,000 of those people with mTBIs could have expected to have made a full recovery within 3 to 6 months. That still leaves 3,000 or so people who didn’t – what the literature refers to as the ‘miserable minority’, those with persistent ongoing symptoms such as headaches, dizziness, and problems with everything from short-term memory through to balance. 3,000 or so people. Every year. But that’s not all, clearly.” Nick continues. “Every year in Australia more than 3,000 people are hospitalised after being concussed, just from playing sport. But **triple** that number won’t seek medical attention. And as many as **ten times** that number won’t even report their concussion to teammates, coaches or family because they fear being removed from play. Or they don’t even know they’re concussed. Nine out of ten people hospitalised with concussion don’t recognise the injury. And then you’ve got to remember that, when our public hospitals are under such cost pressures, most people who present at casualty with ‘mild’ injuries won’t be admitted. Though the ‘tip of the iceberg’ analogy is over-used, the true numbers of people long-suffering ‘mild’ TBI injury is anyone’s guess.”
	+ By way of comparison, the annual national Australian road toll is about 1,100 deaths with 40,000 serious injuries. Under-reporting is minimal.
* **Suicide** is the leading cause of death among young Australians. More than 350 young people aged 18 to 24 take their own lives every year — more than die on the roads. **For every youth suicide, there are 100 to 200 more attempts**. People of all ages, races, genders, incomes and family backgrounds die by suicide. But young people are especially at risk. The relative risk of attempted suicide is **three to four times higher in patients with severe TBI** compared with the general population. Clinical evidence also indicates that both severe and mild TBI are associated with increased suicidal tendencies.
* **Concussion in Sport Australia Position Statement Feb 2019**: Children and adolescents take longer to recover from concussion. A more conservative approach should be taken with those aged 18 or younger. The child’s return to sport program: they should be advised to wait a minimum of 14 days from when all symptoms cease before returning to full contact/collision activities (after medical clearance). The long-term consequences of concussion, and especially multiple concussions, are not yet clearly understood. - *If in doubt, sit them out.*
* Concussion numbers from sport dropped dramatically during Covid-19. The Australian Institute of Health and Welfare (AIHW) reported there were 2,800 injury hospitalisations attributed to Australian rules football in 2020—2,300 male and 500 female. This was 2,400 less than the year before. (2019 is the last year of ‘normalised’ data).

**Overseas numbers:**

* **USA:** Statistically, the Center for Disease Control and Prevention (CDC) estimates that 5.3 million U.S. citizens (**2 percent** of the population) are living with disability as a result of a traumatic brain injury and that annually, about **1.5 million** Americans survive a traumatic brain injury (TBI). Among these, approximately 230,000 are hospitalized.
* As of 2009, all fifty states and Washington, D.C., have passed "concussion laws" mandating that school athletes suspected of having sustained a concussion during play must be taken out of the game or practice.Until the statutory scheme includes some enforcement mechanism, injured athletes will have to rely on their coaches and medical providers to be properly educated and trained. When they are not, injured athletes will be left with no way to recover for their harm.
* **Canada:** Each year, [about one per cent of Canadians sustain concussions](https://doi.org/10.1097/htr.0000000000000503), amounting to some 400,000 concussions in Canada alone. Concussion is a critical public health concern. Up to 30 per cent of [children](https://doi.org/10.1016/j.jpeds.2022.03.039) and [adults](https://doi.org/10.1089/neu.2016.4677) will have persistent problems after concussion that lower their quality of life and hinder their return to work, sport, school and other activities. Research from the University of Toronto also found a link between concussion and an increased risk of suicide. Suicide and brain injury have long been linked by scientists, but just how many people who have had a brain injury end up committing suicide? A new study has a grim answer: It found that the long term risk of suicide increases three-fold among adults who have had concussions. That’s the conclusion of a team of Canadian researchers who studied a health insurance database of more than 235,000 people. Their work was recently published in the [Canadian Medical Association Journal](http://www.cmaj.ca/content/early/2016/02/08/cmaj.150790.full.pdf%2Bhtml). “**Look after your brain. People just don’t take concussions seriously**” says Donald Redelmeier, a practicing physician and professor of medicine who led the study.

**Professor Bennet Omalu** (University of California) is a neuropathologist who was the first to discover and publish findings on CTE in American football players. Actor Will Smith played Dr Omalu in the 2015 movie 'Concussion'.

* Dr Omalu says kids shouldn't play contact sports until they're 18. “Letting kids play football is akin to child abuse. You wouldn’t let your child drink a glass of cognac or smoke a cigarette, so why would you send him out on a [football field](https://www.today.com/news/football-safe-kids-study-looks-brain-changes-t104222) to risk brain damage? We need to develop more brain-friendly, healthier types of sports,” Omalu said. “We have elevated sports to the level of a religion. We’re in denial of the truth.”
* Dr Omalu: ‘I take classes in child abuse recognition every few years in order to maintain my license to practice as a physician. The fundamental definition of child abuse is the intentional exposure of a child to the risk of injury. That injury does not have to occur. We wouldn’t give a child a cigarette to smoke because a cigarette is potentially harmful. But we would put on a helmet on the head of a child and send him out on a field to play a game whereby he sustains repeated blows to his head, to suffer [sub-concussive hits.](https://www.today.com/news/what-parents-coaches-should-know-about-concussions-wbna41610690) Which is more dangerous: a cigarette or a concussion of the brain? A concussion of the brain, of course. If that is not the definition of child abuse, what is it? I’ve not met any parent who disagrees. Some parents will say, “Don’t put it like that; that makes me feel bad.” The damage is permanent because the brain does not have any ability to regenerate itself. The children have not reached the age of consent.
* “There were two papers that came out of Sweden, one in 2014 and another in 2016. Researchers identified 1.1 million children and they followed them for 41 years. They found out that if a child suffers just one concussion that brings him to the hospital, that child is more likely to die before the age of 42, especially through violent means; he has a two to four times increased risk of committing suicide as an adult; and is about two to four times more likely to suffer a major psychiatric illness as an adult, including major depression. He is more likely to have diminished intelligence and is more likely to be less gainfully employed as an adult. He is more likely to become a drug addict or alcoholic; and is more likely to engage in violent or criminal behaviour.
* “But as we got into the 20th century, sports became big business, there was a conflict between the health of the players and the money the investors make. And like in everything in life, money prevailed. It’s happening in America today: participation in tackle football has dropped drastically. In California, high schools are beginning to close their football programmes, because parents are no longer letting their kids play”.

**Failure of self-regulation:** Since 1995, Australian sports have at varying speeds been tinkering with rules and guidelines to try to manage the harm within their sport. This *self-regulatory* approach has led to a sport-specific vertically integrated system and, in several cases, inconsistent application, haphazard enforcement and mixed messaging. The mismanagement of sport-related concussion (SRC) is also a public health concern but unlike COVID, sport's governing bodies almost exclusively set, direct and control the rules around the issue. This begs the question whether private actors like the sport's governing bodies should unilaterally self-regulate public health concerns.  Soaring rates of concussion in AFL at the community level, especially for juniors, wold indicate that self-regulation has failed. At the professional level, concussions are increasing and mismanagement, misrepresentation and high risk protocols have been an ongoing feature of the sport. Retired players are falling through the cracks. Where is the duty of care?

Research demonstrates the health and social burdens of SRC and the externalised costs borne by the wider population. Despite public health implications associated with SRC, Australian policymaking is managed primarily by private actors within each sport resulting in a fragmented and vertically integrated approach, which may not adequately protect players’ interests or address the harm. Mismanaging SRC is not just a private sporting matter but is worthy of recognition as a public health issue, affecting players, their families, and the community. *Building and enhancing trust in our sports system is critical to the future of Australian sport.* Advances in scientific understanding about the serious and long-term harm make this an urgent and high priority matter for policymakers. Time is of the essence as we cannot afford to wait another 25 years.

**Data**: Injuries in elite players are monitored by dedicated teams to reduce and rehabilitate injuries to manage health and ensure long-term success. In contrast, little is known about the types of sports injuries experienced by the remainder of the Australian population, unless an injury is very severe and results in a hospital admission. Australia currently lacks a national data collection that can provide information about the frequency and cause of sports injury to inform injury prevention activities and provide evidence on the risks and benefits of participation. This does not account for concussion diagnoses made in the community, such as in general practice or similar primary healthcare facilities. A proportion of cases of concussion will not present to a medical doctor. **Does Australia have a concussion ‘epidemic’?** There are significant gaps in our understanding of both sport-related and non-sport-related concussion. This lack of information results in an inability to confirm if concussion is indeed ‘an epidemic’ in Australia and prevents accurate assessment of the socioeconomic cost of concussion to society.

**General**:

* Recent evidence suggests females are more likely to suffer concussions than males and that it typically takes females nearly twice as long to recover from concussions.
* Research: Medical Research Future Fund (Aust Govt): The Traumatic Brain Injury (TBI) Mission will provide $50 million over 10 years under the Medical Research Future Fund (MRFF) to support research designed to improve the lives of all Australians who experience TBI. TBI arises from a range of circumstances, including concussion while playing sport, falls in older people or severe injury after major trauma.
* Parallel to the need for national baseline summary data on the incidence and outcomes of moderate to severe TBI in Australia is the need to determine the extent and sources of variation in patient outcomes. However, reducing the incidence of catastrophic outcomes after moderate to severe TBI will be very difficult without baseline data. The Australian Traumatic Brain Injury National Data (ATBIND) project (2021-23) will identify the key determinants of priority outcomes for patients with moderate to severe TBI in Australia: to predict outcomes at hospital discharge. TBI has consistently been the leading cause of post-injury mortality, without successful breakthroughs in treatment. Severe TBI has a high mortality rate of 30–40%, with <50% of survivors returning to full independence and productive activity. New cases of moderate-to-severe TBI add $2 billion in direct lifetime costs to the Australian healthcare system annually. Between 2006 and 2015, there has been no substantial change in survival or functional outcomes post-TBI.
* A Curtin-led research team will develop a new range of online tools that will help predict life-changing consequences for the 200,000 everyday Australians who suffer mild traumatic brain injuries and concussions every year. The project is titled *‘AUS-mTBI: designing and implementing the health informatics approaches to enhance treatment and care for people with mild TBI’*.
* Elite sports have a responsibility to set a good example to youth and grassroots sports. If concussion is not taken seriously in elite sport, that is going to be happening on a Saturday morning when youngsters are playing, where there aren’t ambulances waiting at the side of the pitch. Concussion must be taken seriously and if somebody sustains a bang on the head they need to be withdrawn from the field of play and you need to adopt a precautionary approach. There is also a tendency for the press to laud athletes who sustain injuries and drag themselves back onto the field of play, even swathed in bandages.

**Major development re concussion and sport:**

 **2019 2022**

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| * ‘There is currently no reliable evidence clearly linking sport-related concussion with chronic traumatic encephalopathy (CTE): the link between sport-related concussion and CTE remains tenuous’. (Concussion in Sport Australia Position Statement, Feb 2019.)

‘Further research is needed to better understand the pathophysiology and risk factors for ‘second impact syndrome’ | In a move that will have ramifications for collision sports globally, the US National Institutes of Health **(NIH)** has formally acknowledged a causal link between repeated blows to the head and the neurodegenerative disease chronic traumatic encephalopathy (CTE).The NIH is the largest biomedical research agency in the world and the decision to rewrite its official guidance on CTE has been described by campaign groups as a tipping point in the debate about the risks of playing collision sports. In the NIH’s view research to date suggests the causal link between repeated traumatic brain injury and CTE is clear and unequivocal.That position is at odds with the one held by the Concussion in Sport Group, which is supported by Fifa, World Rugby, AFL and the IOC, among others. The concussion consensus documents published by CISG have consistently played down the connection between CTE and brain injuries sustained in sport, a position that has been used by many sports federations as they defend themselves against legal challenges and calls to reform.The change brings the NIH into line with the **US Centers for Disease Control and Prevention**, which stated in its advice in 2019: “Most research suggests that CTE is caused in part by exposure to repeated traumatic brain injuries.” It means two of the leading independent medical research bodies in the world are in agreement on the causes of CTE. |

**Further Confirming Studies of the sport-concussion link:**

**CLF/Oxford Brookes (UK)**:

* To confirm these NIH and CDC statements, in July 2022 new analysis by world-leading experts on chronic traumatic encephalopathy (CTE), has found conclusive evidence that repetitive head impacts (RHI) cause the degenerative brain disease CTE. Analysis from the Concussion Legacy Foundation (CLF) and researchers from Oxford Brookes University (UK) and 12 other academic institutions has determined a **causal link between repeated head impacts and Chronic Traumatic Encephalopathy (CTE)**. The international team of experts is issuing a global call to action to sports organisations, government officials, parents, and the military to immediately implement CTE prevention and mitigation efforts, especially for children. The researchers analysed the data through the “Bradford Hill criteria”, a trusted set of nine benchmarks developed by one of the pioneers of smoking and lung cancer research to gauge the confidence science can place in a causal relationship between an environmental exposure and an adverse health outcome.
* Among the revelations in the analysis, the authors discovered that the brain banks of the US Department of Defence, Boston University-US Department of Veterans Affairs, and Mayo Clinic have all published independent studies on distinct populations showing that **contact sport athletes were at least 68 times more likely to develop CTE than those who did not play contact sports**. This incredible strength of association, combined with robust evidence in all nine categories, is **conclusive evidence** linking repeated head impacts and CTE (chronic traumatic encephalopathy).
* “This innovative analysis gives us the highest scientific confidence that repeated head impacts cause CTE,” said study lead author Dr. Chris Nowinski, Concussion Legacy Foundation CEO. “Sport governing bodies should acknowledge that head impacts cause CTE and they should not mislead the public on CTE causation while athletes die, and families are destroyed, by this terrible disease.”
* The most studied causes of CTE are contact and collision sports like football, rugby, American football, Canadian football, and Australian football. The study authors are concerned that parents and coaches, who have the most control over whether children are exposed to repetitive head impacts, are not getting the facts from global sports organisations, and their children are being exposed to preventable cases of CTE.
* In the UK, The Football Association recently introduced a trial ban on heading until age 12 as a meaningful attempt at preventing repetitive head impacts in the youth population. Recent research however, has found that nearly three-quarters of boys are compelled to participate in contact rugby in secondary school physical education.
* **Sport needs to acknowledge causal link**: While both the United States Centers for Disease Control and Prevention and the National Football League (NFL) acknowledge a causal relationship between repetitive head impacts and CTE, global sporting organisations including Fédération Internationale de Football Association (FIFA), World Rugby, International Olympic Committee (IOC), National Hockey League, Canadian Football League, National Collegiate Athletic Association, Australian Football League, National Rugby League and New Zealand Rugby have not publicly acknowledged a causal relationship. Experts say it is the duty of these organisations to inform their athletes and their families and take appropriate steps toward CTE prevention and mitigation in light of this recent research.
* Dr Adam J White, Senior Lecturer in Sport and Coaching Sciences at Oxford Brookes University and Executive Director of the Concussion Legacy Foundation UK said: “This analysis shows it is time to include repetitive head impacts and CTE among other child safety efforts like smoking, sunburns, and alcohol.

**Parkinsons Foundation USA**:

* research reported in 2020 shows that upwards of 50 percent of concussions may go unreported. This was a robust, case-controlled, 25-year retrospective study examining medical records from 1990-1991 to 2014-2015. It compared the health outcomes of 47,483 people (28,021 men and 19,462 women) who had suffered concussions with 139,030 (81,871 men and 57,159 women) healthy people (controls) matched by age, sex, socioeconomic status and geographical location. The study used several statistics models among other sensitivity models.

Results: Regardless of age, sex, socioeconomic status and residence, having suffered a single concussion in one’s lifetime increased the likelihood of later being diagnosed with:

* + Parkinson’s disease by 57%
	+ Dementia by 72%
	+ ADHD (Attention-Deficit Hyperactivity Disorder) by 39%
	+ Mood and Anxiety Disorders (MADs) by 72%
	+ Sustaining multiple concussions further increased the risk for developing both PD and dementia.

**University of Glascow FIELD study** (October 2022):

* Led by Professor Willie Stewart: this landmark Scottish study found former international rugby players were 15 times more likely to develop Motor Neurone Disease (MND), with dementia doubled, Parkinsons three fold, Alzeimers five fold. Professor Stewart says football dementia risk is ‘phenomenal’.

**Cardiff University study (December 2022)**

* This study of Welsh professional male Rugby Union players from 2012/13 to 2018/19 included a total of 2888 injuries sustained by 382 players. The 5 injuries with the highest match injury incidence were: concussion, thigh haematomas, hamstring muscle strains, acromioclavicular joint injuries and lateral ankle sprains. These were named common injuries. We then modelled the risk of injury before sustaining a common injury after the risk of injury after it. **Key findings:**
	+ Concussion was the only injury to elevate a player’s injury risk. Risk increased by 26%
	+ Concussion increased the risk of suffering head/neck, pelvic and neurological injuries
	+ Concussion increased subsequent injury risk by 24%
	+ Concussion shortened the time to next injury

**International Inquiries into Concussion in Sport:**

**UK: House of Commons** Digital, Culture, Media and Sport Committee: Concussion in Sport report (grassroots, elite, professional) 15 July 2021. **(*Summary extract*)**

* Each sport is left to itself to decide on correct protocols for concussion, such as when it occurs, what should happen and when participants should return to play.
* In grassroots sport the tracking of injuries and therefore the potential to identify long-term impacts on the brain is almost entirely lacking. Those participants rely entirely on the NHS, which does not have sufficient awareness of procedures to properly address the long term issues.
* The drive that distinguishes world champions and gold medallists also disincentivises prioritising personal safety. Sport has a responsibility to ensure that our elite athletes are not allowed to trade their long-term health for short-term sporting success.
* For too long the sporting landscape has been too fragmented to properly address this issue and Government has delayed taking action, deferring to the numerous sporting bodies. We recognise that sport will never be, and can never be, one hundred percent safe. However, the Government has a duty to ensure that sporting activity, at every level, bears no unnecessary risk.
* There is also a lack of information about the scale of the problem: neither SportScotland nor Sport England collected data on incidence of concussion for participants in grassroots sport and the NHS did not systematically record this information on medical records. Re collection of data: Also, kids do not just play one sport.
* One aspect of every protocol that has been highlighted to us is the need to limit return to play. A message that we repeatedly received was that the NHS is not properly equipped to deal with this issue. Also need to improve GPs understanding and advice. We recommend that NHS England reviews the way in which it collates data about concussion and concussion-related brain injury and ensures that doctors have a full history available to better inform patient treatments. At the moment, there is too much onus on the athlete and then the coach. Realistically, an athlete is going to do everything possible to return to play. **The system allows sports to be funded as long as their protocols look good on paper with no effort put into assessing how those protocols work in practice.** We recommend a more precautionary approach is taken than the Consensus Statement protocols.
* The 2020 FIELD study mentioned earlier in this Report which found risk rates for former footballers were 5 times greater for Alzheimer’s disease, almost 4 times greater for motor neurone disease and 2 times greater for Parkinson’s disease. This solid scientific evidence gave greater weight to those who have campaigned on this issue for years.
* **Football’s engagement with the issue of concussion, both in England and internationally, has taken too long.** Love of the Game (LOTG) is a campaign launched in January 2021 to develop awareness and practical solutions in tackling concussion in sport. Its motto is “save the player save the game”. Kyran Bracken, ex-England player, speaking for the campaign group Progressive Rugby, thought that the game’s current trends might not be helping the issue: The game of rugby, since it went professional, has changed hugely. First, the players are bigger and stronger. You are likely to see the likes of Jonah Lomu all over the place now in the backs. The rules in the game have changed so that the ball is in play 30% more than it ever used to be because of the rule of kicking it outside the 22. Effectively, that means there are more tackles and there are more head injuries. Every single team has a professional defence coach and their job is to basically cover any space on the pitch. Rugby has now become a game of collision and not evasion. I am not saying that is a bad thing but that is the truth of it. The third change in the laws allowing lots of substitutes to come on to the pitch and change the direction of the game means the impact and the intensity is huge. The Progressive Rugby campaign seeks to improve how the game adapts to the challenge and potential long-term health consequences of head trauma, including limiting contact in training, reducing the number of games per year for international players, extending the minimum number of days before ‘Return To Play’ to at least three weeks and establishing a Concussion Fund to provide post-retirement welfare.
* The sports’ governing bodies are left to their own devices and mark their own homework. **We are astounded that sport should be left by the Health and Safety Executive to mark its own homework.**
* Comments have been made as to the obvious potential for conflict of interest within the Concussion in Sport Group (which issues the Consensus Statement). More pointed criticisms of the state of research in this area were made by academics from Newcastle University, who said that “It is striking that in the UK there is almost no independent research into rugby injuries, research is almost exclusively funded by the rugby unions”. *We recommend that the Government uses its power to convene interested parties and establish a single research fund that will co-ordinate and fund research. We also recommend that the Government convene its own specialist group on concussion. This group should take a broader view of the existing science than the Concussion in Sport Group, with its priority on taking a precautionary approach to safety.*
* The value of a coherent approach has been strongly represented. Professor Stewart told us that a great success in Scotland is: this single policy on concussion management, which applies to every sport across the sports and grassroots. That has not been replicated in any other country and I would ask why not. It is not difficult to put the tools for brain injury and concussion recognition and management in the hands of parents and coaches, but no other country has done that.
* *We find it difficult to see any downside of a coherent UK-wide protocol for concussion and recommend that the Government look to the Scottish model and then work with the devolved governments in Scotland, Wales and Northern Ireland to develop, in the next 12 months, a UK protocol for concussion across all sport.*
* We urge the Government to grasp the nettle this time, move past the concerns about how regulation may change sports, and take real and effective action. . It will never be possible to ensure that sport is one hundred percent safe. It should, however, be expected that participants are aware of the risks involved and that there is a precautionary approach to risk management. The Government cannot avoid taking a proactive role in ensuring that this occurs.
* **Government Response** to DCMS Select Committee Report on Concussion in Sport December 2021*: (summary extract)*
* The Government also appointed Laurence Geller CBE as ministerial adviser on concussion in sport in July 2021
* To address the issue of a lack of data about the scale and impacts of sporting head injuries in the UK, the Government is supporting plans for a world-leading research project led by the University of Oxford and backed by the sport concussion charity, Podium Analytics.The Government will look into the feasibility of a national register of concussion incidents.
* **The Government agrees with the Select Committee and will commission a set of shared protocols around concussion in sport. We will build upon the existing work undertaken across the different nations of the UK with stakeholders to aim to develop a single set of shared guidelines across the whole of the UK (including the Return to Play protocols).**

**Canada**

* Important questions remain about concussion prevention, diagnosis and treatment. In 2019, [the Parliamentary Subcommittee on Sports-Related Concussions in Canada](https://www.ourcommons.ca/DocumentViewer/en/42-1/HESA/report-24/) called for the creation of a national expert group and a coordinated national research program.
* In response, the [Canadian Concussion Network/Réseau Canadien des Commotions](https://ccn-rcc.ca/en/) (CCN-RCC) was launched in 2020 to establish a Canadian research agenda spanning all causes of concussions, as well as to support knowledge translation to bring research evidence into clinical practice where it can improve patient care.
* More broadly, [Parachute](https://www.parachute.ca/en/), the largest charitable organization in Canada devoted to injury prevention, is leading the [Concussion Harmonization Project](https://www.parachutecanada.org/en/professional-resource/concussion-collection/concussion-harmonization-project/), supported by the Public Health Agency of Canada and in collaboration with Sport Canada. The project’s goal is to establish consistent concussion guidelines and protocols in more than 50 sports in Canada based on the [Canadian Guideline on Concussion in Sport](https://parachute.ca/en/professional-resource/concussion-collection/canadian-guideline-on-concussion-in-sport/), which is grounded in scientific evidence.
* Concussions are not usually visible using standard neuroimaging diagnostic tools, such as CT scans. The diagnosis of concussion relies largely on the observation of signs such as unconsciousness or vomiting and the reporting of symptoms such as headache, dizziness or “brain fog.”
* However, injuries are not always directly observed, and people cannot or do not always report their symptoms accurately. A [Parliamentary Subcommittee on Sports-Related Concussions in Canada](https://www.ourcommons.ca/DocumentViewer/en/42-1/HESA/report-24/). One of the Subcommittee’s recommendations was to establish a pan-Canadian Concussion Awareness Week, which began in 2021 and takes place this year from September 25.

**TBI in Australia**

* **Australian Sports Brain Bank**: Over half of brains donated to the Australian Sports Brain Bank have signs of chronic traumatic encephalopathy (CTE), a degenerative brain disease associated with repeated blows to the head, researchers reported in 2022. Data from the first three years of the national brain bank shows that of the first 21 donors — all of whom participated in sports with risks of repetitive head injury — all but one donor had some form of neurodegeneration, including 12 who were found to have CTE. "The 21 donors, a mix of professional and amateur players, came from a range of sports, but 17 of them either came from AFL or one of the rugby codes," said neuropathologist Michael Buckland from Sydney's Royal Prince Alfred Hospital and the University of Sydney. The researchers found three of the brain donors with CTE were under the age of 35, and **six of the 12 donors with CTE had died by suicide**. But Dr Buckland said it was repeated exposure to smaller, "sub-concussive" head knocks — which don't lead to a loss of consciousness but can still damage the brain over time — that predominantly leads to CTE. He said the evidence to date, while limited, suggests CTE is more closely related to the number of years a person has played sport, and the age they were first exposed, as opposed to the number of concussions they've had. "While a player might have maybe a few concussions over a couple of years, they'll probably have thousands of sub-concussive blows," he said.

"I think the football codes manifestly downplay the association between repetitive head injuries and CTE, and I would think in the future if the codes took this seriously, they would not only have concussion policies, but CTE policies. They need to develop measures that "further mitigate the risk of sport-related repetitive head injury", which Dr Buckland said should address two key risk factors:

* + "How do we reduce cumulative lifetime exposure to repetitive head injury?
	+ "And should we be seriously debating the age of first exposure to sports-related repetitive head injury?"

Note: the AFL opposed AFL players donating their brains to the Brain Bank for research purposes to benefit future generations.

* David Parkin, a longtime AFL player and former coach who estimates that he had a dozen concussions during his 10-year playing career, said until recent years players understood that they had to play through concussions and that coaches regularly put concussed players back into games. “I was a serious offender and consistently during competition tried to pressure medical staff to get players back in the game,” he said. “That’s the absolute fact.”
* After the AFL announced that it was doubling the mandatory time out for a concussed player from six to 12 days in 2021, the NRL followed suit with an 11-day stand-down. Neither code has provided scientific evidence to support their claim that these stand-downs are safe. Before this, 80 per cent of concussed players were returned to competition the following week, according to calculations from statistics published in the AFL’s injury reports.
* In Australia, **Rugby and AFL have some of the highest rates of head injury of any contact sport in the world**: the *reported* annual hospitalisations due to concussion are around 70 per hundred thousand participants for both AFL and rugby (combined), compared with Touch football (4), Netball (4), Cricket (6), Basketball (10), Soccer (13). AFL has the highest number of concussions in total (source: AIHW). These numbers do not include CTE/sub-concussions.
* 17.2 % of elite rugby league players in Australia chose not to report likely concussive episodes and concussion-related symptoms during the 2018 and 2019 seasons. Clinicians need to be aware of under-reporting in athletes when assessing players following head injuries. The findings highlight the need for development of validated, objective testing for concussion following sports-associated head injury. (BMJ)
* In the AFL, Nathan Gibbs, a former team doctor who tracked concussions on the A.F.L.’s Sydney Swans for 14 years, said the real rate was about two and a half times higher than the A.F.L.’s published figures, which would make it comparable to the N.F.L.’s. “I think there is a lot of pressure not to report concussions,” Gibbs said.
* The AFL Players Association Insights and Impact report, September 2022:  The report states 21% of players surveyed had a concussion in 2021 (down from 31% in 2018) and that 5% had a concussion but not reported it (down from 9% in 2018). That is more than a **quarter of AFL players**who had a concussion in 2021. Also, **64%** of players surveyed are worried about the long term impacts of concussion.  They want a science-based approach to concussion return to play (RTP) protocols and are open to more than the current 12 days.
* A 5 year study at Monash University (2021) has found that AFL players are likely returning to play from concussion with high levels of damaged brain cells, putting them at risk, even though they may feel fine.
* AFL clubs often seems to be seeking to determine how quickly players can be patched up and sent out again, not one that defaults to immediate action in the hope of long term recovery. In many cases concussion is not a transitory disease, it is permanent. Shaun Smith will never work again. John Barnes cannot shower or bath alone. Early onset dementia, loss of memory is common.
* Between 10% and 20% of adults who are diagnosed with concussion have symptoms that persist for more than three months.
* CTE is a preventable disease (repeated head hits causing brain injury). 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 (Frontiers in neurology june 2022 Buckland, Pearce et al).
* Researchers expect that over 90% of AFL footballers who have played 10 years or more will have CTE.
* Henry Ford Sports Medicine Research team (USA): **the most vulnerable age group for long term damage from collision-based sports is 16-24:** aligns with the AFL draft and player trade age groups.

**Peter Jess: CCRF founder & CEO and long time anti-concussion campaigner.** Peter Jess has already managed the neurological testing of over 200 ex-AFL players in the past 6 years. He says “the results are very disturbing and real change is needed in the system to provide greater protection for players. It is shocking to witness first hand the impact brain damage has on retired players. In many cases their lives are irreparably harmed. I am not surprised that the recent AFLPA report found that 64% of AFL players are worried about the long term impacts of concussion. They should be. The AFL is one of the world’s most dangerous sports’. Key points:

* Sub-clinical concussions are the major problem in AFL. The AFL has a duty of care owed to players (as an employer under the Workcover Act).
* The conduct of the AFL competition involves risks to player health and safety which the AFL has powers and responsibilities in regulating. Current RTP protocols are unsafe.
* CTE is preventable but the AFL has not acted: no testing regime is in place. This is in breach of its duty of care. There is a long overdue need for a Concussion Management System and a Concussion Passport for each player at every level to provide longitudinal tracking history via repeated DTI (diffuse tensor image) measurements.
* Monash study: found elevated levels of neurofilament light (Nfl) persisted up to 30 days after the event. The Simoa Analyzer at Monash is not utilised by AFL or clubs. The brain needs at least 30 days to normalise from concussion. This cannot be assessed without testing.
* AFL fails to monitor and test the structural Integrity of the brain, and to independently assess whether the brain has normalised before allowing the participant to return to Train/Play. If concussed players RTP too soon they are risking permanent brain damage. Need safe RTP protocols confirmed via multi-modality testing (see diagram at end of this document).
* AFL fails to monitor and anticipate developments in concussion diagnostics
* AFL fails to adequately regulate RTP protocols including Codes of Conduct, imposing reporting, accountability of medical programs, imposing documentation requirements, to notify participants, to introduce concussion risk management systems and concussion passports.
* AFL has not informed themselves or players of CTE risks.
* Inter-generational brain damage that has impacted past players is continuing without adequate support systems: financial, medical, psychological. There is a need for TMS and MEG scanning techniques to eradicate CTE in the AFL competition along with testing for Nfl biomarkers in the blood. Professor Sandy Schultze showed Nfl protein was elevated 30 days or more after a clinical concussion or the impact of accumulated sub clinical concussions.
* AFL has been advised it needs rapid point of care diagnostic tools to understand the severity of neuronal damage and base return to play (RTP) decisions using appropriate biomarkers and DTI scans, MEG scans and TMS scans.This is the key weakness in the current system and needs to be introduced as soon as possible as standard operating procedure.
* 2021 Consensus in Sport Statement: this group is comprised of self-appointed sports experts, not validated by evidence. It is a danger to participants. Paul McCrory was the Chair and the group is about protecting sport from litigation.
* Associate Professor Alan Pearce has demonstrated brain damage can be assessed year on year using TMS.
* As a result of failure to act by AFL, all players were exposed to risks to their health and safety. There is no recognition by AFL of link between AFL and CTE. (The NFL in USA recognised this in 2015)
* September 2020 Henry Ford Health System study confirmed the most vulnerable athletes were in the 14-18 age bracket and participants with concussion need at least 30 days to recover.
* CTE was clinically described in NFL footballers in 2002: in 110 of 111 brains there was CTE. CTE is not reversible or curable but is a preventable disease.
* The AFL competition: recent concussion history:
	+ **2021**: 104 concussions, a big increase on the previous year. 84% RTP in under 30 days. 6 players in under 12 days.
	+ **2022**:121 clinical concussions: 12 players had 2 clinical concussions. One had 3.
	+ There is no year on year player data so it is not possible to monitor the safety of participants. There are no multi-modality scans to understand the permanent damage to the brain and mitigate risks. There is no recording or testing for sub-clinical concussions: undiagnosed and untreated, unacceptable.
* Repetitive TBIs create the platform for CTE, a preventable environmentally created neurodegenerative disease. For CTE the peak bodies hide behind the need for more research or watery statements from the increasingly discredited Concussion in Sports Group (CSCS).
* National sports organisations cannot determine and administer the requisite Health & Safety (H&S) requirements. The recent UK Parliamentary Inquiry confirmed this position
* A National Sports H&S Commission is required to be established to ensure independent unbiased RTP protocols.
* The current system has failed and will continue to fail at great cost to participants, their families and the community. TBI typically damages the frontal lobe of the brain: this impacts on decision-making in every aspect of the player’s life. The AFL has ignored repeated warnings from Peter Jess and many other people. Peter Jess has been testing and helping over 100 players deal with the myriad of issues that flow from brain damage. The AFL and AFL PA are not dealing with them. These ex-players need regular brain scans.
* RTP needs to be driven by multi-modality tests (to confirm normalisation of the brain (biomarker tests including scans and blood tests). No player should return until tests confirm it is OK to do so.
* The AFL does not have any rapid point of care diagnostic tools to confirm sub-clinical concussions as they occur. They are undiagnosed and untreated and accumulate. No testing, no diagnosis and no treatment.
* The Simoa Analyzer is a rapid point of care diagnostic tool using biomarkers in the blood such as Nfl to detect concussion and sub-concussion in the brain. This allows objective biomarker tests to confirm when it is safe to RTP. This machine has been available at Monsah University from 2016. It has never been used by AFL in RTP protocols, placing all AFL players at risk.
* Fans want to see the best players playing, not be sidelined. Since 2010 over 30 AFL players have had to retire because of the accumulated effects of concussion. This is evidence that the AFL breached its duty of care. Many others with potential brain damage have not retired. This happens in no other workplace in the economy/society. Also there have been at least three suicides from brain damage.
* The AFL has been offered a dedicated Concussion Research Centre that is independent and world’s best practice in the multi-disciplinary fields required for assessment, treatment and rehabilitation created by RTP protocols.
* AFL and clubs have refused bi-annual testing to be able to measure year on year changes: this is a clear breach of their duty of care to mitigate known hazards. SCAT5 is manifestly inadequate in determining sub-clinical concussions. The risks are unacceptable.

**Extract from The Sydney Morning Herald and The Age (September 2021)**

In Australian Institute of Health and Welfare (AIHW) data released exclusively to The Sydney Morning Herald and The Age, brain injuries have overtaken a broken nose or jaw and fractured ankle as the most common injury requiring hospital admission among AFL, league and union players:

## **Head on: Rising concussion rates in community footy exposed amid calls for action on youngsters**

As elite sporting competitions such as the AFL grapple with how to reduce head trauma, exclusive data shows that head knocks in community football have soared. In particular hospitalisations of teenagers suffering concussions in community footy are growing at a concerning rate and experts are calling for urgent action.

by [Damien Ractliffe](https://www.theage.com.au/by/damien-ractliffe-p4yvin), [Craig Butt](https://www.theage.com.au/by/craig-butt-hvf8q), [Richard Lama](https://www.theage.com.au/by/richard-lama-h0x0vk) and [Mark Stehle](https://www.theage.com.au/by/mark-stehle-gxzx4n) **SEP 18 2021**

This experience is far from a one off. Australian Institute of Health and Welfare data released exclusively to The Age and The Sydney Morning Herald reveals **concussion** was the top cause of hospitalisations in community Australian rules football since 2013/14. **More than two-thirds of all concussions in the sport were sustained by young footballers aged between 10 and 19**, causing alarm among experts who worry about the damage done to developing brains. Some are now calling for longer periods on the sidelines after concussions, especially for teenagers, and for further modifications to junior sport.

Before examining those calls it's important to understand what the figures show.

There were 5156 injuries that required hospitalisation among **Australian rules** players across all ages and both sexes in 2018/19. The data gives an idea of what part of the body was involved.

### **Total injuries in community Australian rules football**

**Concussions** were the most common injury requiring hospitalisation in **2018/19** - the last full year of sport prior to the coronavirus lockdowns
- there were **655** concussions, making up **12.7 per cent** of the total.

That status for concussions as the most common source of hospitalisation has come on the back of stark growth in the number of concussions.

**In 2011** there were **346 concussions in Australian rules football that led to hospitalisation**. Concussions made up **8.7 per cent** of all Australian rules football-related hospitalisations and were the second most common injury behind finger fractures.
**That’s about one out of every 11 injuries.**

Two years later there were **417 concussions** in Australian rules football and this injury overtook finger fractures as the most common cause of hospitalisation.
**Concussions made up 10.2 per cent of injuries - or one out of every 10 injuries.**

Throughout the rest of the decade that number kept climbing. In 2018/19 - the most recent year for which we have data - there were **655** concussions.
**They made up 12.7 per cent of injury hospitalisations - or about one in every eight injuries.**

* **Between 2011/12 and 2018/19 there was an 89 per cent increase in concussions in local footy, against a 29 per cent increase in injuries overall\*.**
* Australian rules is not alone in this. Rugby (league and union) and soccer have all recorded an increase in concussion injuries over the past decade at a rate that outstrips the general increase in injuries for each sport.
* The increase in concussion hospitalisations in Australian rules football also outstrips any increase in participation.
* Combining the Australian Institute of Sport and Australian Institute of Health and Welfare data suggests the rate of concussion hospitalisations for Australian rules football players in 2018/19 was about 64 per 100,000 participants. Rugby recorded a higher rate at about 82 per 100,000 participants while soccer (13 per 100,000 participants) and touch football (four per 100,000) posted lower figures.
* Australian rules football also produces more concussions, in raw terms, than the other football codes.
* Alan Pearce, a neuroscientist and associate professor from La Trobe University’s School of Allied Health, said the number of teenage footballers landing in hospital with concussion should be a major concern for the AFL and VFL. According to the data, a large majority of hospitalisations for concussion were in the 10-19 age group, which made up 44 per cent of all football injuries that result in hospitalisation but more than two thirds of all concussions.
* The evidence that collision sports can do terrible damage to brains has been mounting since 2005, when the first NFL player was diagnosed with chronic traumatic encephalopathy, or CTE
* These cases, though, have been described as “the tip of the iceberg” by US head trauma expert Dr Chris Nowinski. He is a former professional wrestler who co-founded and is the chief executive of Concussion Legacy Foundation. “The reality is that 110 of our first 111 [NFL] players had the disease,” Dr Nowinski said of a 2017 study in the US of the brains of 202 deceased NFL footballers, conducted by neuropathologist Dr Ann McKee.
* Speaking to The Age and the Herald in January, Dr Nowinski said the risk of CTE accumulates over an athlete's lifetime, so changing the rules for professionals is not enough. **He said there was ‘no reason for children to play adult forms of contact sport. We have to stop hitting kids in the head’**
* In America, a study released in February by the Centres for Disease Control and Prevention found tackle footballers aged six to 14 sustained 15 times more head impacts than children who played flag football – a non-tackle form of the game similar to touch football – and 23 times more hard head impacts, [triggering calls for children under 14 to play the modified form of the game to avoid CTE.](https://www.theage.com.au/sport/afl/worksafe-appoints-concussion-experts-to-investigate-afl-20201222-p56phy.html)
* *“People are happy to take four weeks off for a broken wrist, but only want to take one off for a concussion when your brain, in the long term, is a lot more important than the function of your wrist”* BAILEY MCINNES (junior player suffering concussion)

While concussion at AFL level receives all the headlines, Dr Rowena Mobbs said head knocks in community sport are the greater cause for concern, particularly when it comes to the impacts on life away from football. “The brain is still developing into the 20s and children are vulnerable to more severe, and more prolonged, concussion. I have seen some devastating outcomes from kids who fail year 12 with concussion two to three years prior, often with post-traumatic migraine that sadly could have been treated earlier if they had sought neurological care.”

* The AFL did not respond to questions based on the Australian Institute of Health and Welfare data, including whether it was considering any additional measures to combat concussion in community, and particularly junior, football. (end)

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**AFL lack of care for ex-players: the people who built the sport**

The average length of an AFL player’s career is about 4-5 years. In that time the player is totally supported, analysed and controlled. It is said many elite athletes experience two deaths in their lifetime. The first at retirement. Globally, studies indicate that some 45% of former professional athletes suffer from anxiety and depression and worse after transitioning out of sport. Whereas they received 100% support in their playing days, in retirement this is very different.

Despite existing support services in place from clubs and peak bodies, many elite athletes struggle with their readiness for life after sport: loss of identity, lack of purpose, reduced career prospects, financial hardship and social challenges (relationship problems, gambling, drug/alcohol misuse) can lead to mental illnesses, depression, anxiety and, in some cases, suicide. Many suffer in silence with major impacts on family.

In the AFL, generations of ex-players suffer in silence and **are badly neglected by the AFL**. They are:

* set up for retirement problems by the AFL concussion RTP protocol (now 12 days) and lack of recognition of CTE.
* excluded from the AFL *Industry* Mental Health & Wellbeing Strategy 2020-22. While most other sporting bodies around the world are now increasing the focus on retired players and transition issues, the AFL told Kate Hall, Head of AFL Mental Health and Wellbeing, that retired players were outside her remit and not to be included in the Strategy.
* receiving minimal funding (~$1m pa) from the AFLPA (2021 income $46m). The AFL has been supporting retired players via the AFLPA. Despite this, too many former AFL players are falling through the cracks and not receiving the support they require. More needs to be done to prevent former players’ mental health descending into mental illness. For many retired players, especially those delisted or whose playing careers are terminated early or in negative circumstances, support needs to be **independent** of the AFL ‘system’. Otherwise, they will not come forward and seek help. A mental block exists. It needs to be recognised that the AFL ‘experience’ is extremely stressful for players and it can be a significant mental challenge to go back into the AFL system to seek help. Issues of pride and privacy are often involved.
* not covered by Workers Compensation legislation
* not covered adequately by an insurance policy relating to injuries incurred playing AFL. The Patrick Bines case is an example. Because he did not play an AFL game he received no significant help after a head knock playing for the Eagles in the WAFL and his life descended into chaos and he contacted Voluntary Assisted Dying Victoria. An insurance clerk and Peter Jess came to his aid (see case study in Appendix below).

**Return To Play (RTP) protocols**

* Best practice concussion protocols may help those who are concussed but they are not going to head off the growing prevalence of CTE
* Strong evidence that children and females take significantly longer to recover from concussion than adult males.
* When is it safe to RTP? No player should return to play until tests confirm he/she is OK This can only be determined by constant monitoring of the Nfl levels in the blood and other multi-modality tests using objective biomarkers including scans and blood tests. 14 days rest is needed then testing every 7 days using biomarkers to confirm when the brain has returned to its zero baseline indicating normalisation of the brain.
* Monash research: dangerous to RTP inside the vulnerability window of one month without the completion of multi-modality tests. These tests need to determine when it is safe to return. Study evidence that AFL players are returning to play from concussion with high levels of damaged brain cells, putting them at risk of long term harm. 12 days is not long enough.
* Players must recover completely before returning to play. Players aren’t always honest about their symptoms, so they need to be thoroughly evaluated by a health care provider who is experienced working with concussion before returning to play.
* Rugby New Zealand: For any concussion, there is a minimum stand-down period before a player can return to contact training. These timeframes are 23 days for players under 19 years and 21 days for players 19 years and older.
* England Boxing’s Rule Book contains concussion protocols, advice and guidance, for both under and over-18s.The protocols stipulate a six step graduated return to competition for both under and over-18s, with a minimum 39 day period post-injury before returning to competition for under-18s and a minimum 35 day period for over-18s.
* Rugby Australia’s protocol incorporates the World Rugby concussion guidelines, which include a six-stage, graduated return-to-play protocol. There is no set timeframe for its completion; the average time for a player in the English Premiership in 2018-19 was 22 days.
* The AFL has a 12 day return to play, introduced in 2021. Before that it was 6 days.
* Best practice in 2023 is a minimum 30 day Return to Play protocol, conditional upon multi-modality tests confirming the brain has returned to its zero baseline, indicating normalisation of the brain. This requires all players be TMS tested twice each season as well as during any post-concussion periods. This 30 day period is supported by a growing number of stakeholders including the Concussion Legacy Foundation and Texas University.
1. **Conclusion**
* Not all risk can be removed from sport but sport must not be allowed to destroy lives. The human brain is special and needs to be protected.
* There is a global shift away from participation in dangerous collision sports due to health and safety concerns. Traumatic Brain Injury (TBI) is an inconvenient truth.
* **TBI/Concussion/CTE is a preventable/discretionary disease.**
* Currently, Australia is lagging the developed world in TBI, concussion and CTE management and mitigation in sport (source: Dr Chris Nowinski, global Concussion Legacy Foundation). Our excellent, and long established, reputation in public health is being damaged by an amateurish and embarrassing approach in how TBI, concussion and CTE is managed in some high profile contact sports.
* The incidence of TBI, concussion and CTE in a few high profile Australian contact sports (football codes) is very high by world standards and is a rapidly growing public health issue. In these cases, there is a need to change the sport to save the sport (‘Save the player, save the game’). The high level of under-reporting of concussion also needs to be taken into account.
* It is apparent that the self-regulation of player health/care by peak football codes in Australia has not been successful. (This conclusion is the same as the recent UK Parliamentary Inquiry into Concussion in Sport: National sports organisations cannot determine and administer the requisite H&S requirements).
* Unfortunately, these football codes have a conflict of interest between entertainment and player health care. This conflict is too great for the codes to manage: they cannot serve two masters: there is no accountability, no adequate insurance or pension provision and a sporting underclass is being created with retired footballers.
* Prevention is better than cure: adapting the rules of ‘problem’ contact sports to prevent TBI happening is better than trying to manage TBI after it has occurred.
* Sport has used the uncertainty in the developing science of TBI, concussion and CTE to delay taking the required action to reduce the incidence of TBI in sport. The phrase ‘further research is needed’ has become shorthand for ‘continue to take risks with player health’. The responsible position would be to make decisions based on an **‘abundance of caution’** to protect player health. If there is any doubt about the impact of TBI assume it has occurred. **‘If in doubt, sit them out’.**
* There is speculation about the possibility of a TBI/concussion/CTE ‘epidemic’ in Australia. Unfortunately, because of poor quality information systems and extensive under-reporting, it will remain speculation until action is taken to improve the situation.
* While the AFL is one of the most successful sporting competitions in the world, based on attendances, it has dropped the ball (failed) in its fundamental obligation: to provide a suitable duty of care for players. With all the money in the sport ***why have the players been left behind* *in obtaining a safe workplace?*** AFL is currently a very dangerous sport to play.
* The AFL has been on the wrong side of history in managing TBI: it has failed in its duty of care to players and ex-players. The system is broken. New enlightened leadership and independent regulation is required to reset the culture around TBI, an existential threat to the AFL and other collision-based sports. For the AFL to survive, it needs to adapt, not deny. There’s no such thing as a tough brain: there is an urgent need for a more cautious, caring approach to player care (including ex-players).
* That the AFL has not demonstrated an effective duty of care for players is evidenced by:
* **Soaring concussion numbers** at the junior and community levels in the last decade. Most concussions in teenage years happen while playing sports. Parents need to better understand the risks their children are taking by playing sports in which they are suffering concussions.
* A **lack of concussion management systems and testing regimes** at the professional level, resulting in arbitrary and risky playing environments. There is a need for ongoing scanning of all AFL player brains before the start of the season, after a clinical concussion and at end of each season. *Why does this not occur in the AFL? Participants are at a constant risk of long term traumatic brain injuries.* It is not a safe workplace. The AFL must introduce a regime of constant testing and scanning of the brain. This will ensure participants are fully recovered before they are cleared to play and train. The current situation is manifestly inadequate. The AFL says it has adopted world’s best practice re concussion RTP (CTE is not mentioned) but studies show the brain does not heal in under 30 days after a clinical concussion. Anything less is unsafe. **Early return to play comes with an incredible amount of risk.**

Also, serious AFL mismanagement and misrepresentation of TBI/concussion/CTE issues has been very visible and concerning in the past decade.

* **A lack of care for past players** who are suffering the myriad of problems associated with TBI injuries. There is not an effective safety net for many past players.
* TBI/Concussion numbers in AFL at junior, community and professional levels are increasing rapidly despite more elaborate structures established inside the AFL in recent years.
* The current governance structure under the AFL is not operating successfully. Every child who participates in junior Australian football activities/matches has the right to expect they will be participating in a safe environment where risks are minimized.
* There is also strong evidence that CTE is a major problem. To quote Chris Nowinski, Chair of the global Concussion Legacy Foundation (CLF): “The risk of CTE accumulates over an athlete's lifetime, so changing the rules for professionals is not enough. There is no reason for children to play adult forms of contact sport. We have to stop hitting kids on the head’.

Dr Anthony Alessi, CLF/University of Connecticut, said “We used to think if you let kids play full-contact sports, it will toughen them up — not true. The more contact you have over time, the greater the risk. Tom Brady never played youth football.”

**We need to stop children playing sports that involve them banging their heads: the developing brain is highly sensitive, and seriously under-reported.**

* There is a need to develop new safer match rules for junior players (up to 18 years of age) to minimise concussions based on an ‘abundance of caution’ principle: the modification of all junior football matches to non-contact versions (as in AFL 9s: touch football with no tackling).
* Early return to play comes with an incredible amount of risk. Football codes currently rely on athletes telling them when they are symptom free or rely on cognitive tests which have problems. There is a long overdue need for a Concussion Management System and a Concussion Passport for each player at every level to provide longitudinal tracking history.
* The AFL fails to monitor and test the structural Integrity of the brain, and to independently assess whether the brain has normalised before allowing the participant to return to Train/Play. If concussed players RTP too soon they are risking permanent brain damage: need safe RTP protocols confirmed via multi-modality testing (see diagram at end of this document). If it can’t be measured, it can’t be managed. We need to take the guesswork out of concussion/TBI. Some people take a lot longer to recover from concussion than others. There is a need for an evidence-based approach based on continual testing feeding into the Concussion Passport.
* Globally, professional sport is undergoing massive change via the introduction of equity capital. The AFL has discussed future overseas expansion of the competition (New Zealand, USA). **Forecast**: Unless AFL football more resembles Gaelic football in the near future the sport is not sustainable. The sport has to adapt to survive. The essential elements, highlights and public attraction of the sport would continue but in a safer format.

**What would a better future look like? Australia as a world leader in TBI management in sport**.

|  |  |
| --- | --- |
| 1. **Governance**
 | An *independent* **National Sports Health & Safety Commission** be established to oversee the development of safer (non-contact) participation rules for junior players in football codes (and other contact sports with high TBI rates) and to ensure independent, unbiased and consistent shared TBI RTP protocols across all contact sports.The Commission would also have a random involvement in assessing concussions in professional football codes on match days. |
| 1. **National Target**
 | An **annual reduction in TBI injuries** of 25% per annum for each contact sport. Spot audits to be conducted to verify outcomes. |
| 1. **Testing/training Facilities**
 | **TBI/Concussion Testing and Training Centres** be established in all States and Territories. Currently medical GPs have variable knowledge about the diagnosis and testing of TBI cases. |
| 1. **Information**
 | **A national TBI Information Strategy** be established that would harvest and disseminate required information to all stakeholders to improve TBI decision-making. **A TBI/concussion passport** would be issued to all participants in contact sports. |
| 1. **Testing**
 | AFL to establish **best practice Concussion Management Systems** (CMS): All participants in contact sports would be tested at the start and end of each season, as well as after any TBI/concussion incident, to assess RTP timing. RTP needs to be driven by multi-modality tests confirming normalisation of the brain (biomarker tests including scans and blood tests). We need to take the guesswork out of concussion management. |
| 1. **Duty of care for retired footballers**
 | All **retired participants** from contact sports would be tested regularly and case managed. Brain trauma and related diseases (including Alzheimer’s, Dementia, Parkinsons, MND, seizures) in ex-players should be recognised as an industrial disease, as workplace injuries (with OH&S compliance, and workers compensation). A safe haven facility be established in each State.  |
| 1. **Legislation**

**changes** | * Include sport in WorkCover/Worksafe and provide income protection
* Duty of Care liability to cover sports participants
* Return To Play requirements: including regular multi-modality testing and Concussion Passport.
 |

* How would the above be financed? A Health and Safety ‘tax’ on high incidence contact sports.

**The Senate Inquiry** now has a real opportunity to make a difference in what is a significant, but unrecognised public health issue. As others have said, it is time to move past concerns about how regulation may change contact sports and focus on stopping the discretionary destruction of peoples’ lives. Australia can become a leader in this area.

**Contact:** Peter Jess, CEO, Community Concussion Research Foundation Ltd.

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**Appendix**

**Figure 1: Age distribution of injury hospitalisations from Australian rules football, 2019–20** Source: AIHW NHMD.





**Case study: Patrick Bines**

**Ex-Eagle Patrick Bines’ brutal injury saw him drop 40kg and use an injecting room. One moment saved him  Fox Sports** July 18th, 2022

Former West Coast rookie Patrick Bines was left in “excruciating pain” and ready to end his life years after an innocuous on-field spoil cost him everything. Bines has detailed the shocking toll taken by the incident and called on the AFL to drastically overhaul compensation for players who suffer life-altering injuries. Playing for the Eagles as a category B rookie in 2019, a mistimed spoil hit Bines in the back of the neck, which sent him down a gruelling path that involved almost 20 operations and the inability to move his head without shooting, stabbing pain. Bines explains he had trialled multiple medications, but his end-of-career payout through an AFL Players Association scheme was heavily taxed and soon used up, leaving his quality of life so bleak he contacted Voluntary Assisted Dying Victoria.

He had already undergone nearly 20 spinal surgeries, endured nerve burnings, lost 40 kilograms while bedridden and been forced to turn to a Richmond injecting room in a bid to try and get his pain under control before the moment that saved his life. When journalist Jon Ralph spoke about [Bines’ plight on Fox Footy’s On The Couch](https://www.foxsports.com.au/afl/teams/west-coast-eagles/afl-news-2022-patrick-bines-former-west-coast-player-careerending-injury-herald-sun-report-superannuation-fund-head-knocks-mental-health/news-story/a2f5ccd74c4773582e679c1e5317637c), insurance expert Adriana Oreskov was watching. It was the moment that changed Bines’ life. On her own accord, Ms Oreskov got in touch with Bines through LinkedIn and, after working together with concussion advocate Peter Jess, has since been able to get the 23-year-old the payout he desperately needed. Earlier this year Bines had his permanent total disability claim approved, after two unsuccessful attempts prior, and was awarded a $500,000 lump sum from AMP that will allow him to get his life on track. On Monday, Bines spoke of the gratitude he had for both Jess and Ms Oreskov in turning is life around. “I was at a pretty high dose of opioid medications – like four, five, six times over the limit of a regular adult,” he admitted On the Couch.“There as an element of it too, where I was getting some it off the street. “You can’t get that much from a pharmacy or a chemist, it was a pretty dangerous amount – red flags go up in the system.

“I’m not proud of it, I hurt a lot of people along the way including my family and friends.Former West Coast Eagles footballer Patrick Bines, who suffered a debilitating injury. Picture: Nicki ConnollySource: News Corp Australia

“(Adriana) sat down with me and put 60 days of 6am to 8pm work in going through all the technical definitions of what I had to meet.

“I am so grateful for her and Peter Jess, now I can start some rehab to get me to the next stage of my life’. Bines says he tried “everything” to try and return to a normal life post-injury, after being diagnosed with a collapse disc in his neck in the C5, 6 and 7, but nothing could help.

“I actually spoke to Victoria Euthanasia, it was a very tough time,” he said.

“Obviously not an easy decision but I just wanted a quality of life.

“I was spending 20 hours on my phone in my room not able to move. When I did roll over, I was just gritting my teeth and really struggling.

“I’d fought for so long and tried every possible avenue.

“I hate to give up, it was a pretty tough and emotional call to make.”

**Bines said the AFL was one of the only sports in the world that doesn’t have a liable insurance policy.** “Athletes need it – there needs to be a safety net,” he pleaded.

“I’m not going to be the last one unfortunately.

“If (Adriana) didn’t message me, I’d still be working through the AFL for everything. It’s been three years now. It’s not about the money, we just need some assistance with rehab.” Bines was denied compensation under insurance company AMP's total and permanent disfigurement clause, signed in his superannuation contract arranged by the AFLPA.

The AFLPA switched to a different policy provider, One Path, in December 2020, but that has proven to be of little help to Bines, who has remained completely unable to work or study since the incident. The former Eagle's story was discussed by the panel on Fox Footy's *On the Couch* on Tuesday night, with Brisbane Lions legend Jonathan Brown flabbergasted that the league had not arranged more help for Bines. He said that while all players acknowledged the risks of getting seriously injured playing football, that was no excuse for the AFL and AFLPA not to have a better working relationship with insurance companies to ensure players are appropriately looked after.

“Firstly, it’s a disgrace he’s not paid out for permanent disability. What more evidence could you have there? It’s a shocking story,” Brown said. “Absolutely you would think players would be more open to paying potentially higher premiums if that gave better insurance.

"I’m not sure the AMP and the AFLPA situation with compensation and some of the pension stuff has been a great relationship over the journey. Glad to see the AFLPA is improving a few things, but that is a disgrace. That is an absolute disgrace, players going out (like Bines).

“Yes we know there is an inherent risk but players should be insured for the rest of their life more than a couple hundred grand. How’s 200 grand going to get that kid through the rest of his life?"

In a statement, the AFLPA acknowledged that there was still plenty of work to be done in this area. Bines’ payment has become the breakthrough for other players knocked back for claims regarding head trauma, repeat concussions and more. “I don’t want this to happen to another player. It’s been hell.”

If Bines was in many other workplaces…the injury that saw him drop out of uni, unable to hold down a job, would see him compensated for life. But…AFL players have no workers’ compensation, no income protection” @RalphyHeraldSun

 Proposed Return To Play Protocol

[Grab your reader’s attention with a great quote from the document or use this space to emphasize a key point. To place this text box anywhere on the page, just drag it.]

 Concussion suspected

Loss of consciousness?

 YES

 (Glascow Coma 9 or <) NO (Glascow Coma 9 or >)

**Emergency** Ward

* 1. Post concussion symptom evaluation
	2. King-Devick test
	3. Oculmotor test
	4. Blood biomarkers – LP/mRNA
	5. CogState evaluation
	6. Vestibular test

Step 1

Step 2

Diagnosis of assessment

 No concussion outcome Concussion outcome

 Return to Play Remove from play

Step 3

Post match follow up

Post match testing

3.1 TMS

3.2 Neurosensory vibration

3.3 Advanced Neuroimaging

3.4 Total field of vision

3.5 CogState Evaluation

 No symptoms Symptoms

 No further follow up Return to Step 1

Update Concussion passport

# Pain, glory, concussion: former AFL players and their families speak out about league inaction

# Unable to live normal lives due to brain injuries sustained on the field, some ex-athletes are asking: where is the support?

# [**Emma Kemp**](file://www.theguardian.com/profile/emma-kemp)**,** [**Melissa Davey**](file://www.theguardian.com/profile/melissa-davey) **and** [**Stephanie Convery**](file://www.theguardian.com/profile/stephanie-convery) **The Guardian Sun 10 Apr 2022**

They are men who lived on the field, playing the game which helped to define them. But for some former [AFL](https://www.theguardian.com/sport/afl) players, those moments of pain and glory have been washed away with such severe memory loss that they can no longer recall their most celebrated achievements, nor other significant details from their lives.

Many are suffering in silence; some say they are too scared of the potential repercussions. Afraid of losing their jobs, or swallowing their pride, or of having to fight toget the help they need from a governing body they allege is doing “everything it can to deny, deny, deny” that football has a concussion problem. Others say they have already lost their families – ripped apart by their broken brains and all the hurt that can entail. Some are simply too sick to speak for themselves, in full-time care with degenerative diseases which will likely – based on the evidence to date – later be linked to a [chronic traumatic encephalopathy (CTE) diagnosis](https://www.theguardian.com/sport/2022/feb/28/concussion-in-sport-cte-found-in-more-than-half-of-sportspeople-who-donated-brains).

Guardian Australia has spoken to six former players and their families as part of an investigation into the AFL’s response to concerns surrounding concussion in the sport. The majority are reluctant to publicly discuss the long-term effects of their repeated brain injuries sustained on the pitch. Almost all, though, say they have received little to no support from the sport’s governing body or, to a lesser extent, the AFL Player’s Association (AFPLA) , both of whom have a duty of care to protect their athletes.

One says he has spent months chasing the AFL for brain scan results from studies they were involved in and follow-up care, whileanother family member has faced repeated “deflection” about funding. One former player says he has received “next to none” from either.

“Obviously when you finish and it’s a career-ending injury there is a payment involved, but it is so is unbelievably subpar, especially in terms of the rest of your life,” he says. “And especially with concussions, depending on how bad it is, you can’t really work at all so it’s really hard to get an actual income. The money they offer should be substantial enough to keep you afloat for at least 10 years.

 “It seems like they’ve applied the same sort of blanket rule – that if someone finishes their career with a knee or something, it’s still shit, obviously, but it’s a knee – you’d be OK. But a brain injury, that couldn’t be more different – it could affect you in 30 years.” That player says he had a brain scan a few years ago on the recommendation of Dr Paul McCrory, the neurologist who last month resigned as chair of the global Concussion in Sport Group amid [allegations of plagiarism](https://www.theguardian.com/education/2022/mar/12/sports-concussion-expert-who-resigned-amid-plagiarism-claims-accused-of-copying-more-articles).

As revealed by the Guardian, McCrory is now the subject of [an independent review](https://www.theguardian.com/sport/2022/mar/24/afl-to-launch-review-of-concussion-expert-paul-mccrorys-work-following-plagarism-claims) launched by the AFL, for whom he was said to have led research, advised on concussion policies and treated and diagnosed athletes sustaining concussions and other serious head injuries. Australia’s medical regulator, Ahpra, [is also investigating](https://www.theguardian.com/australia-news/2022/mar/29/afl-concussion-adviser-paul-mccrory-investigated-by-australian-medical-regulator) whether he treated patients in compliance with an enforceable undertaking he gave the body in 2018 to [not perform certain neurodiagnostic procedures](https://www.theguardian.com/sport/2022/mar/17/afl-says-they-no-longer-work-with-concussion-expert-dr-paul-mccrory). That undertaking is still in place, and privacy laws prevent the regulator from disclosing why the undertaking was given. McCrory has not responded to requests for comment from the Guardian in relation to these matters.

“It’s mind-boggling,” the player says. “For such a big enterprise … if you want to know how to handle it, just fucking ask the people who are going through it. It’s that simple. I don’t know why [the AFL] are so afraid. I guess it’s money, but it’s not like they’ve got a shortage of it. You’d think it would just be a logical adult conversation to have with people, but I guess when money’s involved all logic goes out the window.

“With the PA [the AFL Players Association] there is support, but it’s not like they’re going out of their way to offer it,” they say. “At the end of the day, they’re a union, and they apparently have the players’ best interests at heart. What frustrates me so much is just the lack of action.

“It’s clearly a serious issue that’s been going on for a long time and there’s so much evidence around how it affects people, not just immediately but also in the long term.” A big piece of that long-term puzzle is CTE, the progressive and fatal brain disease which can only be diagnosed by autopsy. But signs of its presence in life include a range of symptoms, such as behavioural changes, mental health issues, impulse control problems, memory loss and other cognitive impairment along with degenerative diseases like Alzheimer’s, Parkinson’s and epilepsy. Some past players who spoke in confidence to Guardian Australiasuffer from such severe memory loss they can no longer operate normally in life.

Some struggle with short-term memory, managing to stay employed by carrying around a notepad at work so they can quietly write down directions from managers or colleagues. Others endure debilitating headaches, unsettling aggression, depression and anxiety. Affected players and their families find it a baffling enough mystery on its own. Compounding the distress is what they describe as the laborious, and ultimately unhelpful, quasi-infrastructure that the game’s administrators insist is designed to support them.

Part of the enigma is the confusing web of research projects, such as the AFL’s major study announced in 2014, from which [the Guardian revealed](https://www.theguardian.com/sport/2022/mar/25/the-afl-the-concussion-doctor-and-the-groundbreaking-brain-study-that-never-appeared#:~:text=Hopkins%2FThe%20Guardian-,The%20AFL%2C%20the%20concussion%20doctor%20and%20the%20groundbreaking%20brain%20study,sport%20at%20the%20highest%20level.) no findings orreports have ever been published. One ex-player says he had scans through the AFL, most recently at the start of 2021. After the latter, he chased the governing body repeatedly – and unsuccessfully – for his results.

 “I did all the tests the AFL wanted me to do,” he says. “And then when it came to me finding out information from the actual specialist, it was like six months later and they still hadn’t got me an appointment with a specialist. I’ve still never found out what happened with those last test results, so the AFL’s got all the data on them. I’ve got no idea. “I was pretty pissed off with that, to be honest.”

A medical consultant for the AFL told him that it was difficult to obtain a timely appointment with specialists in his city of residence. The consultant assured him the program’s primary objectives were to provide players with information and a long-term management plan. He says he was booked an appointment almost 12 months after his scan, which he could not attend due to another unavoidable commitment, but that the AFL had since become more responsive.

“In 2014 they said that I was like an anomaly compared to the other players that they tested in that I had scars on my brain. And I wasn’t a heavy drinker or drug user. But I wouldn’t be able to say the same [now] – my life’s deteriorated a lot since then.

“That [article on Andrew Macpherson](https://www.theguardian.com/sport/2022/mar/17/he-was-just-a-baby-cte-robbed-footy-player-of-his-brain-and-then-his-life) rocked me pretty big. I was just, like, it’s very similar symptoms to what I’ve got. I’ve done about four weeks’ work all this year. The most I’ve worked in a week is probably 15 hours.” Shaun Smith, the former Melbourne and North Melbourne player who in 2020 was awarded a landmark $1.4m insurance payout recognising “total and permanent disablement” caused by the brain injuries he sustained during his 11-year career, was not involved in the AFL’s 2014 study.

“I wasn’t part of that, I wasn’t asked,” Smith says. “I didn’t even know it was on, to be honest. [But with [John] Barnes](https://www.theguardian.com/sport/2022/mar/25/the-afl-the-concussion-doctor-and-the-groundbreaking-brain-study-that-never-appeared) they came back and said, ‘there’s nothing wrong with you’, so it would’ve been a waste of time anyway.

“My take on it is they’re basically trying to do everything they can to deny, deny, deny that there’s actually an issue. The PA actually helped me out a little bit with some counselling and financially as well, which I appreciate greatly.” Another former player, who has experienced major memory loss, says it is understandable that many – including himself – feel the need to remain anonymous.

“If you’re out there saying how you’ve got real issues with concussion and stuff like that, it’s difficult to get a job,” he says. “It’s not in their best interests to be going out there saying they’ve been knocked out 10 times and they’re not feeling well all the time.” This player wants to remain unnamed to preserve the last sliver of his identity not defined by his brain injuries.

“I see blokes all the time who aren’t well, who’ve got real issues with their wives,” he says. “Even the wives talk about their issues. Like it’s just, it’s pretty sad. It’s hard for the wives as well, putting up with the moods, the aggression, all those things. They’re the ones bearing the brunt of it, really.”

This player did not take part in any AFL studies. For him, it was “very much” a trust issue. “The problem is if they start agreeing to doing everything for everyone, it’s not good for them legally, which is a big problem,” he says. “It’s just frustrating.” He is one of a number of former players to have had their brains tested through a 2013 Deakin University study which found memory, reflexes and muscle coordination could all be impaired by concussive and sub-concussive impacts. Another player, who also took part in the independent Deakin study, says he did so because there was, at that stage, no option to do so through the AFL. “Obviously it showed a bit of damage, but that was 10 years ago,” he says. “I’ve recently just got done some through Melbourne University, so [I’m] just waiting [on those results].”

The wife of a former player, whose condition has deteriorated so rapidly he is in respite care in his 60s, had a different experience with the AFLPA. Over the past couple of years she has repeatedly contacted the [AFLPA’s alumni program](https://www.aflplayers.com.au/players-home/alumni) in the hope it could uphold its pledge to provide “all past players [with] access to free and confidential services, including psychological and concussion support, doctors’ network and the AFL Players’ Injury and Hardship Fund”.

“I asked, ‘You have an injury and hardship fund as part of the alumni, how do you access that?’” she says. “And they said, ‘Well, that’s only for people who are absolutely broke, and most of them have mental health issues, they’ve had to be institutionalised or they have drug addictions’. That was the response.” She said she was offered access to a counselling service for herself.

The AFLPA, in a statement to Guardian Australia, said its $4m a year Players’ Injury and Hardship Fund – paid for by player funds allocated as part of the current Collective Bargaining Agreement with the AFL – allows past players to apply to be reimbursed for “medical costs associated with joint surgery, dental and members facing financial hardship, along with career-ending injury support”.

 “Players who retire due to career ending injuries, including concussion, are eligible to apply to the fund, which has assisted more than 600 past players with more than $9m for issues stemming from their playing careers since it was established in 2017,” it said. “We continue to advocate strongly for more research and support for players with concussion issues to be provided by the industry.”

When asked, the AFLPA did not specify a formal criteria for who can access the fund. It says it “takes concussion very seriously” but does not, at this stage, have plans for a concussion-specific fund to assist – financially or otherwise – players and their families navigating the longer-term ramifications of repeated traumatic brain injuries sustained in their place of work. The AFLPA and AFL are negotiating a new CBA, with the current one due to expire at the end of October. The AFL said, via a spokesperson, that it had committed to “reviewing the arrangements for providing financial and/or other assistance to former elite players suffering financial and other difficulties later in life that may be attributable to concussion or head trauma sustained during their professional footballing careers”. “That work is ongoing,” the spokesperson said.

“Separately, the AFL’s Past Player Program provides coordinated neuropsychological assessment, imaging/scans and clinician assessment to past elite players suffering neurological and/or cognitive deficits in retirement. The AFL is currently undertaking a review of the Past Player Program with consideration of further clinical care and support being offered to past players in need.” The wife of the player in care has also been writing to the AFL, including the chief executive, Gillon McLachlan.

“There’s so much deflection when you ask questions about what’s happening with funding,” she says. “There’s been a lot of media about some funding that’s there for the players who’ve been affected. And so much deflection about studies.

“It blows my mind that they can’t, that there’s just nothing. They seem to spend so much money on research and surveys and things like that, and it doesn’t seem to get anywhere.” She says her husband had been due to take part in AFL-run brain scans, which the family welcomed, but had to postpone when he was suddenly admitted to hospital. He is one of numerous past players who intend to join a planned concussion class action against the AFL.

“It’s you against the AFL and the PA,” says another player who has signed up. “Because everyone’s got vested interests and they’re all protecting themselves. You get that initial support. Great. Everyone does when they finish playing. But then you’re in the dark for the rest of it.”

**Know more? Contact emma.kemp@theguardian.com**