A summary of the first Australian and Aotearoa New Zealand Clinical Practice Guideline for the management of mild traumatic brain injury/concussion and persisting post-concussion symptoms in adults and children

Karen M Barlow, Sheryl SY Lim, Elizabeth Haines, Gill Cowen, Jennie Ponsford, Alice Theadom, Julia Treleaven, Gavin Davis, Vicki Anderson, Franz Babl, David Cole, Jennifer Cullen, Stuart Dalziel, Melinda Fitzgerald, Howard Flavell, Caroline Yates, Rebecca Kimble, John Olver, Rhonda Orr, Mark Ralfe, Michael Rose, Nick Rushworth, Gary Browne, Gary Mitchell, Sean Tweedy

Background
Mild traumatic brain injury (mTBI) and concussion are important healthcare issues, with ongoing and persisting symptoms significantly affecting a person's quality of life. Management is often challenging.

Objective
Using a case study example, this article outlines key updates and practical guidance for assessment and management of mTBI/concussion, informed by the newly developed Australian and Aotearoa New Zealand (ANZ) mTBI and concussion clinical practice guideline.

Discussion
The 'Australian and Aotearoa New Zealand Clinical Practice Guideline for the management of mild traumatic brain injury/concussion and persisting post-concussion symptoms in adults and children' is the first guideline to address the full scope of mTBI/concussion management across diverse ANZ populations. It provides general practitioners and other clinicians with practical, evidence-based recommendations for assessing and managing mTBI and persisting symptoms across all ages. Developed through multidisciplinary and consumer collaboration, it aims to promote consistent, high-quality care and reduce practice variation across healthcare settings.

CASE

Miss LC, aged 28 years, is a female executive who works at a law firm and practices martial arts in her spare time. She has a past medical history of infrequent migraine and mild anxiety. She presents to her general practitioner (GP) after sustaining a head injury when she tripped and struck her head on gym equipment during a fitness training session 4 days earlier. She did not lose consciousness at the time but since has had a bad headache, nausea and dizziness, and she is finding it difficult to concentrate at work. She wonders if she needs a brain scan. She also wants to know if she will recover faster if she stays at home and rests, as she has an important martial arts tournament this weekend that she wants to be ready for.

Mild traumatic brain injury (mTBI), often referred to as a concussion, affects over 220,000 people in Australia and Aotearoa New Zealand (ANZ) annually, with 25–30% of people experiencing persisting symptoms for months or longer.[1] Concussion occurs in all age groups, with children, young adults and older adults having the highest incidence. Major causes of concussion include falls, sports-related concussion, motor vehicle crashes, assaults and blast-related incidents.[2] Patient recovery is highly variable. A significant proportion of children and adults experience ongoing symptoms that impair function and quality of life, yet local clinical resources remain limited, and management is inconsistent.[3] The GP plays a crucial part in management, yet up to 40% of Australian GPs report limited confidence in managing mTBI, especially persisting post-concussion symptoms (PPCS).[2] Low patient volumes (40% of GPs report seeing fewer than five concussion cases per year) contribute to this lack of confidence, but a major factor is uncertainty in making evidence-based decisions.[2] Although several evidence-based guidelines exist internationally for managing mTBI/concussion in specific populations,[4] such as children,[5–7] sports-related concussion[8] or in particular settings such as emergency departments,[4,5] none provide comprehensive guidance across management from injury to recovery, nor are they tailored to the ANZ healthcare systems.

To address this gap, a multidisciplinary group of researchers, clinicians and consumers with lived experience has collaboratively developed the first 'Australian and Aotearoa New Zealand Clinical Practice Guideline for the management of mild traumatic brain injury/concussion and persisting post-concussion symptoms in adults and children' (hereafter the ANZCPG).[9] Figure 1 summarises the methodology for the development of the guidelines and the accompanying website (https://anzconcussionguidelines.com). A total of 119 recommendations (61 evidence-based, 58 consensus-based) and 27 practice points were developed. Refer to Table 1 for the types of recommendations in the ANZCPG and Appendix 1 for the recommendations (available online only). The full guideline document and a summary document are available on the website, providing comprehensive details about the rationale, methodology and background information on the recommendations.

The new ANZCPG provides the first binational guideline to address the full scope of mTBI/concussion management from injury to recovery, co-designed with consumers and experts to support the ANZ healthcare systems.[4,10-11] The ANZCPG recommendations are divided into six sections to reflect the patient journey: (1) recognition and assessment; (2) initial management; (3) return to activity, (4) assessment and management of specific symptoms; (5) assessment and management of persisting symptoms; and (6) repeated concussion and long-term effects; refer to Figure 2. All recommendations have been adapted to be consistent with resources generally available to ANZ populations across all aetiologies and age ranges.

The ANZ Concussion Guidelines website (www.anzconcussionguidelines.com) has an online toolbox and quick access tabs corresponding to each stage of the patient journey, which can direct GPs to information and resources required to assist in identifying, assessing and managing concussion presentations; refer to Figure 3. For example, the 'Recognise and assess' tab leads to further information boxes relating to initial identification and assessment of concussion, including tools such as the

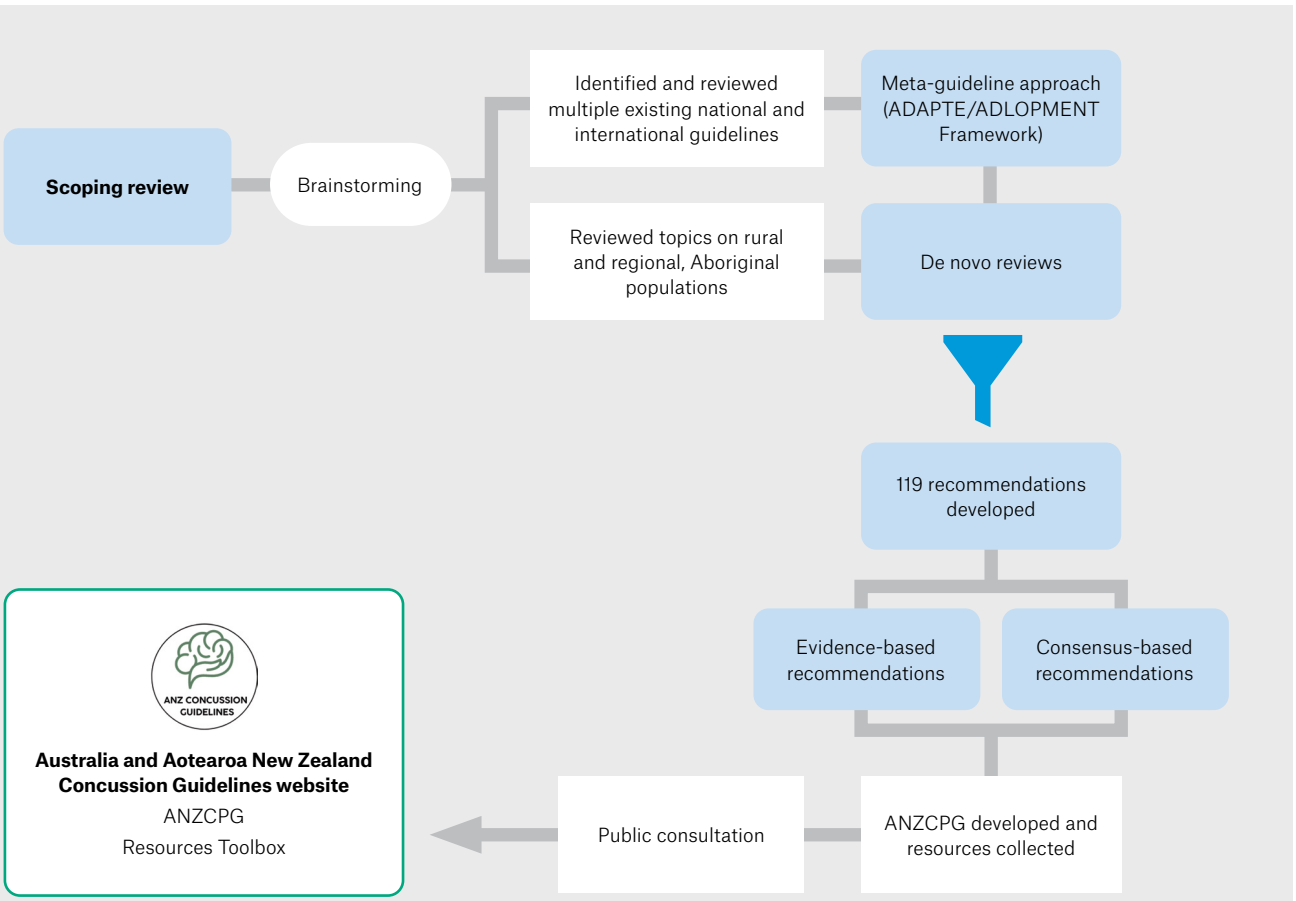

Figure 1. Methodology for the development of the 'Australian and Aotearoa New Zealand Clinical Practice Guideline for the management of mild traumatic brain injury/concussion and persisting post-concussion symptoms in adults and children' and website.

ANZCPG, 'Australian and Aotearoa New Zealand Clinical Practice Guideline for the management of mild traumatic brain injury/concussion and persisting post-concussion symptoms in adults and children'.

Concussion Recognition Tool and the Sport Concussion Assessment Tool. There are specific subheadings with guidance on how to identify red flags at 'When to send to hospital' and 'Neuroimaging' indications. All quick access tabs in the case study that link to recommendations referenced from the website are marked with an asterisk '*'.

CASE CONTINUED

From taking a thorough history, Miss LC's GP identifies that the headaches have migrainous features. Miss LC's examination is unremarkable except for non-focal tenderness of the cervical paraspinal muscles. Her Rivermead Post Concussion Symptom Questionnaire score is 26, suggesting moderate-to-severe level symptoms (**Recognise and assess: Assessment*). The GP and Miss LC discuss concussion and her symptoms (**Initial management: Education and advice*). The GP advises Miss LC that she does not require neuroimaging, discusses the importance of sleep and recommends that she use paracetamol and ibuprofen for milder headaches and her usual triptan for severe headache over the next 2 weeks. She is further advised to limit analgesic use to 2–3 times per week after this because of the risk of medication-associated headache (**Headaches*). Her GP also provides advice regarding activity, recommending she start light exercise and gradually increase intensity and time over the next 2 weeks (**Return to activity*). She should be guided by her symptoms; a mild increase in symptoms during or after exercise is acceptable. When compared with baseline, if symptoms increase by 3 points or more on a 10-point scale lasting longer than an hour, then she should stop the exercise and try again the next day. She should be able to exercise at her previous levels of intensity for 1–2 days (**Return to activity*) before progressing to non-contact martial art drills (**Return to sport strategy: Stage 4*). Miss LC and her GP discuss the potential benefit of physiotherapy for further management of her dizziness, for treatment of her paraspinal cervical tenderness and to assist with a graduated exercise program, and Miss LC says she will consider this (**Management of specific symptoms: Balance, dizziness and visual dysfunction*). The GP recommends that Miss LC continue normal household activities, taking breaks as needed (**Return to activity*), and they agree that it is reasonable for Miss LC to return to work gradually over the next 2 weeks (**Return to activity: Return to work*). The GP provides her with a letter for work and advises that formulation of a return-to-work plan with her employer is often helpful, sometimes with advice from an occupation therapist. She should expect these symptoms to resolve within a few weeks but is warned that it can take 1–3 months. Miss LC is advised not to return to sport, including martial arts, until her symptoms have resolved, she is back to her baseline level of function and at least 21 days have passed since the concussion. She is asked to return for follow-up in 2–4 weeks, or earlier if required.

Table 1. Types of recommendations in the 'Australian and Aotearoa New Zealand Clinical Practice Guideline for the management of mild traumatic brain injury/concussion and persisting post-concussion symptoms in adults and children'[A]

Recommendation	Description
Recommended (Strong) EBR[S]	Benefits of a recommended course of action clearly outweigh the harms, and this is supported by high-quality evidence.
Not recommended (Strong) EBR[S]	Harms of a recommended course of action clearly outweigh the benefits, and this is supported by high-quality evidence.
Conditionally recommended EBR[C]	Denotes uncertainty over the balance of benefits, such as when the evidence quality is low or very low, or when personal preferences or costs are expected to affect the decision, and as such refer to decisions where consideration of personal preferences is essential for decision making.
Generally not recommended EBR[C]	Denotes uncertainty over the balance of harms, such as when the evidence quality is low or very low, or when personal preferences or costs are expected to affect the decision, and as such refer to decisions where consideration of personal preferences is essential for decision making.
Consensus-based recommendation CBR	Recommendation formulated by the GDG in the absence of quality evidence after a systematic review of the evidence was conducted and failed to identify sufficient admissible evidence on the clinical question.
Practice point PP	Used to address important aspects of care that are not addressed by relevant source guidelines or practical considerations or where evidence is lacking. These are developed by consensus of the GDG.

[A]Colour coding represents the different categories of recommendations, as reflected in Appendix 1 (available online only).

C, conditionally; CBR, consensus-based recommendation; EBR, evidence-based recommendation; GDG, guideline development group; PP, practice point; S, strong.

Recognition, assessment and initial management

Through the ANZ Concussion Guidelines website, the 'Initial management' and 'Return to activity' tabs would be appropriate for use by Miss LC's GP, with 'Initial management' information including subheadings of 'Education and advice', 'Early symptom management' and 'Prognosis'. In the case of Miss LC, the 'Return to activity' tab is particularly important, as it explains the evidence for gradual resumption of normal activity and confirms that strict rest is not effective. It also includes a detailed

section on the 'Return to sport', with a table outlining the six progressive steps to safely return to playing sports.

CASE CONTINUED: FOLLOW-UP

Miss LC returns to the GP 5 weeks post-injury because her headache and 'brain fog' are not improving. She has difficulty getting to sleep and worries that her work performance is suffering, and she is struggling to meet important deadlines. However, her physical activity levels have improved (**Return to sport strategy: Stage 3*), and her symptoms score has decreased to 19. She wants to know what else can be done to help her recover.

Persisting symptoms

Concussion symptoms usually resolve within a few weeks of injury. If symptoms continue for longer than 4 weeks, they are considered 'persisting symptoms', which occur in 30–40% of children and 20–50% of adults.[12,13] The ANZ Concussion Guidelines website provides advice about the assessment and management of 'Persisting symptoms', as well as management of the most common acute and persistent symptoms: 'Headaches', 'Cognitive difficulties', 'Sleep disturbance and fatigue', 'Mental health', 'Balance, dizziness and visual disturbances' and 'Autonomic nervous system'. In addition to the concussion itself, pre-existing conditions often contribute to the prevalence and severity of persisting symptoms, making management more complex.[14] In some PPCS cases, especially where symptoms show little improvement or comorbidities are complex, a coordinated approach is required to facilitate recovery. Ideally this involves referral to a multidisciplinary concussion team or service; these typically use shared-care models including the patient's GP and community clinicians. However, there is geographical variation in the availability of such services, with many regions in Australia being under-resourced and significant travel often involved. The ANZCPG provides useful advice about symptom management, rehabilitation and the engagement of local allied health professionals while such services are awaited, or in the absence of such services to assist the GP in coordinating multidisciplinary care with available resources.

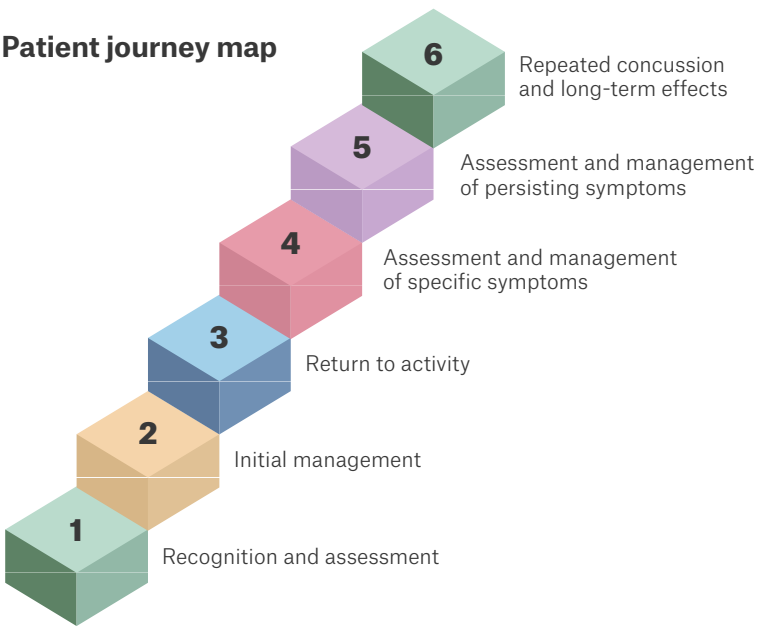

Figure 2. The 'Australian and Aotearoa New Zealand Clinical Practice Guideline for the management of mild traumatic brain injury/concussion and persisting post-concussion symptoms in adults and children' is organised to reflect the patient journey across six key stages from initial assessment through recovery. Each website section provides an overview of important considerations at that stage as well as recommendation tabs with accordions to provide increased detail. The website has a clinical toolbox to aid assessment and management with useful questionnaires, templates, links and flow charts corresponding to each stage.

CASE CONTINUED: MANAGEMENT

The GP reassures Miss LC that she is improving and provides further guidance on strategies to address her persisting symptoms: a 2-week trial of melatonin to improve sleep, information about amitriptyline for headaches, and the usefulness of mindfulness for stress reduction (**Persisting symptoms; Management; Headaches; Mental health*). They agree that if her symptoms have not improved in 2 weeks, the GP will refer her to a multidisciplinary concussion service (**Persisting symptoms: Follow-up and referral*).

Implementation of the ANZCPG

To be useful, all clinical practice guidelines require active implementation strategies to increase their uptake and usefulness. Implementation strategies for the ANZCPG will unfold over the next 2 years. These include the development of resources to increase public education about concussion, app development (eg HeadCheck), tele-rehabilitation and patient-driven models of care. Further, a GP education course based on the ANZCPG is currently in development with Connectivity Traumatic Brain Injury Australia and is anticipated to be available through The Royal Australian College of General Practitioners in 2026. By embedding guideline use into professional learning, we aim to enhance GPs' confidence in managing concussion and thereby improve patient outcomes.

Conclusion

The ANZCPG and its accompanying website and toolbox provide high-level

evidence and practical advice for GPs and other clinicians across the life span. The successful implementation of guidelines will not only increase knowledge across health professionals but ultimately result in standardised practice across ANZ. Hence, we encourage GPs to refer to the guidelines to receive an up-to-date management recommendation with key tools to support care.

Key points

- mTBI and concussion are often overlooked and undermanaged across healthcare settings.
- The ANZCPG bridges gaps in concussion care through evidence-based and locally relevant recommendations.
- GPs play a crucial part in managing mTBI/concussion but report a lack of confidence in managing PPCS.
- The ANZ Concussion Guideline website offers practical resources to aid in decision making and patient education.
- Consistent application of the ANZCPG can improve GPs' confidence and knowledge.

Authors

Karen M Barlow MBChB, MSc, PhD, FRACP, Professor of Paediatric Neurology, Child Health Research Centre), The University of Queensland, Brisbane, Qld; Rehabilitation Specialist, Queensland Children's Hospital, Brisbane, Qld

Sheryl SY Lim BBiomedSc, MPIP, Senior Research Assistant, Child Health Research Centre, The University of Queensland, Brisbane, Qld

Elizabeth Haines MBChB, BSc, PhD, Research Fellow, Child Health Research Centre, The University of Queensland, Brisbane, Qld

Gill Cowen MBBS, MA (Oxon), FRACGP, MSportMed, General Practitioner (FRACGP, MSportMed); Senior Lecturer and Senior Clinical Research Fellow, Curtin Medical School and Curtin Health Innovation Research Institute, Curtin University, Perth, WA

Jennie Ponsford AO, BA (Hons), MA (Clin Neuro), PhD, FCCN, MAPS, Professor of Neuropsychology, Monash-Epworth Rehabilitation Research Centre, Monash University, Melbourne, Vic

Alice Theadom PhD, Professor of Psychology and Neuroscience, Faculty of Health and Environmental Sciences, Auckland University of technology, Auckland, Aotearoa New Zealand

Julia Treleaven PhD, BPhty, Clinical Associate Professor and Senior Lecturer of Physiotherapy, Faculty of Health, Medicine and Behavioural Sciences, The University of Queensland, Brisbane, Qld

Gavin Davis MBBS, FRACS, Neurosurgeon, Murdoch Children's Research Institute, Melbourne, Vic; Neurosurgeon, Cabrini Health, Melbourne, Vic; Neurosurgeon, Austin Health, Melbourne, Vic; Adjunct Clinical Professor, The University of Melbourne, Melbourne, Vic; Adjunct Professor, University of Notre Dame, Melbourne, Vic

Vicki Anderson BA (Hons), MA, PhD, FASSA, FAPS, FAAHMS, FASSBI, Paediatric Neuropsychologist,

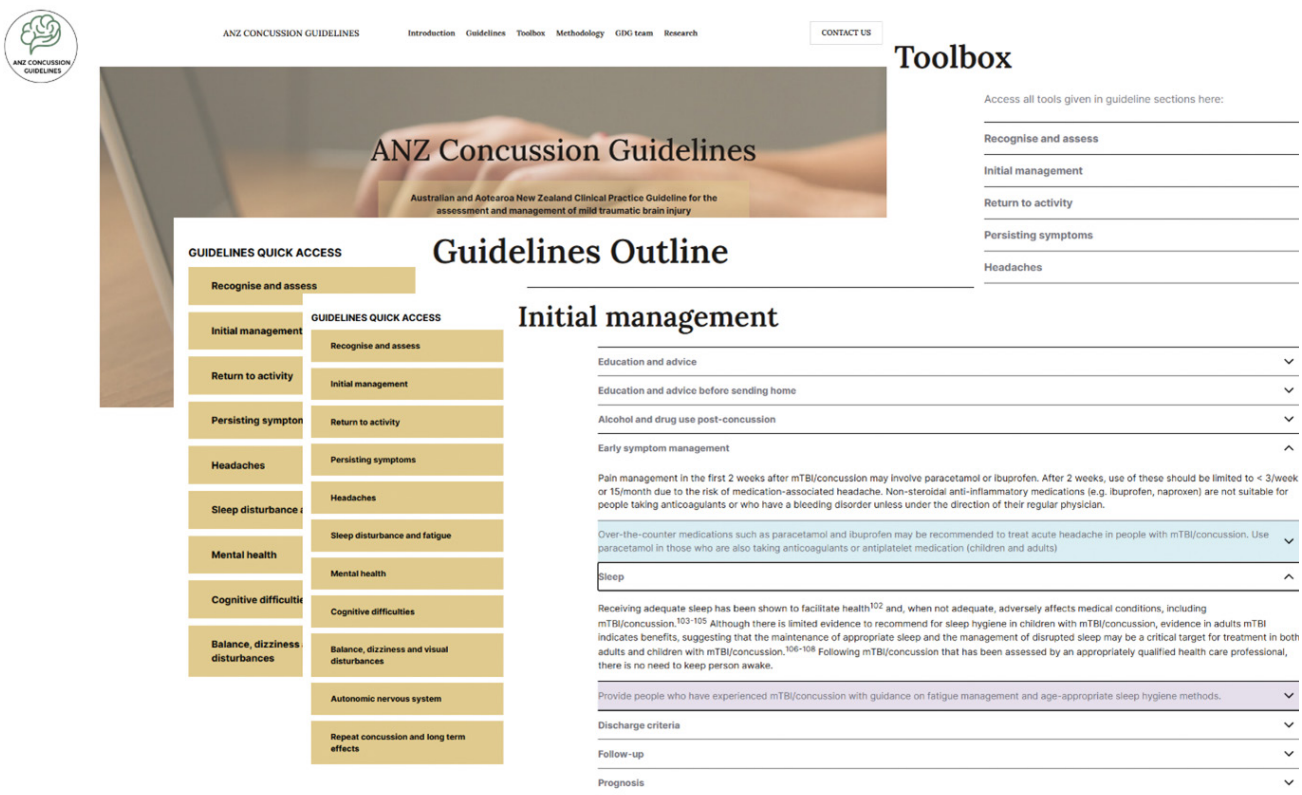

Figure 3. Screenshots of the Guidelines Outline and Toolbox pages of the ANZ Concussion Guidelines website (www.anzconcussionguidelines.com), with examples of tools that can be accessed for different stages of the patient journey. If you have suggestions for what you would like to see in the toolbox, you can share your ideas through the 'Contact Us' page on the website.

Adapted with permission from the ANZ Concussion Guidelines website (www.anzconcussionguidelines.com).

Murdoch Children's Research Institute, Melbourne, Vic; Professorial Fellow, School of Psychology & Department of Paediatrics, The University of Melbourne, Melbourne, Vic

Franz Babl MD, MPH, DMedSc, FRACP, FAAP, FACEP, Paediatric Emergency Physician, Murdoch Children's Research Institute, Melbourne, Vic; Professor of Paediatric Emergency Medicine, Department of Paediatrics, The University of Melbourne, Melbourne, Vic; Paediatric Emergency Physician, Royal Children's Hospital, Melbourne, Vic

David Cole, Consumer Advocate, Brisbane, Qld

Jennifer Cullen AM, CEO, Synapse, Brisbane, Qld; Adjunct Associate Professor, Menzies Health Institute, Griffith University, Brisbane, Qld

Stuart Dalziel MD, PhD, Paediatric Emergency Physician, Starship Hospital, Auckland, Aotearoa New Zealand; Professor of Paediatrics and Emergency Medicine, School of Medical and Health Sciences, University of Auckland, Auckland, Aotearoa New Zealand

Melinda Fitzgerald PhD, John Curtin Distinguished Professor, Curtin Health Innovation Research Institute, Curtin University, Perth, WA; Professor of Neurotrauma, Perron Institute for Neurological and Translational Science, Perth, WA; Chief Executive Officer, Connectivity Traumatic Brain Injury Australia, Perth, WA

Howard Flavell MD, FRACRM, Rehabilitation Medicine Physician, Royal Darwin Hospital, Darwin, NT

Caroline Yates MBChB, FRACGP, General Practitioner, Brisbane South Health Pathways, Brisbane, Qld; Rural Specialist, Royal Flying Doctor Service, Brisbane, Qld

Rebecca Kimble MBBS, FRANZCOG, MAICD, Director, Queensland Clinical Guidelines, Clinical Excellence Queensland, Brisbane, Qld; Professor of Obstetrics & Gynaecology, Faculty of Health, Medicine and Behavioural Sciences, The University of Queensland, Brisbane, Qld

John Olver AM, MBBS, MD (Melb), FAFRM (RACP), Rehabilitation Physician, Epworth Healthcare, Melbourne, Vic; Emeritus Professor, School of Clinical Sciences at Monash Health, Monash University, Melbourne, Vic

Rhonda Orr B Pharm, M ExSpSc, PhD, Professor, Exercise and Sports Science, The University of Sydney, Sydney, NSW; Honorary Associate, Sydney Children's Hospitals Network, Children's Hospital Institute of Sports Medicine, Children's Hospital Westmead, Sydney, NSW

Mark Ralfe MBChB (Otago), DRANZCOG, DCH, FRACGP, MMed, General Practitioner/Sports Medicine Doctor, Wakefield Sports and Exercise Clinic, Adelaide, SA

Michael Rose MD, FRACP, Consultant Physician and Geriatrician, Cabrini Health, Melbourne, Vic

Nick Rushworth Executive Officer, Brain Injury Australia, Sydney, NSW

Gary Browne MD, Staff Specialist, Sydney Children's Hospitals Network, Children's Hospital Institute of Sports Medicine, Children's Hospital at Westmead, Sydney, NSW; Professor of Paediatrics and Emergency, Discipline of Child and Adolescent Health, Sydney Medical School, The University of Sydney, Sydney, NSW

Gary Mitchell MBBaO, FACEM, Emergency Physician, Royal Brisbane and Women's Hospital, Brisbane, Qld; Senior Lecturer, Royal Brisbane Clinical Unit, Faculty of Medicine, The University of Queensland, Brisbane, Qld

Sean Tweedy PhD, AES, AEP, Professor of Sports and Exercise Science, School of Human Movement and Nutrition Sciences, The University of Queensland, Brisbane, Qld

Competing interests: KMB is an unpaid member of the advisory committee for Connectivity Traumatic Brain Injury (TBI) and Concussion Australia, Guideline Development Group for the PREDICT guideline and declares institutional grants from the Medical Research Future Fund (MRFF) and Motor Accident Insurance Commission; SSYL declares employment supported by funding from an MRFF grant; EH declares employment supported by funding from an MRFF grant; GC is a member of the MRFF Expert Advisory Panel for TBI and declares institutional grants (AI MRFF stream 1 2021 TBI grant and CI MRFF Stream 1 2020 TBI Mission grant), unpaid roles as Chair WA Concussion Network and Advisor for WA Football Club (WAFC), gifts/rewards for services to WAFC presentations, and Connectivity presentations; JP declares institutional grants from the Transport Accident Commission and the National Health and Medical Research Council (NHMRC), payment for medico-legal reports and book royalties from Informa Press; AT is a grant reviewer for the Ministry of Business, Innovation and Employment and declares payment from the Australasian Society for the Study of Brain Impairment and institutional grants from the Rutherford Discovery Fellowship, Health Research Council Grants and Accident Compensation Corporation; JT declares payments for various postgraduate education providers such as International Federation of Orthopaedic Manipulative Physical Therapists (IFOMPT), American Psychological Association (APA), Musculoskeletal Physiotherapist, payment for involvement in Concussion Corner Academy, reports written for patients with post-concussion symptoms – various solicitors; GD is a member of the Scientific Committee of the 6th International Consensus Conference on Concussion in Sport, honorary member of the AFL Concussion Scientific Committee, and Section Editor, Sport and Rehabilitation, Neurosurgery and declares institutional grants from the MRFF and unpaid attendance at meetings organised by sporting organisations including the National Football League, National Rugby League, International Olympic Committee, International Ice Hockey Federation and Fédération Internationale de Football Association (FIFA); VA declares institutional funding from MRFF, institutional grants from MRFF, NHMRC and Royal Children's Hospital Foundation, payments from Pearson Publishing to Anderson Neuropsychology Pty LTD for textbooks, consulting fees for involvement on NHMRC/MRFF panels, payments for presentations by Children's Hospital Foundation and American Psychological Association (Editor fee), payments for expert testimony, and institutional payment for Australian Football League – partnership re HeadCheck App; FB is CEO of Synapse Australia and a member of the Independent Advisory Council for the National Disability Insurance Scheme (NDIS) and declares NHMRC institutional and individual grants, and is one of the Chief investigators on PREDICT guidelines; JC declares payment for advice to Disability Royal Commission paid to Synapse; SD is one of the lead investigators on PREDICT guideline and declares institutional grants/support from Cure Kids NZ and Health Research NZ, unpaid leadership positions on PREDICT and PERN, and a paid contract with Pharmac NZ; MF is CEO of Connectivity TBI Australia and declares grants from MRFF, NHMRC and the Neurotrauma Research Program, contracts for research by Argenica Therapeutics and MediCann Health, honorary positions with paid travel for Mission TBI Expert Advisory Panel, Wicking Centre Tasmania, Scientific Advisory panel and ARC Centre of Excellence for Integrative Brain Function; CY is a consultant for Australian Digital Health Agency (ADHA) and Cubicko about electronic health systems and a paid member of the guideline development group on this project, and declares paid work for Health Pathways for Brisbane South PHN; JO declares a grant from the Transport Accident Commission (Vic), paid consultation fees for membership on advisory boards and lecture presentations of AbbVie Pharmaceuticals and Ipsen pharmaceuticals; RO declares a grant from the MRFF; NR declares that Brain Injury Australia (BIA) received payment to act as a consumer representative on MRFF research advocacy funding from the Department of Social Services, NDIS, Royal Commission into Violence, Abuse, Neglect and Exploitation of People with Disability, and has a partnership agreement with MAX employment. DC, HF, RK, MRa and MRo have no competing interests to declare.

Funding: This Guideline was developed with funding support from the National Health and Medical Research Council (NHMRC) Medical Research Futures Fund (MRFF) research grant (2008070) administered by the Child Health Research Centre at the University of Queensland. The project was also supported by Acquired Brain Injury in Children Research Program at The University of Queensland. KMB's time was supported by a grant from the Motor Accident Insurance Commission in Queensland. JP was funded in part by NHMRC and Transport Accident Commission institutional grants. FEB was funded in part by an NHMRC investigator leadership grant and the Royal Children's Hospital Foundation, Parkville, Australia. AT received institutional grants from Rutherford Discovery Fellowship, Health Research Council Grants and Accident Compensation Corporation. VA was funded in part by institutional grants from the MRFF, NHMRC and the Royal Children's Hospital Foundation. JC received funding from Synapse Australia. SRDs time was part funded by Cure Kids New Zealand. GD received institutional grants from MRFF. MF received funding in part from MRFF, NHMRC and Neurotrauma Research Program. GM was funded in part by Rugby Australia, Queensland Rugby Union, Fiji Rugby Union. NR received funding in part from Brain Injury Australia and MRFF. ST received institutional funding from NHMRC. CY received funding in part from MRFF.

Provenance and peer review: Commissioned, externally peer reviewed.

AI declaration: The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

Correspondence to:
k.barlow@uq.edu.au

Acknowledgements

The guideline development group (GDG) would like to acknowledge the input and considerable feedback obtained during the Guideline development process from the Consumer Working Group, who provided their expertise and added considerable insights of lived-experience and local context considerations: Australia: Francesca Brady, NSW; Megan Butner, Qld; Andrew Cocks, WA; David Cole, Qld; Brenda Desplace, Qld; Tayla Fletcher, Qld; Kirsty Foreman, WA; Paulien Robinson, Qld; Monique Sermon, WA; Gerard Thomas, WA; New Zealand: Sarah Taimana Brodrick, Auckland; Anonymous, Aotearoa New Zealand. The GDG would also like to acknowledge the input and feedback obtained during the public consultation phase, which was invaluable and increased the relevance of the Guideline to the Australian and New Zealand healthcare settings. This included feedback from institutions (eg The Royal Australian College of General Practitioners, New South Wales Health Agency for Clinical Innovation, Accident Compensation Corporation New Zealand, Australian Physiotherapy Association, Australia and New Zealand Society for Geriatric Medicine), specialists in psychology, neuropsychiatry, allied health and emergency medicine, interdisciplinary concussion

management teams, concussion researchers and people with live experience.

We acknowledge the contribution and expertise of Dr Sarah Harris, Notre Dame University from the GDG and would also like to thank the members of the Physiotherapy and Occupational Therapy Working Group: Ashley Callaghan, Miffy Durham, Georgina Leov, Felix Leung, Alexander Ring, Kirrilee Smith, Julia Treleaven (Chair), Steven Lane, and Michelle Spanevello.

We are grateful for the external input of Professor Christopher Giza, University of California Los Angeles. We would like to thank Ms Agnes Wilson and Ms Kate Sawkins (Hereco) for their expertise and input to the guideline development process and the guideline development section of the Clinical Excellence Queensland. We thank Ms Jen Ramson, Ampersand Health Science Writing. We would also like to acknowledge Brad Partridge, The University of Queensland, for his advice regarding ethical considerations in guideline development and thank Ms Stephanie MacDonald, The University of Queensland, who organised the GDG process.

References

1. Hyder AAWC, Wunderlich CA, Puvanachandra P, Gururaj G, Kobusingye OC. The impact of traumatic brain injuries: A global perspective. NeuroRehabilitation 2007;22(5):341–53. doi: 10.3233/NRE-2007-22502.
2. Thomas E, Chih H, Gabbe B, Fitzgerald M, Cowen G. A cross-sectional study reporting concussion exposure, assessment and management in Western Australian general practice. BMC Fam Pract 2021;22(1):46. doi: 10.1186/s12875-021-01384-1.
3. White PE, Register-Mihalik J, Donaldson A, Sullivan SJ, Finch CF. Concussion guideline implementation perceptions and experiences among parents of community-level Australian Football junior players. BMJ Open Sport Exerc Med 2017;3(1):e000215. doi: 10.1136/bmjsem-2016-000215.
4. Silverberg ND, Iaccarino MA, Panenka WJ, et al; American Congress of Rehabilitation Medicine Brain Injury Interdisciplinary Special Interest Group Mild TBI Task Force. Management of concussion and mild traumatic brain injury: A synthesis of practice guidelines. Arch Phys Med Rehabil 2020;101(2):382–93. doi: 10.1016/j.apmr.2019.10.179.
5. Babl FETE, Dalziel S. Australian and New Zealand guideline for mild to moderate head injuries in children – Full guideline. Paediatric Research in Emergency Departments International Collaborative, 2021.
6. Hingley S, Ross J. Guidelines for diagnosing and managing paediatric concussion: Ontario Neurotrauma Foundation guideline. Arch Dis Child Educ Pract Ed 2016;101(2):58–60. doi: 10.1136/archdischild-2014-307252.
7. Lumba-Brown A, Yeates KO, Sarmiento K, et al. Centers for Disease Control and Prevention guideline on the diagnosis and management of mild traumatic brain injury among children. JAMA Pediatr 2018;172(11):e182853. doi: 10.1001/jamapediatrics.2018.2853.
8. McCrory P, Meeuwisse W, Dvořák J, et al. Consensus statement on concussion in sport-the 5th international conference on concussion in sport held in Berlin, October 2016. Br J Sports Med 2017;51(11):838–47. doi: 10.1136/bjsports-2017-097699.
9. Barlow KM, Ponsford JL, Theodom A, et al. Mild traumatic brain injury and concussion and persisting post-concussion symptoms: New guidelines to support evidence-based assessment and management in Australia and Aotearoa New Zealand. Med J Aust 2025;223(9):446–49. doi: 10.5694/mja2.70082.
10. Lumba-Brown A, Yeates KO, Sarmiento K, et al. Diagnosis and management of mild traumatic brain injury in children: A systematic review. JAMA Pediatr 2018;172(11):e182847. doi: 10.1001/jamapediatrics.2018.2847.
11. Babl FE, Tavender E, Ballard DW, et al; Paediatric Research in Emergency Departments International Collaborative (PREDICT). Australian and New Zealand guideline for mild to moderate head injuries in children. Emerg Med Australas 2021;33(2):214–31. doi: 10.1111/1742-6723.13722.
12. Nguyen JVK, Willmott C, Ponsford J, et al. Moving forward on the road to recovery after concussion: Participant experiences of interdisciplinary intervention for persisting post-concussion symptoms. Disabil Rehabil 2024;46(17):3961–69. doi: 10.1080/09638288.2023.2261374.
13. Theadom A, Parag V, Dowell T, et al; BIONIC Research Group. Persistent problems 1 year after mild traumatic brain injury: A longitudinal population study in New Zealand. Br J Gen Pract 2016;66(642):e16–23. doi: 10.3399/bjgp16X683161.
14. Marshall S LA, Curran D, Fischer L, Velikonja D, Bayley M. Living concussion guidelines: Guideline for concussion and prolonged symptoms for adults 18 years or older. The Ottawa Hospital Research Institute, 2023.

correspondence **ajgp@racgp.org.au**