

# Opportunities for the management of metabolic dysfunction-associated fatty liver disease within Aboriginal and Torres Strait Islander peoples

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## Introduction

Metabolic dysfunction-associated fatty liver disease (MAFLD) is frequently acknowledged as the hepatic manifestation of the metabolic syndrome<sup>1</sup> and is characterised by the excessive accumulation of hepatic fat<sup>2</sup> within the setting of obesity, type 2 diabetes (T2D) and/or metabolic dysregulation.<sup>3</sup> MAFLD is the leading cause of liver disease worldwide,<sup>4</sup> with a 20–30% prevalence globally and within Australia.<sup>5</sup> MAFLD is strongly linked to both liver-specific morbidity and mortality and extrahepatic morbidity and mortality, notably T2D, cardiovascular disease (CVD) and lifestyle-related cancers.<sup>6,7</sup> In Australia, the prevalence of MAFLD is expected to increase by 25% between 2019 and 2030, paralleling trends of increasing obesity and diabetes.<sup>8</sup> Concerningly, prevalence is likely underestimated due to the asymptomatic and non-specific nature of the condition in its early stages, lack of awareness and community-level screening, and lack of diagnosis until the disease has progressed to later stages.<sup>4,9</sup> While the therapeutic landscape for MAFLD management is likely to change with recent advances in Phase III clinical trials,<sup>10</sup> there are currently no approved pharmacological agents for the long-term management of MAFLD. Lifestyle therapy is the cornerstone of MAFLD management, with adiposity loss via improved diet quality and increased physical activity/exercise central to MAFLD regression, the prevention of MAFLD progression, and reducing the risk of CVD, T2D and lifestyle-related cancers.<sup>11–14</sup>

## Epidemiology of metabolic dysfunction-associated fatty liver disease in Aboriginal and Torres Strait Islander peoples: a significant knowledge gap

Currently, there are limited data available on the prevalence of MAFLD within individual Australian States and Territories; the

available data are from white/Caucasian populations and therefore cannot be generalised to other groups, including Aboriginal and Torres Strait Islander peoples.<sup>2,5,15</sup> Data on the prevalence and associated burden of MAFLD among First Nations peoples is lacking. In hospitalised patients with cirrhosis, 3% of Aboriginal and Torres Strait Islander peoples were identified as having MAFLD as their presumed aetiology.<sup>16</sup> Another study examining hepatocellular carcinoma in Aboriginal and Torres Strait Islander peoples found that 6.1% had MAFLD.<sup>17</sup> However, similar to the general population, these results are likely to be substantially underestimated in Aboriginal and Torres Strait Islander peoples, especially with the prevalence of the related comorbidities of T2D and obesity being up to 48% and 45%, respectively, in this group.<sup>17,18</sup> This is likely due to the low awareness of and evaluation for MAFLD<sup>17</sup> and individuals not being appropriately coded as having MAFLD within healthcare databases.<sup>17,19</sup> Early detection of MAFLD in Aboriginal and Torres Strait Islander peoples is vital given that timely assessment of fibrosis risk, MAFLD and liver fibrosis staging, and appropriate intervention and specialist referral are required to reduce disease progression. While data are lacking, it is plausible that Aboriginal and Torres Strait Islander peoples will be at higher risk of advanced fibrosis, cirrhosis complications, and liver-related mortality given the higher rates of T2D and related comorbidities.

The aim of this commentary was to examine the opportunities for management of MAFLD among Aboriginal and Torres Strait Islander peoples. The objectives were to explore the impact of cultural determinants of health and investigate the current approaches and best practices for the management of MAFLD among Aboriginal and Torres Strait Islander peoples in this context. This commentary was undertaken following a systematic search of the literature from inception to April 2023 that did not return any results for literature describing MAFLD in Aboriginal and Torres

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Strait Islander peoples (see [Supplementary Material S1](#) for the search method employed).

## Cultural determinants of health in the leadership and management of metabolic dysfunction-associated fatty liver disease for Aboriginal and Torres Strait Islander peoples

The cultural determinants of health (CDOH) are essential for the health and wellbeing of Aboriginal and Torres Strait Islander

peoples.<sup>20</sup> Although an abundance of diversity exists within and between groups, Aboriginal and Torres Strait Islander peoples share a unique and valuable perspective on health.<sup>21</sup> Health is viewed as a holistic concept that not only encompasses the physical wellbeing of an individual but also the social, emotional, spiritual and cultural wellbeing of the entire community.<sup>20</sup> The CDOH centre on this definition<sup>22</sup> and encompasses a range of cultural factors that build resilience, nurture a sense of identity and support strong physical and mental health for individuals, families and communities.<sup>20</sup> As a strength-based approach, focusing on the CDOH allows the social realities of Aboriginal and Torres Strait Islander peoples to be placed

**Table 1: Opportunities for MAFLD management within the context of the cultural determinants of health.**

CDOH Framework	Description	Opportunities in the context of MAFLD management
<b>Connection to culture</b> <i>Connection to Country</i>	Reciprocal relationships between person and Country include spiritual and cultural elements that can foster social cohesion in cultural activities and empower individuals and communities. <sup>35,36</sup>	Increased physical activity and an improved diet to enhance autonomy. <sup>22</sup> Traditional ways of living are a known protective factor against many common diseases in the Western world, including obesity and T2D. <sup>33–35</sup> Language, connection with Elders and living on traditional Country is highly likely to be protective for mental health and may facilitate reconnection to enhance physical and mental health and wellbeing. Caring for Country is associated with increased physical activity, healthy eating, improved mental health and a reduced risk of T2D and CVD. <sup>21,38,39</sup>
<b>Connection to family, kinship and community</b>	Provides a social support network that determines how individuals relate to one another, thus fostering a sense of belonging, which can be protective of physical and mental health. <sup>37</sup>	Elders play a crucial role in the community through supporting group cohesion and transferring knowledge, including that of chronic disease and positive health behaviours. <sup>21</sup> Incorporating family security when delivering culturally safe and culturally responsive health services for the management of MAFLD among First Nations peoples. Family engagement, group-based activities, and cultural safety are key enablers of physical activity in Aboriginal and Torres Strait Islander peoples, specifically those that are led by local communities. Group-based, family-oriented interventions may be an effective approach for increasing physical activity levels for MAFLD management. <sup>40</sup> Community governance and ownership of MAFLD management will ensure that care is sensitive to community needs. <sup>32</sup> Community leaders, such as Elders and youth leaders, that drive social change directed towards the cultural needs of the community have significant positive outcomes. <sup>21</sup>
<b>Cultural identity</b>	Provides cultural empowerment and the building of a strong cultural identity grounded in Aboriginal and Torres Strait Islander ways of knowing, being, and doing	Adapting exercise programs to incorporate cultural values leads to increased physical activity. <sup>37</sup> Culture is a key source of motivation for physical activity participation. This may be less accessible for urban communities, but cultural needs should underpin intervention for MAFLD. This highlights the need for future MAFLD management to shift from dominant western nutrition interventions to approaches that are responsive to the cultural determinants associated with Aboriginal and Torres Strait Islander peoples' health and wellbeing.
<b>Self-determination</b>	Promotion of Aboriginal and Torres Strait Islander peoples' capacity to pursue their cultural, social and economic rights and self-determination in health and wellbeing. <sup>22</sup>	Programs and organisations that are led by Aboriginal and Torres Strait Islander staff and family members promote cultural safety <sup>32</sup> and have been shown to improve health outcomes in people living with T2D. <sup>41</sup> For Aboriginal and Torres Strait Islander communities, traditional food knowledge and culture are correlated with self-determination and a healthy diet. <sup>42</sup> Aboriginal and Torres Strait Islander peoples need to be involved in all aspects of the decision-making process as well as lead the self-determination discourse to ensure decolonisation in health is successful. <sup>21</sup> Self-determination supports the right for Aboriginal and Torres Strait Islander peoples to implement governance structures, direct decisions and develop programs and strategies via their own institutions and communities that are responsive to the social realities impacting wellbeing. <sup>43</sup> Indigenous-led service provision, in collaboration with Aboriginal Community Controlled Health Organisations (ACCHOs), can integrate awareness, evaluation, and management of MAFLD, enabling early detection, culturally responsive risk assessment, fibrosis staging, and referral pathways based on a family- and kinship-centred approach.

Abbreviations: CDOH, cultural determinants of health = T2D, type 2 diabetes = CVD, cardiovascular disease = MAFLD, metabolic-associated fatty liver disease.

at the forefront<sup>22</sup> and helps to “inform and influence policy, program decisions and outcomes”.<sup>23</sup>

MAFLD is potentially reversible with weight loss,<sup>24</sup> with a 7-10% reduction shown to significantly reduce hepatic fat and regress hepatic fibrosis.<sup>26</sup> Long-term adherence to lifestyle change is challenging,<sup>4</sup> yet harnessing the strengths of Aboriginal and Torres Strait Islander communities through utilising the CDOH is a powerful opportunity for the management of MAFLD.<sup>25</sup> For example, the Mediterranean diet is frequently cited as a key dietary strategy for the management of MAFLD;<sup>1,4</sup> however, the revitalisation of First Nations food knowledge has been shown to strengthen cultural identity and improve health and wellbeing outcomes.<sup>21,27,28</sup> Traditional diets often include foods low in energy density with high protein, polyunsaturated fats, complex carbohydrates and low sugar and saturated fats, which partially explains the little to no evidence of T2D prior to colonisation.<sup>28</sup> Furthermore, a high-protein, low-calorie intake meal plan, similar to a traditional diet, resulted in an average weight loss of 7.46 kg over 10 weeks in a group of First Nations peoples living with T2D.<sup>27</sup> Therefore, effective dietary approaches to MAFLD need to be adapted and culturally responsive.

Connection to Country, connection to family, kinship and community, cultural identity and self-determination are determinants that are strongly identified as having a positive impact on the health and wellbeing of Aboriginal and Torres Strait Islander peoples.<sup>21,22,29</sup> The CDOH have been shown to improve healthcare outcomes for Aboriginal and Torres Strait Islander peoples but are not well understood or well utilised in research.<sup>22</sup> There is considerable opportunity to employ domains from CDOH that incorporate the strengths and assets of Aboriginal and Torres Strait Islander peoples in the leadership and management of MAFLD. Evidence supported opportunities for MAFLD management within the context of the CDOH are presented in Table 1.

Currently, no program exists specifically targeting MAFLD management among Aboriginal and Torres Strait Islander peoples.<sup>30</sup> Most people living with MAFLD do not require specialist liver care, and MAFLD is best managed holistically.<sup>7</sup> Therefore, management needs to be underpinned by First Nations peoples’ unique perspectives on health and culture.<sup>31</sup> Effective management must be guided by the knowledge and sovereignty of Aboriginal and Torres Strait Islander peoples.<sup>31</sup> Culturally responsive engagement practices, such as Yarning, storytelling and Dadirri (deep listening), provide a rich and invaluable source of data<sup>32</sup> that could be used for developing culturally safe and responsive management strategies.

## Limitations and future directions

Aboriginal and Torres Strait Islander cultures are dynamic and not homogenous.<sup>22</sup> Cultural values, beliefs, and knowledge systems are not uniformly expressed across all groups, and therefore the findings of this research may not be generalisable to all First Nations communities. The management of MAFLD must avoid a one-size-fits-all approach and requires a more nuanced understanding of the impacts of the cultural determinants, in which information and leadership should come directly from First Nations peoples. Furthermore, the studies included in the research did not measure the degree to which First Nations peoples were involved and therefore may not completely reflect the lived experiences of Aboriginal and

Torres Strait Islander peoples’ perspectives of culture on health and wellbeing outcomes.

Building the capacity of Aboriginal Health Workers and Aboriginal Community Controlled Health Organisations (ACCHOs) to coordinate MAFLD awareness, screening and management in a culturally responsive way is required to manage the growing burden of MAFLD. We advocate for much-needed research in Aboriginal and Torres Strait Islander MAFLD management and leadership. The CDOH were found to have a significant impact on the health and wellbeing of First Nations peoples, specifically connection to Country, kinship and community, cultural identity and self-determination. Culturally safe and responsive health care, informed by the CDOH, is imperative for effective management of MAFLD among Aboriginal and Torres Strait Islander peoples. Management strategies must centre the voices and social realities of First Nations peoples at both individual and community levels to ensure priorities and needs are met. MAFLD is preventable, whilst culture is central and inseparable from health and wellbeing. Drawing on these strengths presents a powerful opportunity for the management of MAFLD among Aboriginal and Torres Strait Islander peoples.

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## Conflicts of interest

The authors have no competing interests to declare.

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## References

- Godoy-Matos AF, Silva Júnior WS, Valerio CM. NAFLD as a continuum: from obesity to metabolic syndrome and diabetes. *Diabetol Metab Syndrome* 2020; **12**(1):60–80.
- Farrell AM, Magliano DJ, Shaw JE, Thompson AJ, Croagh C, Ryan MC, et al. A problem of proportions: estimates of metabolic associated fatty liver disease and liver fibrosis in Australian adults in the nationwide 2012 AusDiab Study. *Sci Rep* 2022; **12**(1):1956–63.
- Eslam M, Newsome PN, Sarin SK, Anstee QM, Targher G, Romero-Gomez M, et al. A new definition for metabolic dysfunction-associated fatty liver disease: an international expert consensus statement. *J Hepatol* 2020; **73**(1):202–9.
- Mahady SE, Adams LA. Burden of non-alcoholic fatty liver disease in Australia. *J Gastroenterol Hepatol* 2018; **33**(Suppl 1):1–11.
- Roberts SK, Majeed A, Glenister K, Magliano D, Lubel JS, Bourke L, et al. Prevalence of non-alcoholic fatty liver disease in regional Victoria: a prospective population-based study. *Med J Aust* 2021; **215**(2):77–82.
- Younossi Z, Tacke F, Arrese M, Chander Sharma B, Mostafa I, Bugianesi E, et al. Global perspectives on nonalcoholic fatty liver disease and nonalcoholic steatohepatitis. *Hepatology* 2019; **69**(6):2672–82.
- Gofton C, George J. Updates in fatty liver disease: pathophysiology, diagnosis and management. *Aust J Gen Pract* 2021; **50**(10):702–7.
- Adams LA, Roberts SK, Strasser SI, Mahady SE, Powell E, Estes C, et al. Nonalcoholic fatty liver disease burden: Australia, 2019-2030. *J Gastroenterol Hepatol* 2020; **35**(9):1628–35.

9. George ES, Roberts SK, Nicoll AJ, Reddy A, Paris T, Itsiopoulos C, et al. Non-alcoholic fatty liver disease patients attending two metropolitan hospitals in Melbourne, Australia: high risk status and low prevalence. *Intern Med J* 2018; **48**(11):1369–76.
10. Tacke F, Puengel T, Loomba R, Friedman SL. An integrated view of anti-inflammatory and antifibrotic targets for the treatment of NASH. *J Hepatol* 2023; **79**(2):552–66.
11. Keating SE, Sabag A, Hallsworth K, Hickman IJ, Macdonald GA, Stine JG, et al. Exercise in the management of metabolic-associated fatty liver disease (MAFLD) in adults: a position statement from exercise and sport science Australia. *Sports Med* 2023; **53**(12):2347–71.
12. Younossi ZM, Zelber-Sagi S, Henry L, Gerber LH. Lifestyle interventions in nonalcoholic fatty liver disease. *Nat Rev Gastroenterol Hepatol* 2023; **20**(11):708–22.
13. Stine JG, Long MT, Corey KE, Sallis RE, Allen AM, Armstrong MJ, et al. Physical activity and nonalcoholic fatty liver disease: a roundtable statement from the American college of sports medicine. *Med Sci Sports Exerc* 2023; **55**(9):1717–26.
14. George ES, Forsyth A, Itsiopoulos C, Nicoll AJ, Ryan M, Sood S, et al. Practical dietary recommendations for the prevention and management of nonalcoholic fatty liver disease in adults. *Adv Nutr* 2018; **9**(1):30–40.
15. Kemp W, Clayton-Chubb D, Majeed A, Glenister KM, Magliano DJ, Lubel J, et al. Impact of renaming NAFLD to MAFLD in an Australian regional cohort: results from a prospective population-based study. *J Gastroenterol Hepatol* 2022; **37**(2): 395–403.
16. Valery PC, Clark PJ, Pratt G, Bernardes CM, Hartel G, Toombs M, et al. Hospitalisation for cirrhosis in Australia: disparities in presentation and outcomes for Indigenous Australians. *Int J Equity Health* 2020; **19**(1):27–38.
17. Wigg AJ, Narayana SK, Hartel G, Medlin L, Pratt G, Powell EE, et al. Hepatocellular carcinoma amongst aboriginal and Torres Strait Islander peoples of Australia. *EclinicalMedicine* 2021; **36**:100919–28.
18. Australian Institute of Health and Welfare. *Overweight and obesity: an interactive insight*. Canberra: Australian Institute of Health and Welfare; 2020.
19. Hayward KL, Johnson AL, Horsfall LU, Moser C, Valery PC, Powell EE. Detecting non-alcoholic fatty liver disease and risk factors in health databases: accuracy and limitations of the ICD-10-AM. *BMJ Open Gastroenterol* 2021; **8**(1):e000572.
20. Smith RL, Devine S, Preston R. Recommended methodologies to determine Australian Indigenous community members' perceptions of their health needs: a literature review. *Aust J Prim Health* 2020; **26**(2):95–103.
21. Salmon M, Doery K, Dance P, Chapman J, Gilbert R, Williams R, et al. *Defining the indefinable: descriptors of Aboriginal and Torres Strait Islander peoples' cultures and their links to health and wellbeing*. Canberra: Lowitja Institute; 2019.
22. Verbunt E, Luke J, Paradies Y, Bamblett M, Salamone C, Jones A, et al. Cultural determinants of health for Aboriginal and Torres Strait Islander people – a narrative overview of reviews. *Int J Equity Health* 2021; **20**(1):181–90.
23. Lovett R. Aboriginal and Torres Strait Islander community wellbeing identified needs for statistical capacity. In: Kukutai T, Taylor J, editors. *Indigenous data sovereignty. Toward an agenda*. 38. Canberra: ANU Press; 2016. p. 213–32.
24. Kanwal F, Shubrook JH, Younossi Z, Natarajan Y, Bugianesi E, Rinella ME, et al. Preparing for the NASH epidemic: a call to action. *Gastroenterology* 2021; **161**(3): 1030–42.
25. Tashkent Y, Olynk JK, Wigg AJ. Liver disease in aboriginal and Torres Strait Islander people. *Journal of the Australian Indigenous HealthInfoNet* 2022; **3**(4):1–29.
26. Chalasani N, Younossi Z, Lavine JE, Charlton M, Cusi K, Rinella M, et al. The diagnosis and management of nonalcoholic fatty liver disease: practice guidance from the American Association for the Study of Liver Diseases. *Hepatology* 2018; **67**(1):328–57.
27. Power T, East L, Gao Y, Usher K, Jackson D. A mixed-methods evaluation of an urban Aboriginal diabetes lifestyle program. *Aust N Z J Publ Health* 2021; **45**(2):143–9.
28. Wilson A, Wilson R, Delbridge R, Tonkin E, Palermo C, Coveney J, et al. Resetting the narrative in Australian aboriginal and Torres Strait Islander nutrition research. *Curr Dev Nutr* 2020; **4**(5). nzaa080-nzaa5.
29. Arabena K, Country Can't Hear English. *A guide supporting the implementation of cultural determinants of health and wellbeing with Aboriginal and Torres Strait Islander peoples*. Riddell's Creek. Victoria: Karabena Consulting; 2020.
30. Amarasena S, Clark PJ, Gordon LG, Toombs M, Pratt G, Hartel G, et al. Differences in the pattern and cost of hospital care between Indigenous and non-Indigenous Australians with cirrhosis: an exploratory study. *Intern Med J* 2022:1–9.
31. Tamwoy N, Rosas S, Davis S, Farthing A, Houghton C, Johnston H, et al. Co-design with aboriginal and Torres Strait Islander communities: a journey. *Aust J Rural Health* 2022; **30**(6):816–22.
32. Butler T, Gall A, Garvey G, Ngampromwongse K, Hector D, Turnbull S, et al. A comprehensive review of optimal approaches to co-design in health with First Nations Australians. *Int J Environ Res Publ Health* 2022; **19**(23):16166–204.
33. Kelly R, Hatzikirikiakidis K, Kuswara K. Inequities in obesity: indigenous, culturally and linguistically diverse, and disability perspectives. *Public Health Res Pract* 2022; **32**(3):e3232225–33.
34. Lee A, Ride K. Review of nutrition among aboriginal and Torres Strait Islander people. *Australian Indigenous HealthBulletin* 2018; **18**(1):1–48.
35. O'Dea K. Marked improvement in carbohydrate and lipid metabolism in diabetic Australian Aborigines after temporary reversion to traditional lifestyle. *Diabetes* 1984; **33**(6):596–603.
36. Harfield SG, Davy C, McArthur A, Munn Z, Brown A, Brown N. Characteristics of Indigenous primary health care service delivery models: a systematic scoping review. *Glob Health* 2018; **14**(1):12–23.
37. Gidgup MJR, Kickett M, Weselman T, Hill K, Coombes J, Ivers R, et al. Barriers and enablers to older Indigenous people engaging in physical activity - a qualitative systematic review. *J Aging Phys Activ* 2022; **30**(2):340–52.
38. Burgess CP, Johnston FH, Berry HL, McDonnell J, Yibarbuk D, Gunabarra C, et al. Healthy country, healthy people: the relationship between Indigenous health status and 'caring for country'. *Med J Aust* 2009; **190**(10):567–73.
39. Weir JK, Stacey C, Youngetob K. *The benefits associated with caring for country: literature review*. Canberra: Australian Institute of Aboriginal and Torres Strait Islander Studies; 2011.
40. Dahlberg EE, Hamilton SJ, Hamid F, Thompson SC. Indigenous Australians perceptions' of physical activity: a qualitative systematic review. *Int J Environ Res Publ Health* 2018; **15**(7):1492–505.
41. Si D, Bailie RS, Togni SJ, d'Abbs PH, Robinson GW. Aboriginal health workers and diabetes care in remote community health centres: a mixed method analysis. *Med J Aust* 2006 Jul 3; **185**(1):40–5.
42. Christidis R, Lock M, Walker T, Egan M, Browne J. Concerns and priorities of Aboriginal and Torres Strait Islander peoples regarding food and nutrition: a systematic review of qualitative evidence. *Int J Equity Health* 2021; **20**(1):220–39.
43. Arabena K, Country Can't Hear English. *A guide supporting the implementation of cultural determinants of health and wellbeing with Aboriginal and Torres Strait Islander peoples*. Riddell's Creek. Victoria: Karabena Consulting; 2020.

## Appendix A Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.anzjph.2024.100138>.