BMJ Global Health

Are adverse childhood experiences (ACEs) the root cause of the Aboriginal health gap in Australia?

Subash Thapa ,[1] Peter Gibbs,[2] Nancy Ross,[3] Jamie Newman,[4] Julaine Allan,[1] Hazel Dalton,[1] Shakeel Mahmood,[1] Bernd H Kalinna,[1] Allen G Ross[1]

To cite: Thapa S, Gibbs P, Ross N, *et al*. Are adverse childhood experiences (ACEs) the root cause of the Aboriginal health gap in Australia?*BMJ Glob Health* 2024;**9**:e014901. doi:10.1136/bmjgh-2023-014901

Handling editor Seye Abimbola

Received 23 December 2023
Accepted 4 February 2024

Check for updates

© Author(s) (or their employer(s)) 2024. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

[1]Rural Health Research Institute, Charles Sturt University, Orange, New South Wales, Australia
[2]Regional Enterprise Development Institute (REDI.E), Dubbo, New South Wales, Australia
[3]School of Social Work, Dalhousie University, Halifax, Nova Scotia, Canada
[4]Orange Aboriginal Medical Service, Orange, New South Wales, Australia

Correspondence to
Dr Subash Thapa;
suthapa@csu.edu.au

INTRODUCTION

Adverse childhood experiences (ACEs) encompass traumatic events that occur before the age of 18. There is a consensus among scholars that ACEs are broadly categorised into abuse, neglect, and household dysfunction, and further into 10 distinct subtypes (eg, physical abuse, emotional abuse, sexual abuse, physical neglect, emotional neglect, parent with mental illness, incarcerated relative/family members, parental substance abuse, mother treated violently and parental divorce).[1 2] ACEs pose a significant risk for further physical, mental, social and economic disadvantage. In many countries, a clear dose–response relationship exists between ACEs score and mental illness, addiction, poor diet, medication non-adherence, utilisation of health services and chronic morbidity throughout one's lifespan.[1 2]

During childhood, exposure to multiple ACEs is associated with delayed brain and cognitive development, impaired mental health, compromised academic performance and social-behavioural issues.[1] In later life, experiencing four or more ACEs is associated with risk behaviours including smoking, alcohol and drug use, sexual risk-taking, interpersonal and self-directed violence, and homelessness.[1 2] Consequently, individuals with higher ACEs scores are at an elevated risk of developing non-communicable diseases (NCDs), including cancers, circulatory diseases, chronic respiratory diseases and metabolic disorders in adulthood.[2]

The burden resulting from childhood abuse and/or neglect is significantly higher among specific sociodemographic groups. These groups include females, older age groups, individuals experiencing homelessness or residing in deprived neighbourhoods and certain ethnic groups.[3 4] Among Indigenous Australians, the trauma of historical events associated with colonisation and the stolen generation has been passed down to subsequent generations, potentially causing childhood adversities to become a common phenomenon. In the mid-1960s, Indigenous Australians experienced widespread deprivation and dispossession of virtually all their land. In 1993, the Australian Parliament passed 'The Native Title Act', which recognised the rights and interests of Aboriginal and Torres Strait Islander people with respect to land and waters according to their traditional laws and customs. However, the recognition of Aboriginal and Torres Strait Islander peoples' rights over their land and waters has been limited to smaller sections of Western Australia, the Northern Territory, and South Australia (figure 1). A 2006 survey found that 8% (26 900 individuals) of Australian Indigenous people aged 15 and older reported having had a history of being removed from their natural families,

SUMMARY BOX

⇒ Indigenous Australians face a two-fold likelihood of experiencing multiple adverse childhood experiences (ACEs) including neglect, physical, emotional and sexual abuse compared with the general Australian population.
⇒ The higher rate of ACEs among Indigenous Australians has consequentially led to the early diagnosis of chronic illnesses (eg, type II diabetes, cardiovascular disease and stroke), mental health issues (eg, anxiety, depression, suicide) and early death.
⇒ Strength-based approaches, which involve co-designed and Indigenous-led primary prevention programmes, as well as integrative ACE screening and treatment, will not only improve long-term public health outcomes but will also reduce healthcare costs and help close the Health Gap.
⇒ We believe ACEs are the root cause of the Aboriginal health gap in Australia.

BMJ Glob Health: first published as 10.1136/bmjgh-2023-014901 on 4 March 2024. Downloaded from http://gh.bmj.com/ on March 6, 2024 at Edith Cowan University. Protected by copyright.

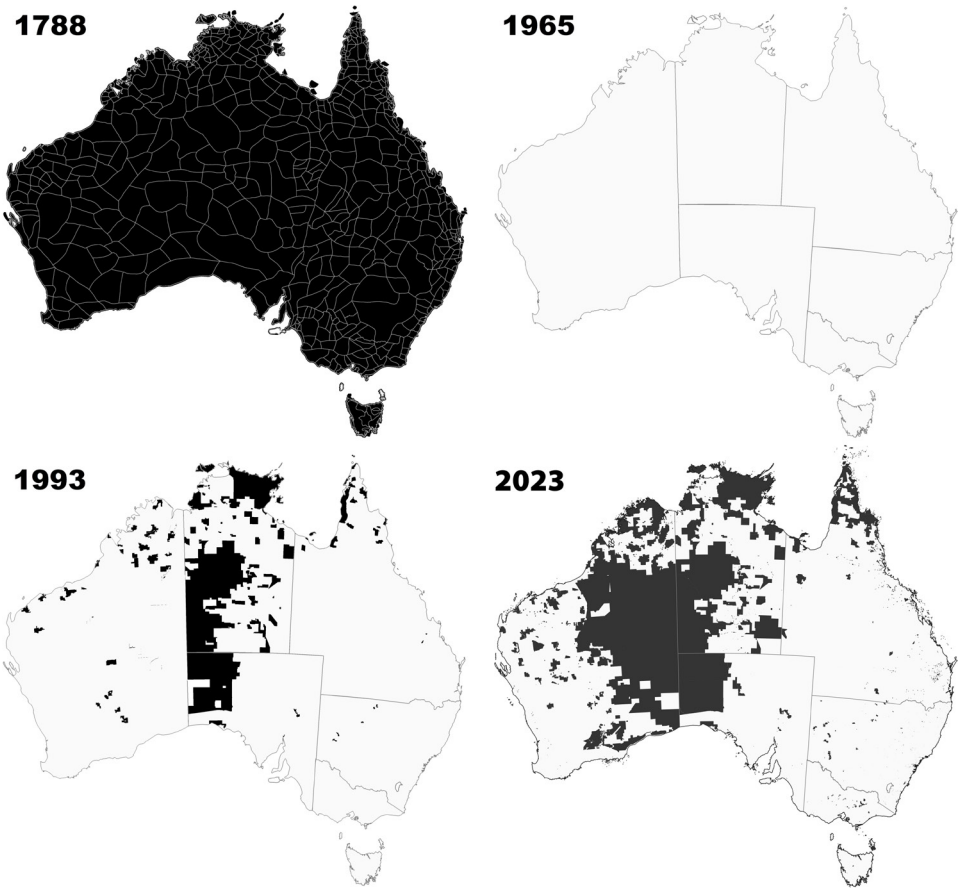

Figure 1 Altman and Markham map showing Aboriginal land in 1788, 1965, 1993 and 2023 (permission granted by Professor Jon Altman and Dr Francis Markham).

and 38% (127 775 individuals) mentioned having relatives (eg, parents and grandparents) experiencing family separation.[5]

In Australia, there exists a substantial health gap between Indigenous and non-Indigenous populations, associated with intergenerational trauma and decades of neglect and discrimination. In this perspective, we provide a contemporary update on the prevalence of ACEs within Indigenous Australians and discuss how the higher burden contributes to the Aboriginal health gap. We also discuss whether ACEs prevention policies and programmes may contribute to achieving the 'closing the gap' targets.[6 7]

ARE ACES THE ROOT CAUSE OF THE ABORIGINAL HEALTH GAP?

What is the Aboriginal health gap?

The 'Aboriginal health gap' refers to long-standing disparities between Australian Indigenous and non-Indigenous populations observed with various health indicators, including life expectancy, NCD prevalence, health service access, nutrition and overall well-being. This health gap translates to an approximate 8-year difference in life expectancy at the national level, while this is as high as 13 years in rural Northern Territory.[8] Additionally, the median age at death at the national level differed by at least 20 years (Australian General Population=81 years; Indigenous Australians=60 years).[9] Lifestyle and metabolic factors, mental illnesses and substance dependence are strongly linked to the increasing burden of NCDs and premature deaths among Indigenous Australians. Moreover, there continues to be a substantial difference in socioeconomic conditions, and healthcare access that further exacerbates the gaps.[10 11]

The Australian Institute of Health and Welfare's (2019) estimates reveal a consistent and substantial disparity in disease-specific age-standardised mortality rates for the leading causes of death between Indigenous and Non-Indigenous Australians (figure 2).[12] Indigenous Australians experience a 1.5-fold higher age-standardised mortality rate (229 per 100 000 people) for heart diseases and cancers compared with non-indigenous Australians (151 per 100 000 people), while for diabetes, this rate is 5-fold higher (74 per 100 000 compared with 16 per 100 000).[12] From 2006 to 2019, there was an annual average increase of 67 per 100 000 people in age-standardised mortality rates for Indigenous Australians, whereas non-Indigenous Australians experienced a decrease of 6 per 100 000 people during the same period.[12]

How do ACEs contribute to the Aboriginal health gap?

There is evidence demonstrating that psychological trauma or post-traumatic stress disorder can impact

BMJ Glob Health: first published as 10.1136/bmjgh-2023-014901 on 4 March 2024. Downloaded from http://gh.bmj.com/ on March 6, 2024 at Edith Cowan University. Protected by copyright.

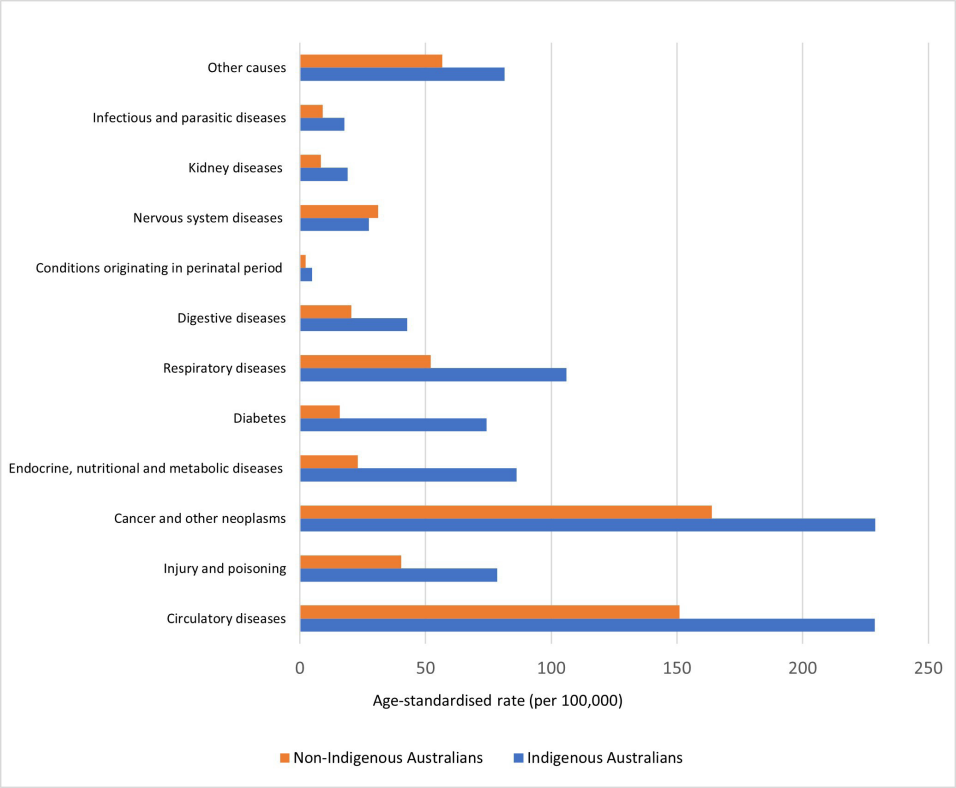

Figure 2 Causes of mortality by Indigenous status, 2015–2019. (Source: Australian Institute of Health and Welfare National mortality database).

the epigenetic composition of individuals and have both biological and behavioural consequences on the offspring of exposed individuals.[13] Possible epigenetic changes resulting from intergenerational trauma and increased childhood adversity among Australian Indigenous populations have not yet been confirmed by peer-reviewed evidence. Beyond genetic predisposition, the connection of intergenerational trauma and exposure to ACEs in Indigenous Australians is influenced by systemic racism resulting in overlapping economic deprivation, compromised family dynamics, poor physical and mental health, and substance dependence.[14 15]

Available studies suggest no substantial difference in the prevalence of at least one childhood trauma between Indigenous people (64%) and the general population (62%).[4 16–19] However, consensus among these studies indicates that Indigenous populations have a notably higher prevalence of multiple ACEs, including physical, sexual abuse and domestic violence, compared with the non-Indigenous population (table 1).[4 16–19]

Among Indigenous Australians, 64% experience four or more ACEs, while in the general population, this figure stands at 28%.[4] Nasir *et al* based on a clinic-based study among Indigenous Australians aged 18 years and older found the prevalence of physical abuse, sexual abuse and both types of abuse before the age of 15 at 17%, 15% and 23%, respectively. This is nearly twice the rates reported in the Australian general population according to the Australian Bureau of Statistics (2016), which were 8%, 9% and 13%, respectively.[16] Furthermore, neglect, housing instability (eg, homelessness and overcrowding) and parents with addiction are also prevalent, affecting as many as one in two Indigenous Australian children, whereas these issues are experienced by less than one in five in the general Australian children.[4 19] The variability in measurement, data sources and small sample sizes, however, hinders accurate estimation of national ACEs data or trends within Indigenous and general populations.

It is important to note that experiencing multiple ACEs and specific ACEs spectrum (eg, sexual and physical abuse), along with factors including age and frequency, have distinct implications for both physical and mental health outcomes, and early death.[18 20–22] Severe abuse and neglect before age 12 result in a nine-fold higher risk of self-harm and suicidal tendencies among Indigenous individuals compared with the general population without childhood adversities.[20] This partially explains the higher rates of suicide among Indigenous populations (5.7% of all deaths in 2019) compared with the non-Indigenous population (1.9%).[23] We believe ACEs are the root cause of the Aboriginal health gap in Australia.

What are the risk factors for ACEs exposure and poor health outcomes?

Certain Indigenous subpopulations, such as those residing in rural and remote areas (eg, Modified Monash Model 2–7),[24] those with early childhood trauma (before the age of 10), and those who have experienced sexual or physical abuse, face a higher risk of poor mental health

BMJ Glob Health: first published as 10.1136/bmjgh-2023-014901 on 4 March 2024. Downloaded from http://gh.bmj.com/ on March 6, 2024 at Edith Cowan University. Protected by copyright.

Table 1 ACEs spectrum by Indigenous status

	Indigenous population (%)	General population (%)
ACEs≥4	64.0	28.0
Abuse		
Physical abuse	17.3	8.5
Sexual abuse	14.6	7.7
Physical and sexual abuse	23.1	13.4
Neglect (physical and emotional)	52.5	18.0
Household dysfunction		
Parental mental illness†	–	33.0
Parental incarceration†	–	10.0
Parental substance abuse	52.2	24.0
Domestic violence	41.2	18.0
Parental divorce†	–	37.0
Housing instability	56.6	18.0

*Data sources: Prevalence rates for ACEs≥4 for Indigenous and general populations obtained from Wickramasinghe *et al*.[4] Prevalence rates for ACEs≥4, specifically abuse, for Indigenous populations obtained from Nasir *et al*,[16] and for the general population from the Australian Bureau of Statistics, 2016. Prevalence rates for all items under household dysfunction for the Indigenous population obtained from Twizeyemariya *et al*[19] and for the general population from Wickramasinghe *et al*.[4]
†Data for parental mental illness, divorce and incarceration for Indigenous populations not reported in original studies.
ACEs, adverse childhood experiences.

outcomes.[16 18] Despite the increased risk in rural areas, the reporting of childhood maltreatment and household dysfunction to child protection authorities is notably lower in rural regions when compared with urban areas.[25] Interestingly, previous studies revealed heightened risks of self-harm, suicidal tendencies and even fatalities among Indigenous individuals who have had contacts with the authorities or had hospitalisations.[20–22]

Working with different clusters of abused, neglected and ill children from Northern Territory, Roper *et al* came across an unexpected cluster of predominantly Aboriginal children who had low school attendance but good health and minimal contact with the child protection services.[18] The fact that some children have poor school attendance yet thrive in other aspects of life suggests that they are not in severe deficit but are acquiring a distinct set of skills and values (resilience characteristics) that differ from those conventionally taught and assessed in Western education.

Protective factors linked to Indigenous identity appear to provide resilience even in the presence of structural disadvantages, including poverty and crowded living conditions (figure 3). A study conducted among Canadian Indigenous communities demonstrated that Indigenous cultural identity and practices (eg, music, group singing and dancing) are associated with psychosocial resilience against ACEs-related outcomes.[26] The relevance of these findings to Australian Indigenous communities is due to contextual similarities with respect to Indigenous history and conflict in colonised countries.

WILL ACES PREVENTION HELP CLOSE THE GAP?

The National Agreement on Closing the Gap and the Australian National Preventive Health Strategy 2021–2030 underscore the importance of achieving health equity by increasing healthy lifespans of Indigenous peoples by an additional 3 years by 2030.[6 7] The 2020 updated National Agreement on Closing the Gap contains 17 national targets, 3 of which are relevant to this discussion: (a) Aboriginal and Torres Strait Islander children are not over-represented in the child protection system; (b) Aboriginal and Torres Strait Islander children thrive in their early years and (c) Aboriginal and Torres Strait Islander children are engaged in high quality, culturally appropriate early childhood education in their early years.

In Australia, ACE prevention has the potential to substantially reduce healthcare demands and associated costs which is estimated at $A6.8 billion annually.[27 28] Continuing current Aboriginal-led or codesigned prevention programmes, investing in research and developing culturally tailored preventive initiatives based on a strength-based approach present strategic opportunities to not only reduce healthcare costs but also enhance long-term public health outcomes. Prevention and early intervention for mental health and well-being have been emphasised and a commitment has been made to raise investments in preventive health to 5% of the total health expenditure by 2030. However, given the current progress on 'closing the gap' achieving Aboriginal health and life expectation equality by 2030 appears unlikely.[12] We believe a substantial reduction in ACE prevalence among Indigenous children will narrow the health gap.

What ACEs prevention strategies are implemented?

In Australia, population-wide programmes, including Family Well-being Programmes, Childcare and Early Education, and Child Welfare Programmes, have been implemented for approximately three decades, targeting the general population. The Family Well-being programme has been tested among Indigenous communities and shown to have positive effects on preventing family violence and improving school attendance rates, as well as health behaviours, including reduced rates of smoking, heavy drinking and substance use.[29] However, evaluation of social security programmes including financial assistance (JobSeeker Payment, Child Support Scheme) has had mixed benefit in the Northern Territory.[30] Monetary assistance programmes were associated with an increased alcohol and substance use in Indigenous

BMJ Glob Health: first published as 10.1136/bmjgh-2023-014901 on 4 March 2024. Downloaded from http://gh.bmj.com/ on March 6, 2024 at Edith Cowan University. Protected by copyright.

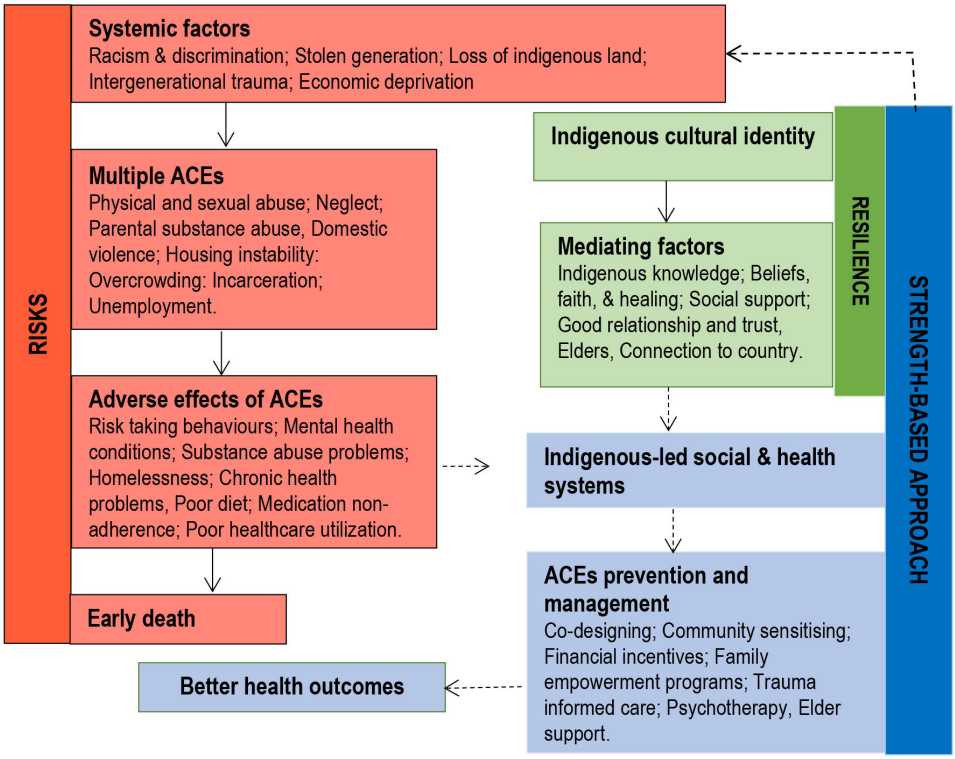

Figure 3 Framework for ACE-specific risks and resilience factors among Indigenous Australians. (Solid arrows confirm established associations; dotted arrows suggest observations yet to be verified by scientific literature.) ACEs, adverse childhood experiences.

families.[24] Other population-wide programmes, including Housing Support Programmes to improve the well-being of Aboriginal families and communities, lacked systematic evaluation to assess their impact on increasing family well-being and preventing ACEs.[31]

At the community level, benefits of involving Indigenous parents in codesigning programme strategies are increasingly recognised in the last decade and looks promising for ACEs prevention. Williams *et al* found that a parent support programme (parental playgroup participation) holds significant potential for reaching and engaging Indigenous families and children in home learning activities, especially in remote areas.[32] In 2016, the Queensland Police Service implemented a community sensitisation programme called 'Speak Up Be Strong Be Heard' in 26 Indigenous communities. This programme received positive feedback from participants and led to a substantial increase in child maltreatment reporting.[33] Short-term education and counselling programmes, including school-based programmes, community healing, mobile outreach and family-based counselling, have been implemented in specific regions.[34] Yet, there is a scarcity of peer-reviewed evidence regarding the effectiveness of these community codesigned programmes, particularly for Indigenous Australians. The absence of evidence may reflect the unequal power dynamics in Australia's academic and government structures, which influence the established narratives about what is effective and what is not.

Secondary prevention strategies, focused on individuals affected, including pharmacological interventions, psychotherapeutic treatments and trauma-informed care, have demonstrated promising outcomes in enhancing communication and alleviating symptoms of trauma and mental illnesses in general populations.[35] However, enrolment in screening and treatment programmes within Indigenous Communities remains notably low due to stigma and mistrust in mainstream service providers and government-run agencies.[36 37] It is unclear what a strength-based, trauma-informed approach for the treatment and management of ACEs and comorbid mental health problems would look like. Additionally, how it will promote active engagement among Indigenous patients, families and healthcare providers as part of trauma-informed care and ensure continuity of care remains uncertain.

What health policy and programme gaps exist?

The National Preventive Health Strategy 2021–2030 acknowledges the role of culture in healing intergenerational trauma among Indigenous people and preventing its future impact.[6] Despite this, there is a lack of political discourse on strategies for achieving this goal. The recent Australians' rejection of the Indigenous Voice in constitutional vote also indicates continuing structural injustice towards Indigenous Australians.[38] The current programmatic approaches to addressing challenges within Australian Indigenous communities will

BMJ Glob Health: first published as 10.1136/bmjgh-2023-014901 on 4 March 2024. Downloaded from http://gh.bmj.com/ on March 6, 2024 at Edith Cowan University. Protected by copyright.

have limited impact unless accompanied by a significant focus on understanding and addressing structural factors, including intergenerational trauma (figure 3). Therefore, policies and programmes aimed at 'closing the health gap' strategy should first reduce the burden of the intergenerational trauma and ACEs to address the health inequities.[7]

Existing strategies to prevent ACEs lack a specific focus on engaging and giving ownership of the programmes to Indigenous populations, especially those in rural and remote areas of Australia. Only a few strength-based approaches (eg, trust building, policies for equitable job conditions, healthcare professions education) to mitigate system-level challenges that influence the Aboriginal Health gap have been documented.[37 39–41] However, these strength-based approaches tend to focus more on resilience (eg, skills, attitudes, norms, practices) rather than socioecological factors that contribute to the Aboriginal health gap on a broader spectrum.[39 40 42]

Strength-based approaches that consider structural factors (eg, racism, poverty, intergenerational trauma) would contribute to increased resilience and empowerment, and facilitate culturally tailored ACE prevention, and management in an Indigenous context, considering the structural inequalities surrounding Indigenous people (figure 3).[32 39 42] It is crucial for the Commonwealth and state governments to invest in the well-being of Indigenous children and families by implementing comprehensive, multilevel, population-based approaches to enhance the resources available to Indigenous parents for raising children. These approaches should ensure that Indigenous Australians have ownership of policy decisions, design and implement programmes at all levels and lead research initiatives.[43] Indigenous-led institutions (eg, Regional Enterprise Development Institute, Dubbo, Orange Aboriginal Medical Services) and Indigenous Health Providers are generally community embedded and designed to meet local needs.[44]

What evidence gaps exist?

As recommended by the Centers for Disease Control and Prevention (USA), the first step in ACE prevention is to establish national ACE surveillance to gather evidence on the scope of the issue, and when and where ACEs occur, and to evaluate effectiveness of prevention measures.[45] The First National Children's Mental Health and Well-being Strategy in Australia has also highlighted the absence of regular national data collection or reporting on children's overall mental health and well-being.[46] In the relatively few studies on ACEs in Australia, evidence on the prevalence and impacts of ACEs in Indigenous populations originates from either underpowered, urban clinic-based studies or studies relying on linked administrative and health data (eg, data on child protection services).[4 16 20] This underscores the essential requirement for systematic approaches to effectively gather and analyse population-based ACEs data, especially within Indigenous and rural and remote communities.

One challenge with respect to universalising ACE screening is that, without effective interventions and responses in place for those with multiple ACEs and comorbid mental health conditions, the screening might lead to more negative outcomes and incur additional costs.[47] Strategies for managing ACE, including early treatment and support, have also emerged in recent years; however, there is mixed evidence for their effectiveness.[48–50] It is still unclear whether evidence-based interventions for high ACE scores, including more harmful spectrums and comorbid conditions, are available.

While existing Australian studies provide partial insights into both protective and risk factors linked to ACEs, they fall short of providing a comprehensive understanding of vulnerability and resilience. Despite the devastating impact of colonisation and the 'stolen generation', many Indigenous individuals and families have prospered in their daily lives. The concept of socioecological resilience of Indigenous communities (eg, connectedness and cultural identity) against childhood trauma and its harmful effects is a subject of investigation, from a strength-based approach.[51 52] Bridging this evidence gap is crucial for creating interventions tailored to the culture and context. Moreover, it is imperative to share knowledge between Indigenous communities, policy-makers and service managers about how existing social practices and structures contribute to increased ACEs among Indigenous Australians.[40 52 53] Because intergenerational trauma and childhood trauma can lead to severe and enduring effects, recovery can only be facilitated through culturally and contextually appropriate interventions grounded in the most current evidence.

CONCLUSIONS

A significant healthcare disparity persists between Indigenous and non-Indigenous Australians, rooted in intergenerational trauma, decades of neglect and discrimination. This trauma can have both biological and behavioural consequences on the offspring of exposed individuals. The interplay between intergenerational trauma and ACEs is further exacerbated by economic hardship, strained family dynamics, physical and mental health challenges, as well as substance use. Indigenous Australians face twice the likelihood of encountering multiple ACEs, including physical and sexual abuse, neglect and economic hardship. This increased exposure leads to elevated rates of chronic illnesses, mental health conditions, suicidal ideation and mortality compared with the general population.

The solution to bridging this health gap lies in prioritising ACE prevention strategies that are based on a strength-based approach, culturally safe and codesigned with Indigenous communities. Such an approach will not only lead to long-term public health outcomes but also reduces healthcare costs, aligning seamlessly with the overarching 'closing the gap strategy'. We believe

BMJ Glob Health: first published as 10.1136/bmjgh-2023-014901 on 4 March 2024. Downloaded from http://gh.bmj.com/ on March 6, 2024 at Edith Cowan University. Protected by copyright.

ACEs are the root cause of the Aboriginal health gap in Australia.

AUTHORS' POSITIONALITY

PG and JN both serve as chief executive officers of two Aboriginal-led health institutions and are Indigenous community leaders. Additionally, JN holds a membership position on the Aboriginal Health and Medical Research Council. All the authors of this paper share a commitment to fostering good relations with Indigenous peoples. The purpose of this paper is to highlight gaps in policies, programmes and research that act as barriers to achieving the 'closing the gap' strategy. We aim to do so in partnership with Indigenous peoples, working towards advancing health equity and closing the health gaps through strengths-based approaches.

Contributors ST and AGR conceived the idea and conducted the literature review. ST extracted the data and wrote the first draft of the manuscript, which was critically revised by PG, NR, JN, JA, HD, SM and BK. PG and JN, who are Indigenous community leaders and the CEOs of two Indigenous-led health institutions, revised the manuscript, focusing on improving cultural sensitivity, methodological appropriateness, respect for cultural values, and ensuring ethical considerations. All authors approve the final version.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Map disclaimer The depiction of boundaries on this map does not imply the expression of any opinion whatsoever on the part of BMJ (or any member of its group) concerning the legal status of any country, territory, jurisdiction or area or of its authorities. This map is provided without any warranty of any kind, either express or implied.

Competing interests None declared.

Patient consent for publication Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement The commentary does not present new data. Sources for data cited are available in the references provided.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: http://creativecommons.org/licenses/by-nc/4.0/.

ORCID iD

Subash Thapa http://orcid.org/0000-0002-1182-8511

REFERENCES

1 Bellis MA, Hughes K, Ford K, *et al*. Life course health consequences and associated annual costs of adverse childhood experiences across Europe and North America: a systematic review and meta-analysis. *Lancet Public Health* 2019;4:e517–28.
2 Felitti VJ, Anda RF, Nordenberg D, *et al*. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: the adverse childhood experiences (ACE) study. *Am J Prev Med* 1998;14:245–58.
3 Liu M, Luong L, Lachaud J, *et al*. Adverse childhood experiences and related outcomes among adults experiencing homelessness: a systematic review and meta-analysis. *Lancet Public Health* 2021;6:e836–47.
4 Wickramasinghe YM, Raman S, Garg P, *et al*. Burden of adverse childhood experiences in children attending Paediatric clinics in South Western Sydney, Australia: a retrospective audit. *BMJ Paediatr Open* 2019;3:e000330.
5 Australian Bureau of Statistics. 4704.0-the health and welfare of Australia's aboriginal and Torres Strait Islander peoples. 2008.
6 Department of Health. *National preventive health strategy 2021–2030*. Commonwealth of Australia Canberra, 2021.
7 Productivity Commission. Review of the National agreement on closing the gap: draft report. 2023.
8 Zhao Y, Li SQ, Wilson T, *et al*. Improved life expectancy for indigenous and non-indigenous people in the Northern territory, 1999-2018: overall and by underlying cause of death. *Med J Aust* 2022;217:30–5.
9 Based on Public Health Information Development Unit (PHIDU). *Torrens University Australia material from: Social Health Atlas of Australia: Population Health Areas (online). In: University T, editor. Adelaide, Australia*. 2018.
10 Markwick A, Ansari Z, Sullivan M, *et al*. Inequalities in the social determinants of health of aboriginal and Torres Strait Islander people: a cross-sectional population-based study in the Australian state of Victoria. *Int J Equity Health* 2014;13:91.
11 Thapa S, Ahmed KY, Ross AG. Beyond Statistics: health inequities in rural and remote communities of Australia. *Lancet Public Health* 2023;8:S2468-2667(23)00246-3.
12 Australian Institute of Health and Welfare. Aboriginal and Torres Inslander health performance framework. data visualization. measures 1.23 leading causes of mortality. *AIHW* 2022. Available: https://www.indigenoushpf.gov.au/measures/1-23-leading-causes-mortality/data#DataVisualisation
13 Youssef NA, Lockwood L, Su S, *et al*. The effects of trauma, with or without PTSD, on the Transgenerational DNA methylation alterations in human Offsprings. *Brain Sci* 2018;8:83.
14 Centers for Disease Control and Prevention (CDC). *About the CDC-Kaiser ACE Study*. 2020.
15 Kairuz CA, Casanelia LM, Bennett-Brook K, *et al*. Impact of racism and discrimination on physical and mental health among aboriginal and Torres Strait Islander peoples living in Australia: a systematic Scoping review. *BMC Public Health* 2021;21:1302.
16 Nasir BF, Black E, Toombs M, *et al*. Traumatic life events and risk of post-traumatic stress disorder among the indigenous population of regional, remote and metropolitan central-Eastern Australia: a cross-sectional study. *BMJ Open* 2021;11:e040875.
17 Higgins DJ, Mathews B, Pacella R, *et al*. The prevalence and nature of multi-type child Maltreatment in Australia. *Med J Aust* 2023;218 Suppl 6:S19–25.
18 Roper L, He VY, Perez-Concha O, *et al*. Complex early childhood experiences: characteristics of Northern territory children across health, education and child protection data. *PLoS One* 2023;18:e0280648.
19 Twizeyemariya A, Guy S, Furber G, *et al*. Risks for mental illness in indigenous Australian children: A descriptive study demonstrating high levels of vulnerability. *Milbank Q* 2017;95:319–57.
20 Leckning B, He VYF, Condon JR, *et al*. Patterns of child protection service involvement by aboriginal children associated with a higher risk of self-harm in adolescence: A retrospective population cohort study using linked administrative data. *Child Abuse & Neglect* 2021;113:104931.
21 Segal L, Doidge J, Armfield JM, *et al*. Association of child Maltreatment with risk of death during childhood in South Australia. *JAMA Netw Open* 2021;4:e2113221.
22 Moore E, Gaskin C, Indig D. Attempted suicide, self-harm, and psychological disorder among young offenders in custody. *J Correct Health Care* 2015;21:243–54.
23 Martin G, Lovelock K, Stevenson B. An overview of indigenous mental health and suicide prevention in Australia. 2023.
24 Versace VL, Skinner TC, Bourke L, *et al*. National analysis of the modified Monash model, population distribution and a socio-economic index to inform rural health workforce planning. *Aust J Rural Health* 2021;29:801–10.
25 Kerr J. A descriptive analysis of the characteristics, seriousness and frequency of aboriginal intimate partner violence in the Northern territory, Australia: a strategy for targeting high harm cases'. unpublished masters thesis. Oxford, UK, Oxford University, 2016
26 Chandler MJ, Lalonde CE. Cultural continuity as a protective factor against suicide in first nations youth. *Horizons* 2008;10:68–72.
27 Adults Surviving Child Abuse (ASCA). The cost of unresolved childhood trauma and abuse in adults in Australia. 2015.
28 Pacella R, Nation A, Mathews B, *et al*. Child Maltreatment and health service use: findings of the Australian child Maltreatment study. *Med J Aust* 2023;218 Suppl 6:S40–6.
29 Williamson LM, Baird L, Tsey K, *et al*. Exposure to the family wellbeing program and associations with empowerment, health, family and cultural wellbeing outcomes for aboriginal and Torres Strait Islander peoples: a cross-sectional analysis. *BMC Public Health* 2023;23:1569.

BMJ Glob Health: first published as 10.1136/bmjgh-2023-014901 on 4 March 2024. Downloaded from http://gh.bmj.com/ on March 6, 2024 at Edith Cowan University. Protected by copyright.

30 Bray JR, Gray M, Hand K, *et al*. Compulsory income management in the Northern territory–evaluating its impact. *Aust J Social Issues* 2015;50:373–96. 10.1002/j.1839-4655.2015.tb00356.x Available: https://onlinelibrary.wiley.com/toc/18394655/50/4
31 Reavley N, Morgan A, Bee M, *et al*. Summary of interventions to prevent adverse childhood experiences and reduce their negative impact on children's mental health: an evidence based review. 2020.
32 Williams KE, Berthelsen D, Viviani M, *et al*. Participation of Australian aboriginal and Torres Strait Islander families in a parent support programme: longitudinal associations between Playgroup attendance and child, parent and community outcomes. *Child Care Health Dev* 2017;43:441–50.
33 Carrington A, Dewar S, Kinchin I, *et al*. A police-led community response to child abuse and youth sexual violence and abuse in indigenous communities in far north Queensland: "speak up. *Child Abuse Negl* 2019;98:S0145-2134(19)30405-3.
34 Atkinson J. Trauma-informed services and trauma-specific care for indigenous Australian children. 2013.
35 Beckett P, Holmes D, Phipps M, *et al*. Trauma-informed care and practice: practice improvement strategies in an inpatient mental health ward. *J Psychosoc Nurs Ment Health Serv* 2017;55:34–8.
36 Goodman A, Fleming K, Markwick N, *et al*. They treated me like crap and I know it was because I was native": the Healthcare experiences of aboriginal peoples living in Vancouver's inner city. *Soc Sci Med* 2017;178:87–94.
37 Topp SM, Tully J, Cummins R, *et al*. Building patient trust in health systems: A qualitative study of Facework in the context of the aboriginal and Torres Strait Islander health worker role in Queensland, Australia. *Soc Sci Med* 2022;302:S0277-9536(22)00290-8.
38 Cox R. n.d. Political legitimacy and the indigenous voice to Parliament. *J Applied Philosophy*
39 McKenzie HA, Dell CA, Fornssler B. Understanding Addictions among indigenous people through social determinants of health frameworks and strength-based approaches: a review of the research literature from 2013 to 2016. *Curr Addict Rep* 2016;3:378–86.
40 Maher N. Decolonising health promotion in an indigenous context: deadly choices using a strengths-based approach to empower indigenous people to become health promoters themselves [student thesis]. 2022.
41 Kennedy A, Sehgal A, Szabo J, *et al*. Indigenous strengths-based approaches to Healthcare and health professions education – recognising the value of elders' teachings. *Health Educ J* 2022;81:423–38.
42 Zimmerman MA. Resiliency theory: a strengths-based approach to research and practice for adolescent health. *Health Educ Behav* 2013;40:381–3.
43 Chamberlain C, Gee G, Brown SJ, *et al*. Healing the past by Nurturing the future-Co-designing perinatal strategies for aboriginal and Torres Strait Islander parents experiencing complex trauma: framework and protocol for a community-based Participatory action research study. *BMJ Open* 2019;9:e028397.
44 Campbell MA, Hunt J, Scrimgeour DJ, *et al*. Contribution of aboriginal community-controlled health services to improving aboriginal health: an evidence review. *Aust Health Review* 2018;42:218.
45 Centers for Disease Control and Prevention (CDC). Preventing adverse childhood experiences: Leveraging the best available evidence. 2019.
46 National Mental Health Commission. National children's mental health and wellbeing strategy. Royal exchange NSW 1225. 2021.
47 Finkelhor D. Screening for adverse childhood experiences (aces): cautions and suggestions. *Child Abuse & Neglect* 2018;85:174–9.
48 Pearce J, Murray C, Larkin W. Childhood adversity and trauma: experiences of professionals trained to routinely enquire about childhood adversity. *Heliyon* 2019;5:e01900.
49 Sanders MT, Welsh JA, Bierman KL, *et al*. Promoting resilience: A preschool intervention enhances the adolescent adjustment of children exposed to early adversity. *Sch Psychol* 2020;35:285–98.
50 Lee SC, Rawlings MA. Healing from trauma through Psychoeducation: understanding young adult client group experiences. *Soc Work Groups* 2022;46:20.
51 Ungar M. The social Ecology of resilience: addressing Contextual and cultural ambiguity of a nascent construct. *Am J Orthopsychiatry* 2011;81:1–17.
52 Usher K, Jackson D, Walker R, *et al*. Indigenous resilience in Australia: A Scoping review using a reflective Decolonizing collective dialogue. *Front Public Health* 2021;9:630601.
53 Radford A, Toombs E, Zugic K, *et al*. Examining adverse childhood experiences (aces) within indigenous populations: a systematic review. *Journ Child Adol Trauma* 2022;15:401–21.

BMJ Glob Health: first published as 10.1136/bmjgh-2023-014901 on 4 March 2024. Downloaded from http://gh.bmj.com/ on March 6, 2024 at Edith Cowan University. Protected by copyright.