

Mapping Aboriginal and Torres Strait Islander maternal and infant health programs and services in Victoria, Australia

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ABSTRACT

Background. In Victoria, Aboriginal maternal and infant health services are funded by the Victorian Government with coordination led by the Victorian Aboriginal Community Controlled Health Organisation (VACCHO). This research aims to compare the distribution of these services with the Aboriginal infant population across all local government areas (LGAs) of Victoria and identify gaps in service availability. **Method.** Statewide mapping of Aboriginal maternal and infant health services in Victoria was undertaken in 2023, and Aboriginal and Torres Strait Islander population data for each LGA in Victoria were sourced from the 2021 Australian Bureau of Statistics Census. Data relating to the geographical location of Aboriginal-specific maternal and infant health services were collected from the websites of VACCHO and the Victorian Department of Health. These data were geocoded and overlaid onto LGAs using a geographical mapping software program. Data were analysed via SPSS, a statistical analysis program. **Results.** There was considerable variation in the availability of Aboriginal-specific maternal and infant health services across both metropolitan and regional areas of Victoria. Only 21 of 79 (27%) Victorian LGAs offered Aboriginal-specific services in either pregnancy or early childhood, and 12 (15%) offered continuity of care throughout pregnancy and early childhood specifically for Aboriginal families. Twenty-seven out of 79 (34%) LGAs offered no specific Aboriginal maternal and infant services. However, the median population of Aboriginal infants in LGAs with some services was significantly higher than in LGAs offering no services (81.0 vs 19.5, $P < 0.001$). Seven of the 16 LGAs (43%) with >100 Aboriginal infants had no specific Aboriginal maternal and infant health service. **Conclusion.** Aboriginal-specific maternal and infant health services have been addressing the healthcare needs of Aboriginal families across Victoria since their inception. There does, however, need to be further targeted investment in Aboriginal Community Controlled Health Organisations so that developing communities within Victoria can access continuity of maternal and infant healthcare across the perinatal periods to improve the overall health of future generations of Aboriginal children and families.

Keywords: ethnicity, infant, pregnancy, programs.

KEY POINTS

- We mapped the availability of Aboriginal maternal and infant health services in Victoria and compared their distribution against the Aboriginal and Torres Strait Islander population.
- We identified gaps in Aboriginal early years health service provision in both urban and regional locations.
- Some areas with a high population of Aboriginal infants offer no Aboriginal-specific services.
- Few LGAs offer continuity of Aboriginal-specific services across pregnancy and the early childhood period.

Introduction

Before colonisation, Aboriginal and Torres Strait Islander people thrived on a balanced relationship with the land, sea and waterways, adapting to the environment and enabling strong, thriving peoples and cultures.¹ Colonisation, including forced child removal and

disruption of traditional food systems, interrupted this balance, resulting in detrimental health outcomes.² Contemporary manifestations of colonisation include shorter life expectancy, infectious and chronic diseases, mental health disorders and substance dependence.¹ Experiences of racism and state-sanctioned child removal have led to widespread mistrust among Aboriginal people towards mainstream institutions, including health services.³ This article will respectfully use the term 'Aboriginal' when referring to the First Peoples of mainland Australia.

Aboriginal Community Controlled Health Organisations (ACCHOs) were established in the 1970s to respond to unmet primary health care needs for Aboriginal communities. The first ACCHO was founded in Sydney in 1971, followed by the Victorian Aboriginal Health Service in Melbourne in 1973. Since then, the sector has progressively grown to 145 ACCHOs in over 550 sites.⁴ In Victoria, the Victorian Aboriginal Community Controlled Health Organisation (VACCHO) is the peak body for ACCHOs, supporting 33 member ACCHOs and advocating for better health for Aboriginal communities.⁵ A priority for VACCHO is supporting health in the early years of life for Aboriginal families.⁵ In 2021 there were 4144 Aboriginal infants (aged 0–2 years) in Victoria, equivalent to 6% of the Victorian Aboriginal population.⁶

Ensuring a healthy start to life is vital for establishing health throughout life and strengthening future generations.^{1–3} In Australia, healthy birthweights and early childhood development are key priorities within the Closing the Gap agenda, agreed by all levels of government and the ACCHO sector.⁷ The National Aboriginal and Torres Strait Islander Early Childhood Strategy prioritises healthy births, early childhood development, connection to culture, safe and supporting environments, and contribution to better service systems.⁸ Therefore, the provision of maternal and infant healthcare by ACCHOs, grounded in community and culture, is essential for Aboriginal and Torres Strait Islander families.

Education about and support for pregnancy, breastfeeding, nutrition, oral health, active play and sleep are essential components of comprehensive maternal and infant healthcare to support healthy growth and development.^{1–3} A recent review found that having access to culturally appropriate infant health services was a key determinant of infant feeding decisions for Aboriginal and Torres Strait Islander families.⁹ In Victoria, Maternal and Child Health (MCH) Services are funded by the state government as a 'universal' primary health service for all Victorian families with children from birth to 3.5 years. MCH nurses provide 10 key 'age and stage' visits including growth monitoring and provision of information and support.⁷ Evidence suggests some Aboriginal families are concerned about racism and cultural safety and do not feel comfortable attending mainstream MCH services.⁸ Consequently, engagement with MCH services is lower for Aboriginal families than for other Victorian families. For example, at 12 months, 67.5% of Victorian Aboriginal families attend the scheduled MCH visit, compared with 83.4% of non-Aboriginal families.⁷

Thus, many Aboriginal families may be missing out on growth assessment and important support for various health issues.

Maternal and infant services for Aboriginal and Torres Strait Islander families differ across the country, with each state unique in its policy context. For example, in 14 sites across the country with one located in Victoria, ACCHOs work in partnership with the Australian Nurse-Family Partnership Program to deliver maternal and infant services through a nurse-home visiting model.¹⁰ Two examples of Aboriginal-specific services in Victoria are Koori Maternity Services (KMS) and the Aboriginal Maternal and Child Health (Aboriginal MCH) Initiative. Both are funded by the Victorian Department of Health with coordination provided by VACCHO. These Aboriginal-specific services are designed to meet the specific cultural and healthcare needs of Aboriginal families. Similar maternal and infant health programs are provided in other states, such as the Aboriginal Maternal and Infant Health Service in New South Wales and the Apunapima Baby One program in Far North Queensland, which have demonstrated improvements in the provision of antenatal and postnatal care for Aboriginal babies.^{11–13}

KMS provide care for Aboriginal mothers from conception to around 6 weeks postpartum. The service is usually delivered at an ACCHO (three within public hospitals), with services delivered by a midwife in partnership with an Aboriginal health worker.^{14,15} The Aboriginal MCH initiative was established in response to advocacy from VACCHO to provide MCH nurses for Aboriginal families at certain ACCHOs. Both KMS and Aboriginal MCH provide the same level of staffing to funded services regardless of population size. Although these Aboriginal-specific services provide a culturally safe alternative to mainstream health services, they are not available in all communities; thus, not all Aboriginal families have access to culturally appropriate maternal and infant healthcare. To inform future Aboriginal and Torres Strait Islander maternal and infant health service planning in Victoria, it is important to understand the geographical distribution of Aboriginal-specific maternal and infant services across Victoria in relation to the Aboriginal infant population. Mapping studies can be a useful method for evaluating the availability and location of services and have been undertaken internationally¹⁶ and within Australia;¹⁷ however, no mapping studies have focused specifically on Aboriginal and Torres Strait Islander maternal and infant health.

Therefore, the aim of this study was to compare the distribution of Aboriginal-specific services for maternal and infant healthcare with the Aboriginal infant population across all local government areas (LGAs) of Victoria and identify gaps in service availability.

Methods

Positionality statement

This research was led by a Mununjali woman (FM) as part of a PhD project supported by a team comprising non-Aboriginal

nutrition and public health researchers (RL, PL, JB, VV). The lead researcher (FM) has extensive experience working in Aboriginal health in communities around Australia. Her standpoint is firmly grounded in Aboriginal kinship systems that transcend Western views of conventional family structures. Her Aboriginality was central to the research process.

Data collection and analysis

A mapping study was undertaken to identify Aboriginal-specific maternal and infant health services available for Aboriginal families in Victoria during the first 1000 days of life (conception to age 2 years). Population data from the 2021 Census were sourced from the Australian Bureau of Statistics (ABS) website, including the total number of Aboriginal and Torres Strait Islander people and number of Aboriginal infants (aged 0–2 years) in each Victorian LGA. Data on the availability and geographical location of Aboriginal-specific maternal and infant health services (e.g. KMS and Aboriginal MCH) were collected by FM from the maternity and early years page of the VACCHO website¹⁸ and the early years hub page of the Victorian Department of Health.¹⁹ Both websites provide a list of Aboriginal-specific service providers. Service information was gathered between February and June 2023, cross-checked for accuracy by JB and confirmed through consultation with the VACCHO early years team to ensure geographic service locations were current. All data (service name and address) were publicly available; hence the study was exempt from ethics review. Population and service location data (including x, y coordinates) were

entered into Microsoft Excel and uploaded into the Aeronautical Reconnaissance Coverage Geographic System (ArcGIS), a geographical mapping program.^{20,21}

Statistical analysis

Data on the population of Aboriginal infants in each LGA and the existence of Aboriginal-specific maternal and infant health services (pregnancy service, postnatal service or both) were imported into SPSS (version 29). Services were coded as a pregnancy service, postnatal service or both (providing continuity of care across the perinatal period). The Mann–Whitney *U* Test was used to compare the median population of Aboriginal infants in two groups of LGAs: (1) LGAs with either an Aboriginal-specific pregnancy service or Aboriginal MCH service or both (coded as ‘any service’), and (2) no Aboriginal-specific maternal and infant health services (coded as ‘no service’).

Results

Of the 79 Victorian LGAs, 21 (27%) offered Aboriginal-specific services in either pregnancy or maternal child health, and 12 (15%) offered both, providing continuity of Aboriginal-centred care throughout the first 1000 days. Figs 1 and 2 provide maps of services across regional and metropolitan LGAs, shaded according to the Aboriginal infant population. The maps indicate the location of ACCHOs and

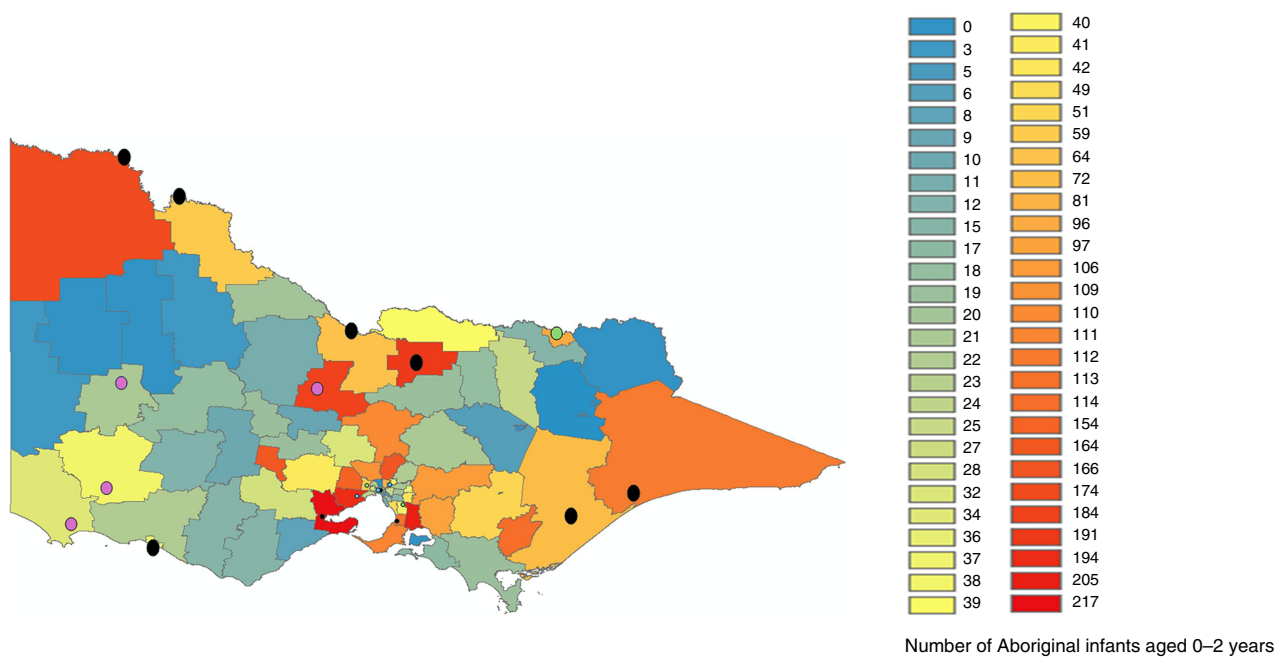


Fig. 1. Location of Aboriginal-specific maternal and infant services by local government area (LGA) according to the number of Aboriginal infants aged 0–2 years (Victoria). ● Koorie Maternity Services (KMS). ● Both KMS and Aboriginal Maternal Child Health (MCH) Services. ● Aboriginal MCH Services. ● Aboriginal maternal and infant health service within a mainstream facility.

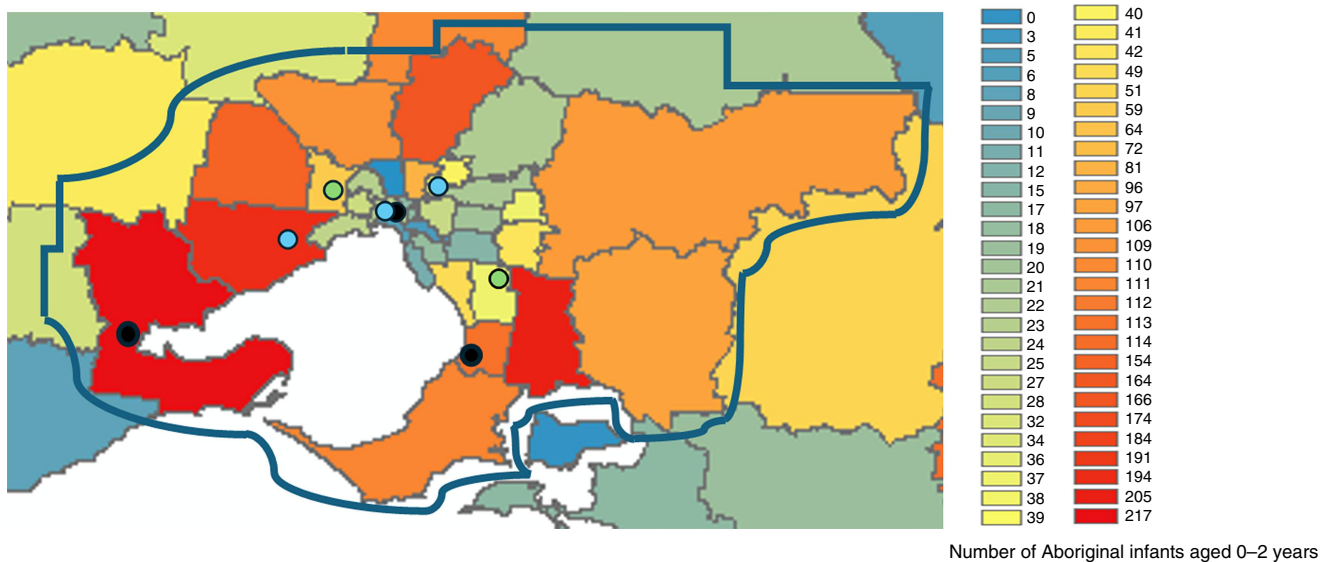


Fig. 2. Location of Aboriginal-specific maternal and infant services by local government area (LGA) according to the number of Aboriginal infants aged 0–2 years (Metropolitan Melbourne). ● Koorie Maternity Services (KMS). ● Both KMS and Aboriginal Maternal Child Health (MCH) Services. ● Aboriginal MCH Services. ● Aboriginal maternal and infant health service within a mainstream facility.

public hospitals that provide Aboriginal-specific maternal and infant health services.

Table 1 lists 50 of the 79 Victorian LGAs by Aboriginal infant population on the basis of the 2021 Census. Sixteen LGAs had an Aboriginal infant population above the state average (>100), yet 7 of these 16 LGAs had no Aboriginal-specific maternal and child health services. Gaps in service provision were particularly apparent in high-growth LGAs in outer-metropolitan Melbourne. For example, the city of Melton is the fastest-growing municipality in Victoria²² and does not have any Aboriginal-specific maternal and infant health services, indicating a major gap in early years service provision. Likewise, the Casey LGA has services available in neighbouring LGAs; however, access to these services is dependent on the availability of transport, either personal or public. By contrast, regional LGAs such as Ballarat would require Aboriginal families to travel longer distances to access Aboriginal-specific services. The median population of Aboriginal infants in LGAs that had some services was significantly higher than in areas offering no service (81.0 vs 19.5, $P < 0.001$).

Discussion

This is the first study in Australia, to our knowledge, to map the availability of Aboriginal maternal and infant health services and compare their geographical distribution with the Aboriginal and Torres Strait Islander population. Our analysis found that areas offering Aboriginal-specific services tended to have a higher Aboriginal infant population, which is a positive finding. There are Aboriginal maternity care services

available at three LGAs within metropolitan Victoria that offer care to Aboriginal women throughout pregnancy and after birth. However, our analysis also suggests there are some major gaps in Aboriginal early years health service provision in Victoria, with only one in four LGAs offering Aboriginal-specific maternal and infant health services. Concerningly, some LGAs with the highest populations of Aboriginal infants (aged 0–2 years) offer no Aboriginal-specific services. Furthermore, very few LGAs (15%) offer continuity of Aboriginal-specific maternal and infant healthcare across pregnancy and the early childhood period.

Barriers to accessing maternal and infant healthcare for Aboriginal families extend beyond the physical distance to a service. Aboriginal and Torres Strait Islander people continue to experience the ongoing effects of colonisation including intergenerational trauma, systemic racism and forced removal of children.²⁴ This forced removal of children, known as the Stolen Generations, perpetuates mistrust in government institutions and has interrupted kinship systems and parenting styles.²⁵ Lack of culturally safe care, experiences of racism, limited numbers of Aboriginal staff in the health workforce and under-resourcing of services further affect the continuity of care for Aboriginal mothers and their babies.^{26–28} The Strong Mums, Solid Kids program operated by the Nunkuwarrin Yunti ACCHO²⁹ offers continuity of care from pregnancy to early childhood for Aboriginal families in Adelaide. Evidence shows that Aboriginal-led, culturally safe models of maternal and infant healthcare improve service engagement, smoking cessation and maternal and infant health outcomes.^{30–33} Providing an Aboriginal-specific pregnancy care service and an Aboriginal-specific maternal and child health service in the same location is

Table 1. Aboriginal maternal and infant health service delivery by LGA proportionate to Aboriginal infant population.

LGA	Major city/inner/ outer regional ^A	Aboriginal infant pop. aged 0–2 years	Organisation	Aboriginal pregnancy services	Aborigin- al MCH services
Greater Geelong	Major city	217	Wathaurong Aboriginal Co-operative	KMS	AMCH
Casey	Major city	205			
Wyndham	Major city	194	Werribee Mercy Hospital	Nangnak Wan Myeek Program	
Greater Shepparton	Inner regional	191	Rumbalara Aboriginal Co-operative	KMS	AMCH
Greater Bendigo	Inner regional	184	Bendigo & District Aboriginal Co-operative		AMCH
Mildura	Outer regional	174	Mallee District Aboriginal Services	KMS	AMCH
Whittlesea	Major city	166	Bubup Wilam Northern Health Epping	KMS	AMCH
Ballarat	Inner regional	164			
Melton	Major city	154			
Latrobe (Vic)	Inner regional	114	Ramahyuck District Aboriginal Co-operative	KMS	AMCH
Frankston	Major city	113	Peninsula Health Frankston Hospital First Peoples Health and Wellbeing	KMS	AMCH
East Gippsland	Outer regional	112	Gippsland & East Gippsland Aboriginal Co- operative	KMS	AMCH
Mornington Peninsula	Inner regional	111			
Mitchell	Inner regional	110			
Hume	Major city	109			
Yarra Ranges	Inner regional	106			
Cardinia	Inner regional	97			
Wodonga	Inner regional	96	Mungabareena Aboriginal Co-operative	KMS	AMCH
Darebin	Major city	81	Victorian Aboriginal Health Service (VAHS)	KMS	AMCH
Wellington	Outer regional	72			
Campaspe	Inner regional	64	Njernda Aboriginal Corporation	KMS	AMCH
Brimbank	Major city	59	Western Health Sunshine Hospital	KMS	
Swan Hill	Outer regional	59	Mallee District Aboriginal Services	KMS	AMCH
Merri-bek	Major city	54			
Baw Baw	Inner regional	51			
Kingston	Major city	49			
Knox	Major city	42			
Moorabool	Inner regional	41			
Banyule	Major city	40	Mercy Hospital	Nangnak Wan Myeek Program	
Moira	Inner regional	39			
Southern Grampians	Outer regional	38	Windamara Aboriginal Corporation (Hamilton)		AMCH
Greater Dandenong	Major city	37	Dandenong & Districts Aboriginal Co- operative	KMS	
Maroondah	Major city	37			
Warrnambool	Inner regional	36	Gunditjmara Aboriginal Co-operative	KMS	AMCH

(Continued on next page)

Table 1. (Continued)

LGA	Major city/inner/outer regional [^]	Aboriginal infant pop. aged 0–2 years	Organisation	Aboriginal pregnancy services	Aboriginal MCH services
Glenelg	Outer regional	34	Windamara Aboriginal Corporation (Heywood)		AMCH
Macedon Ranges	Inner regional	32			
Golden Plains	Inner Regional	28			
Maribyrnong	Major city	27			
Boroondara	Major city	25			
Wangaratta	Inner regional	25			
Hobsons Bay	Major city	24			
Moonee Valley	Major city	23			
Melbourne	Major city	23	Royal Womens Hospital	Baggarrook	
Moyne	Inner regional	22			
Nillumbik	Major city	22			
Murrindindi	Inner regional	21			
Manningham	Major city	21			
Horsham	Outer regional	21	Goolum Goolum Aboriginal Co-operative		AMCH
Gannawarra	Outer regional	20			
Whitehorse	Major city	20			

LGA, Local Government Area; MCH, Maternal Child Health; KMS, Koori Maternity Service; AMCH, Aboriginal Maternal and Child Health.

[^]Based on the Australian Statistical Geography Standard.²³

likely to enhance continuity of care, which has been shown to contribute to improved health outcomes.^{26,27}

We identified 18 LGAs that had at least one Aboriginal-specific maternal and infant health service (an Aboriginal pregnancy service and/or an Aboriginal MCH service) and a further three LGAs within the metropolitan Melbourne area that offer Aboriginal-specific pregnancy services within public hospitals. Therefore, Aboriginal families residing outside of these three LGAs have no option other than to access the public health service that does not offer specific Aboriginal maternity and infant healthcare. Mainstream maternal and infant healthcare does not align with Aboriginal ways of infant care as culture is not paramount when approaching service delivery, which can lead to a lack of continuity of care.³⁴ There is evidence that Aboriginal-specific maternity and infant healthcare results in positive health outcomes, as Aboriginal mothers are more likely to engage in maternal and infant health programs.^{35,36}

A strength of this study was the leadership by an Aboriginal researcher as part of a project undertaken in partnership with VACCHO, the peak body for Aboriginal health in Victoria. Another strength was the use of geospatial mapping software for visual representation of the target population in relation to the location of Aboriginal maternal and infant health service delivery in Victoria. This approach highlighted the gaps in service delivery and, coupled with data about underlying population composition, can help

guide future investment. This spatial display of data can be a valuable tool for health services research because of its ability to integrate various data sources to produce visual maps that VACCHO and other Aboriginal organisations can use for service planning and advocacy. This type of approach has been used to inform physical accessibility, relative to distance, to healthcare services^{37–39} along with health workforce planning.⁴⁰ This is the first study to apply spatial methods to Aboriginal and Torres Strait Islander maternal and infant health service delivery in Victoria. The visual map representing early years services available in relation to the location of the Victorian Aboriginal communities has been provided to VACCHO as a tool to identify gaps in service delivery and inform their policy advocacy.

A limitation of this study is that it only included services focused on maternal and infant healthcare and did not capture other early childhood services such as Aboriginal playgroups, which may be delivered at ACCHOs or elsewhere in the community, where there is an opportunity for sharing of infant health information. Another limitation is that population data were obtained from the 2021 Census; however, service availability data used for mapping were obtained in 2023. However, it is unlikely this affected the findings, as LGAs with the highest Aboriginal and Torres Strait Islander populations remained relatively stable between the 2016 and 2021 Censuses.⁴¹

This study was a preliminary mapping exercise to understand the distribution of Aboriginal-specific maternal and infant health services in Victoria in relation to the population of Aboriginal and Torres Strait Islander infants. These population data were available at the LGA level rather than at postcode level, as has been used in other mapping studies.³⁹ Thus, a more detailed analysis of actual travel distances to services was not possible given LGAs cover numerous postcodes, an important limitation of this study. The issue of physical access to services, particularly using public transport, is an important area for future research. Although our visual map provides some insight into the physical accessibility of services for Aboriginal families, it does not provide insight into service size, staff capacity, cultural safety or the effectiveness of services in meeting the needs of the Aboriginal population residing within the area.

Service planning should prioritise areas that have no specific Aboriginal and Torres Strait Islander maternal and infant health service but have a high population of Aboriginal infants aged 0–2 years. Maternal and infant health services should ideally be delivered through ACCHOs as part of holistic comprehensive primary health care.³⁴ Further research is needed with Aboriginal families and service providers to understand specific supports required to enhance health during pregnancy and early childhood, which will be undertaken in the next phase of this project. This will involve interviews with Aboriginal families and service providers in Victoria to explore their views, experiences and preferences regarding access to early years services, with a specific focus on the provision of information and support about infant nutrition and active play. Together with the services map, this qualitative study will provide important context about access to early years services in Victoria.

Conclusion

This study highlights several areas of Victoria that have a high Aboriginal infant population yet no Aboriginal-specific maternal and infant health services, and continuity of maternal and infant healthcare is available in only a limited number of LGAs. It is unclear where and how Aboriginal families living in these areas are accessing health information and support during pregnancy and the first 1000 days of life. To enhance continuity of care in the first 1000 days, services need to be planned on the basis of population needs and, where possible, through an ACCHO to ensure cultural safety. Aboriginal and Torres Strait Islander infants are our future; therefore, ensuring a healthy start to life can contribute to healthy outcomes for Australia's First Peoples.

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