Centre for Community Child Health

murdoch children's research institute

Reporting the Health and Development of Children in Rural and Remote Australia

Prepared for Royal Far West

The Royal Children's Hospital Melbourne

Reporting the Health and Development of Children in Rural and Remote Australia

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Executive summary

Children living in rural and remote[1] Australia face inferior health and developmental outcomes[2] relative to their peers living in urban areas. There are various co-existing factors (known as the social determinants of health) which significantly contribute to such disparities, including (but not limited to) socioeconomic status and race. This review applies an expanded delineation of the social determinants of health to include geographic isolation (remoteness) as a fundamental explanation for the poorer developmental status of children in rural and remote Australia. This is because children in rural and remote Australia are not only significantly more likely to face concurrent social, economic and environmental conditions that are known to adversely impact health and development, but they are also significantly more likely to experience lack of access to appropriate services, known to mediate the impact of adversity in early childhood.

Indigenous children face an even higher chance of being exposed to these adverse conditions and are also significantly more likely than their non-Indigenous counterparts to live in remote and rural areas. Consequently, Indigenous children continue to experience adverse developmental outcomes at disproportionately higher rates.

Given that early childhood is the period of greatest developmental plasticity with profound long-term influences, access to timely and quality Early Childhood Education and Care (ECEC) services (such as preschool), and Early Childhood Intervention (ECI) services (such as allied health services and paediatricians) can prevent the avoidable and address presenting issues from the onset. However, for children who live in these areas, the effects of such disproportionate levels of disadvantage are compounded due to poor access to these services. While ECEC is recognised as a significant contributing factor to positive health and development outcomes, the focus of this review pertains primarily to services for children who have transient or long-term developmental issues.

The Centre for Community Child Health (CCCH) conducted this review for Royal Far West (RFW) to inform a systematic approach toward improving access to health services and health outcomes for children living in rural and remote Australia. The review did this by: 1) profiling the population characteristics of children in rural and remote Australia; 2) identifying the current context and the developmental health needs, met and unmet, of vulnerable children and families in rural and remote Australia; and 3) providing an evidence-based overview of what is causing the status quo, and what is most effective in addressing these issues.

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[1] In this report, the term 'rural' refers to areas that are defined by the Australian Standard Geographic Classification (ASGC) as 'Inner regional' and 'Outer regional'; and the term 'remote' refers to areas that are defined by the ASGC as 'Very remote' and 'Remote'.

[2] In this report, the definition of developmental vulnerability is that provided by the Australian Early Development Census (AEDC). The AEDC measures the development of children across five key domains, which are closely linked to child health, education and social outcomes: physical health and wellbeing; social competence; emotional maturity; language and cognitive skills (school-based); and communication skills and general knowledge. The AEDC measures the development of children in Australia in their first year of full-time school.

The review also identified Local Government Areas (LGA) in all bar two (Northern Territory and Australian Capital Territory) jurisdictions, with the highest concentration of such children whose needs are not being met.

Key findings

Where are they?

While the review identified significant gaps in the availability of data (particularly recent data) relating to Australian children (in particular Indigenous and refugee children) in rural and remote Australia, it found that:

- The Northern Territory (NT) has the greatest *proportion* of children living remotely (48.3 per cent), while New South Wales (NSW) has the greatest *number* of children living remotely (360,743), followed closely by Queensland (QLD) (352,700).
- Most Indigenous children live in NSW (29.7 per cent), however, Indigenous children makeup the largest proportion of the population in QLD (37.5 per cent).
- The NT has the largest proportion of Indigenous children living remotely (79.5 per cent), followed by QLD (69.8 per cent) and NSW (57.2 per cent).

Distribution of developmental vulnerability:

- In 2015, children living in Very Remote areas in Australia were twice as likely as those living in Major Cities to be developmentally vulnerable on one or more domain(s) (47.0 and 21.0 per cent) in their first year of school. They were also three times more likely to be developmentally vulnerable on two or more domains (31.8 and 10.2 per cent).
- The proportion of children with at least one developmental vulnerability in their first year of school, has increased since 2012.
- As of 2015, the NT has the highest proportion of vulnerability in both one or more and two or more Australian Early Development Census (AEDC) domains (37.2 per cent and 23.1 per cent, respectively); while NSW has the largest number of children who are vulnerable across both one or more and two or more domains (18,378 and 8,733, respectively).

Who are they?

The review aimed to identify the overall profile of children residing in rural and remote Australia, with particular attention to developmental outcomes, *and* the social determinants (e.g. socioeconomic status and parental employment status) known to significantly impact developmental outcomes. After analysing results pertaining to the identified social determinants, *and* developmental outcomes for children in metropolitan, rural and remote LGAs across all five states, it was observed that not only did children in remote and rural LGAs (in all five states) repeatedly presented as having the poorest developmental outcomes, but that they

were also significantly more likely to be exposed to the adverse social determinants of health and development.

The review found that, across Australia, children in the identified rural and remote areas shared many common characteristics:

- *They experience poverty at disproportionately higher rates*. Children in each of the identified LGAs experience greater rates of poverty than adults and children in metropolitan areas in their respective jurisdictions, and their adult counterparts in their respective LGAs.
    - This is significant because children living in the most socioeconomically disadvantaged locations in 2015 were twice as likely as those from the least disadvantaged areas to be developmentally vulnerable on one or more domain(s) (32.6 and 15.5 per cent respectively) in their first year of school. They were almost three times more likely to be developmentally vulnerable on two or more domains (18.4 and 6.7 per cent respectively) in their first year of school.
- *They are more likely to live in unemployed households, with single parent families, and in families where the mother has a low educational attainment*. Indigenous children in remote areas are more likely to live in one-parent families compared to non-Indigenous children. Indigenous employment rates are also noticeably influenced by remoteness.
- *They are more likely to be Indigenous*. Indigenous children account for 38 per cent of all children in remote areas, despite making up less than 5 per cent of all children in Australia.
    - Indigenous children are almost 8 times as likely to live in remote areas (23 per cent) as all Australian children (3 per cent).
- *They are more likely to be socially isolated*. While only 17 per cent of children (0-15 years of age) in major cities across Australia face the greatest risk of social exclusion, the percentage increases by more than double for children living in remote areas (46.5 per cent) and by more than four times for children living in very remote areas (71.6 per cent).
    - Indigenous children and families are significantly more likely to experience social isolation than non-Indigenous Australians (40 per and 22 per cent respectively).
- *They are more likely to be exposed to Family and Domestic Violence (FDV) and have contact with child protection services*. Children in remote areas are four times as likely as those in major cities to be the subject of a substantiation and twice as likely to be in out-of-home care. Indigenous children living in remote and very remote areas are nine times more likely to be in out-of-home care than their non-Indigenous counterparts.
- *They are less likely to engage in Early Childhood Education and Care (ECEC) services*. Long travel time and distance and a smaller number of services funded to meet the needs of families in remote areas (due to low population density and a greater distribution of population in these areas) is shown to be a significant contributing factor to lower ECEC participation rates in remote areas. Indigenous children have lower levels of participation in ECEC than those of non-Indigenous children.

What are the main service gaps for children and families in remote and rural Australia?

Overall, both providing and accessing appropriate services in rural and remote areas across Australia pose as major problems. Access to appropriate services is exponentially more challenging with increased remoteness, as services are widely dispersed at low density because of greater distances and limited transport options. This is concerning because access to appropriate and quality services is an important determinant of developmental outcomes in terms of prevention, early intervention and management of existing developmental issues.

A number of specific issues concerning access to and provision of services were identified:

- *Access to early childhood intervention (ECI) services*. Children with a disability and/or developmental delay in rural and remote Australia, and their families, face multiple and concurrent barriers to accessing ECI services as a direct consequence of their geographical location. These include (and are not limited to): travelling long distances, extensive waiting times and workforce shortages resulting in complications accessing therapy, resulting in high levels of unmet need. The gaps in early intervention services in rural and remote settings are particularly evident amongst allied health (including mental health) and paediatrician services.
- *Access to regular allied health services*. A significant majority of the rural and remote communities which are identified in this study only have access to paediatricians and allied health professionals (e.g. speech and physiotherapists) on a sessional basis (sometimes less than once per month). Sessional availability can impact the quality of the service as it provides limited opportunity for health professionals to gain adequate knowledge of their client (and their community) and provide therapeutic input with adequate frequency. Limited availability also means longer wait times and less access.
- *Access to paediatricians*. The capacity to recruit and retain paediatricians in remote and rural Australia is a significant problem. Issues pertaining to increased workload and greater working hours, social isolation, and lack of financial incentive (due to reduced income and greater cost of living) have been identified as some of the key contributing factors to the current state of affairs. Lack of access to paediatricians means that obtaining a diagnosis, which is required for a referral to appropriate allied health services, is much less likely. A late diagnosis invariably leads to later access to paediatric allied health intervention services, and as such, poorer outcomes.
- *Access to mental health services*. Mental health services for children aged 0-12 are particularly difficult to source in rural and remote areas across all jurisdictions. The few services which were found are predominantly located inside hospitals in major townships and required long distant travel. The alarming lack of child mental health services means that the provision of adequate mental health care is made tremendously difficult. Recruiting and retaining staff in rural and remote mental health services is also a significant and continuing challenge, with chronic staffing issues widely reported.
- *The tyranny of distance*. Families and professionals need to travel long distances to access and provide services. Most paediatricians and allied health services who work with children aged 0-12 are located in major towns, and it is not unusual for families to face travel distances of over 100 KM (each way) to

reach an appropriate service provider. Families who do not have access to personal transportation face longer travel times and distance, as a direct route between them and the service may not be available via public transportation.

- *Meeting the needs of Indigenous children*. Indigenous children have substantially higher rates of developmental vulnerabilities than non-Indigenous children. However, Indigenous children face greater challenges accessing appropriate services given that they are more likely to reside in remote and very remote areas, and the lack of culturally appropriate services in these areas.
- *Provision of telehealth services.* Telehealth services are not always available or appropriate in rural and remote areas. Many remote areas do not have the requisite broadband internet and the necessary technological equipment to enable telehealth services. Further, the provision of health services via telecommunication is not always an appropriate solution for children with a disability/developmental vulnerability.

What does the evidence say?

- What happens in the early years has profound implications for later development because: a) this is the time when developmental plasticity is at its greatest; and b) learning and development are cumulative, with later development building upon earlier development.
- Children with developmental vulnerabilities (and their families) need access to local and affordable prevention and early intervention services within a universal early childhood service system and/or specialised response provisions. These services need to be based on core values and principles concerned with evidence-based best practice pedagogy as identified in the early childhood generalist and early intervention research (Moore, 2011).
- Investing in early childhood intervention and education services has proven to be effective in improving children's developmental outcomes, particularly for those from disadvantaged backgrounds. Investing in early childhood has also been shown to be a cost-effective strategy for promoting productivity and economic growth. The highest rate of return in early childhood development comes from investing as early as possible, from birth through age five, in disadvantaged families. There does not appear to be any economic analyses that have been conducted on the economic benefits of investing in rural and remote services for children.

Strategies that have been shown to be effective in either improving access to services or improving both access and health and development outcomes for children in rural and remote Australia include the following:

- *Rural workforce recruitment and retention strategies.* Attracting and retaining health professionals in rural and remote Australia is a significant problem. Factors relating to the nature of the work, long travel times and distances, burnout and lack of adequate support and financial incentives have all been identified as barriers to workforce recruitment and retention in geographically isolated areas.
- *Outreach services.* Children living in regional Australia need to rely on outreach care supported by academic centres. To support the development of outreach services, evidence indicates that the

incidence of disease, the context for service delivery, addressing community concerns with visiting services, recruitment and retention of health professionals, and integration with resident and visiting health and community services must all be taken into account.

- *Fly-In-Fly-Out (FIFO) and Drive-In-Drive-Out (DIDO) services.* This form of service can have short-term benefits by increasing equity and accessibility to services and reducing the need to travel long distances for health care. However, significant disadvantages need to be considered in the longer term.
- *Tele practice / telehealth.* Telehealth is coordinated and managed differently across the States and Territories in Australia. In some jurisdictions, telehealth is centrally coordinated (e.g. NSW Telehealth Network), while in others it is managed by general practitioners (GPs) and community centres (TAS), the Rural Health Alliances (VIC), or through individual hospitals (SA and WA).

  While delivering family-based tele-mental health care is not without its challenges, there is evidence that tele-practice is acceptable to parents of children. Telehealth / tele-practice has been used successfully by a range of professionals working with children, including speech pathologists, teachers of the deaf, medical practitioners, and parenting trainers.

  Although tele-practice approaches have great potential, they are not necessarily simple or cheap to establish. Key challenges include (but are not limited to):

  - costs: start-up costs; equipment maintenance and repair; internet connectivity; and staff training
  - technology: poor quality transmission; and data security
  - privacy, ethics, liability issues: privacy and confidentiality may be compromised; and potential for misdiagnoses due to inability to examine patients.

  While there are increasingly ways to overcome these challenges, it is important to acknowledge and respond to the limitations of telehealth in practice.

Gaps in our knowledge

There are still a number of gaps in our knowledge, including base level information on rural child health and gaps in evidence which require more research. These include:

- *Telehealth / tele-practice with families of young children*. More research in tele-practice is needed, using broader outcomes measures than have been used to date, and more models of service targeting children and families. The use of tele-practice in supporting those with lifelong disabilities is another area that has not been investigated extensively.
- *Increased use of place-based approaches[3] in rural and remote areas*. There are a number of place-based initiatives currently in Australia, mostly in disadvantaged urban areas with only a few in rural

[3] Place-based approaches aim to address complex issues at the community/neighbourhood level, such as poor housing, social isolation, poor or fragmented service provision that leads to gaps or duplication of effort, and limited economic

and remote areas. Place-based (or collective impact) approaches are well suited to addressing the problems faced by disadvantaged communities such as individual LGAs identified in this study. Further research and trialling of these strategies is warranted, drawing on the evidence already emerging.

- *How to address and prevent family and domestic violence for families living in non-urban communities*. There is limited evidence regarding the effectiveness of different models of service provision for addressing and preventing family and domestic violence.
- *How to improve access and availability to quality data*. There is very limited evaluation on whether the current reporting framework and information infrastructure are meeting the needs of services, researchers and policy-makers working within the context of rural and remote Australia. Factors such as improvement in data quality, availability and scope, and improvements in Indigenous identification continue to be areas where further knowledge is urgently required.

The way forward

There are some positive directions and initiatives with respect to improving services and outcomes for rural children. These include national investment in the National Disability Insurance Scheme (NDIS) and in improving mental health services through Primary Health Networks, rural workforce recruitment and retention strategies, integrated care initiatives (for example, in NSW), which focus on or include improving children's health and development and selected place-based initiatives.

Perhaps what is most lacking for rural children is a comprehensive, coordinated national approach that is aimed at giving them the best start in life, that acknowledges and responds to the risk of developmental vulnerability in rural areas, plugging the gaps in services and addressing the gaps in data, information and evidence.

The following are our opportunities:

- *Focus on prevention*. The current system of intervention and support services in developed countries such as Australia is predominantly geared towards focusing on the presenting problems rather than the underlying causes that lead to families having problems in the first place. Direct interventions to address complex problems such as child abuse and FDV will always struggle to achieve sustainable results while the conditions that led to the problem remain unchanged.
- *Adopt a multilevel coordinated approach*. Interventions must be multidimensional and address all factors that shape the combined influence of the child, the family, social networks, and wider community and society factors. As such, action is required by multiple sectors and levels of government, as well as non-government services.

opportunities. By using a community engagement approach to address complex problems, a place-based approach seeks to make families and communities more engaged, connected and resilient.

- *Better integrated and co-ordinated service systems*. The service system must become better integrated, including across health, education and disability sectors, so as to address the multiple influences on children's development.
- *Consider adopting a place-based approach*. Communities in rural and remote areas are more likely to remain caught in a spiral of disadvantage such as poverty and high unemployment. When social disadvantage becomes entrenched in a particular locality, a disabling social environment can develop, leading to intergenerational disadvantage. Adopting a place-based approach in these areas can address complex problems by focusing on the social and physical environment of a community and deliver better integrated and more accessible service systems. It also offers one way of organising a multilevel approach to address a community's collective needs and coordinating services more effectively (Centre for Community Child Health, 2011).
- *Use co-design / co-production strategies*. Here, the service systems and communities work as partners in the planning, management, delivery and evaluation of what, how, when and where services are delivered. This is particularly true of work with Indigenous communities. Given the extensive histories of dispossession and lack of respect for Indigenous culture and attachment to country, Indigenous communities are acutely sensitive to attempts, however well-meaning, to impose solutions to the challenges they face in raising their children in ways that they (and we) would wish.
- *Adopt a model of progressive universalism*. We need to build a service system based on provision of universal services for all families, with additional services being provided to those with greater needs.

  While population surveillance and screening services need to be available to all children living in rural and remote areas, there are two groups for whom such services are particularly needed – those with developmental difficulties and disabilities, and Indigenous children.

  - Children with developmental difficulties and disabilities. Compared to services in urban areas, the current surveillance and screening service systems are less effective at detecting when children living in rural and remote areas are experiencing developmental difficulties and responding promptly and effectively. Additional or alternative ways of identifying and supporting children with developmental difficulties and disabilities need to be explored as a matter of urgency.
  - Indigenous children. Indigenous children are also significantly more likely to be exposed to risk factors that increase the likelihood of disability (low birthweight, infectious diseases, violence etc.). Early intervention is critical given that high rates of disability can have adverse effects on education, speech, social development, and other lifelong outcomes. Early identification is vital, and more effective and systematic ways of screening Indigenous children in the most remote and disadvantaged areas are urgently needed.
- *Explore alternative models of service*. More needs to be done to drive specialist expertise downwards, that is, to provide training and on-line support to local staff (e.g. allied health assistants, teachers and nurses) in some of the core tasks usually restricted to specialists. More use should also be made of telecommunications/telehealth to provide specialist oversight for rurally-based medical and allied health professionals.

- *Expand and support telehealth services*. To guide the development and expansion of tele-practice in the child development space, consider a national paediatric telehealth centre to act as a centre of excellence in rural service delivery and telehealth for children, extending and promoting evidence-based practice.
- *Collecting and using data.* In order to ensure that all policies and practices are based on the latest and most reliable evidence, we need access to accurate and up-do-date data. As we found when we came to compile the data presented in this review, this kind of data is not readily available and in some cases very difficult to access. Improved systems for collecting accurate and up-to-date information on children in rural and remote areas would greatly help in planning appropriate services to meet their needs for them.
- *Working with the new National Rural Health Commissioner*. This new position will act as an independent and high-profile advocate for regional, rural and remote health reform and will represent the needs and rights of regional, rural and remote Australia.

1. Introduction

Children living in rural and remote regions in Australia have poorer health and developmental outcomes relative to their peers living in urban areas. There are many reasons why we should regard such disparities as unacceptable, not least of which is that children have the fundamental human right to a high standard of health and wellbeing (United Nations Convention on the Rights of the Child, 1990). As interpreted by the United Nations' Committee on the Rights of the Child (2013), children's right to health is

> an inclusive right, extending not only to timely and appropriate prevention, health promotion, curative, rehabilitative and palliative services, but also to a right to grow and develop to their full potential and live in conditions that enable them to attain the highest standard of health through the implementation of programmes that address the underlying determinants of health.

There are many reasons for the disparities between children's outcomes in rural / remote and urban regions. One has to do with Australia's geography and where children and their families live. Australia is one of the most urbanised countries in the world, with over two-thirds of the population living in major cities, and one of the lowest population densities outside of its major cities (Baxter, Hayes & Gray, 2011). This creates issues with isolation and access to infrastructure and services. Timely access to appropriate services become more challenging with increased remoteness (Baxter et al., 2011), which particularly disadvantages children with additional health and developmental needs.

Children in rural and remote Australia are also much more likely to be exposed to concurrent risk factors that are known to adversely impact developmental outcomes, such as (but not limited to) poverty, and residing in an unemployed household. The decline in the importance of agriculture to national economies has led to a rise in rural poverty, both in Australia and across the Western world (Alston, 2009). In contrast to urban poverty, rural poverty is largely invisible because it is widely dispersed in areas of low population density and not necessarily typified by homelessness.

As a result of the combined effects of poverty and relative geographical and social isolation, people living in rural and remote areas cannot access the resources necessary to ensure their wellbeing as readily as their urban counterparts. In turn, this may prevent them from participating in social networks and institutions (Alston, 2009), and in ongoing learning. The Regional Australia Institute (2017) has summarised the levels of human capital across Australia, defined as the skills and capacities that reside in people that are put to productive use. Their analysis focuses on learning and development from early childhood to adulthood, and clearly shows that it is regional and remote areas that exhibit lower measures of human capital development.

This is important because the social, economic and environmental conditions into which we are born, and experience in early childhood, have the power to shape our lifelong health and wellbeing outcomes (Marmot, 2015, 2016; The Marmot Review, 2010). Known as the social determinants of health (Braveman, Egerter & Williams, 2011; WHO Commission on the Social Determinants of Health, 2008), these refer to 'the circumstances in which people grow, live, work, and age, and the systems put in place to deal with illness',

which are 'in turn, shaped by political, social, and economic forces' (WHO Commission on the Social Determinants of Health, 2008). These social determinants can have a larger impact on health and developmental outcomes than do our genetic or biological dispositions, or our access to health care services (Braveman & Gottlieb, 2014; The Health Foundation, 2017).

This has become increasingly evident as global research continues to find higher rates of health and developmental vulnerabilities among children who are most disadvantaged in societies (Marmot, 2004). By the time children reach school, there are significant differences between the cognitive, non-cognitive and social skills of those from advantaged and disadvantaged backgrounds (Reardon, 2011; Moore, McDonald & McHugh-Dillon, 2015). Children who fall behind their peers are more likely to be from low-income families (Reardon, 2011). This is clearly reflected in the latest Australian Early Development Census (AEDC) findings (AEDC National Report, 2015) which highlight a strong dose-relationship between socioeconomic disadvantage and developmental vulnerability: the greater the level of socioeconomic disadvantage experienced by children, the greater their developmental vulnerabilities.

This has significant implications for rural and remote Australia, where geography and disadvantage combine to create a higher risk of developmental vulnerability and greater likelihood of not being able to access appropriate supports and services. Children in rural and remote Australia are more likely to be exposed to a concurrent range of challenging conditions which increase their odds of experiencing developmental vulnerabilities (Edwards & Baxter, 2013; Goldfeld & West, 2014). These conditions include (but are not limited to): poverty, social isolation, housing stress, and exposure to Family and Domestic Violence (FDV). Emerging trends in the AEDC show a widening gap in developmental outcomes for children in geographically isolated areas, relative to those in major cities.

Indigenous children face an even higher chance of being exposed to these adverse conditions (Askew et al., 2013) and are also significantly more likely than their non-Indigenous counterparts to live in remote and rural areas (ABS, 2010). The simultaneity of these two factors has meant that Indigenous children continue to experience adverse developmental outcomes at disproportionately higher rates (AEDC National Report, 2015).

For children with developmental issues who live in rural and remote Australia, the effects of such disproportionate levels of disadvantage are compounded due to poor access to appropriate services, such as allied health services and paediatricians (Hanft, 2014). This is a missed opportunity, as early childhood is the period of greatest developmental plasticity with profound long-term influences. Timely early intervention services can prevent the avoidable and address presenting issues from the onset, before they escalate and significantly impact on lifelong outcomes (Fox et al., 2015; Moore & McDonald, 2013; Moore, McDonald & McHugh-Dillon, 2015).

1.1 Purpose of review

CCCH was engaged by Royal Far West (RFW) to inform a systematic approach toward improving access to health services and health outcomes for children living in rural and remote Australia, with a focus on developmental health. This review aimed to achieve this in three ways:

I. by profiling the population characteristics of children in rural and remote Australia;

II. by identifying the current context and the developmental health needs, met and unmet[4], of children and families in rural and remote Australia; and

III. by providing an evidence-based overview of what is causing the status quo, and what is most effective in addressing these issues.

The primary objectives of this review move away from the more common focus on primary and acute healthcare provision. Instead it emphasises the developmental, behavioural and mental health status/needs of children aged 0- 12 years of age, and existing gaps in the provision of appropriate services that help address developmental needs and support children, and their families, to reach their potential. Accordingly, the review does not focus on children with organic disease or chronic health problems as a primary diagnosis, but instead seeks to identify those who have conditions related to their developmental health, learning, behavioural and mental health, including but not limited to diagnosed disability.

The review identified LGAs in all bar two (Northern Territory and Australian Capital Territory) jurisdictions, with the highest concentration of such children whose needs are not being met and explores the specific characteristics of these communities. A review of the NT was carried out at the territory level, given the large amount of land that is covered by remote LGAs in these areas. The ACT has not been included in this review, given that it does not contain any rural or remote areas.

1.2 Report structure

The report is structured around the review's central lines of enquiry, assembled into four areas, as outlined in Table 1.

[4] Because the current study involves desk-top research, it will not be possible to get a complete picture of the extent to which rural/remote children's developmental health needs are being met or not, nevertheless, some evidence of gaps is likely to emerge from the literature review, and these will be noted.

Table 1: Key line of enquiry by area

Area	Where are they?	Who are they?	What are the gaps versus the needs?	What does the evidence say?
Enquiry	What is the distribution of children by Indigenous status and remoteness, across each jurisdiction? Which LGAs have the greatest concentration of children with significant developmental vulnerabilities? What are the disparities between Indigenous and non-indigenous children?	What is the overall profile of children residing in rural and remote areas in each Australian jurisdiction? Includes: sociodemographic profile; rates of child protection involvement; developmental outcomes; and rates of access to early childhood education and care (ECEC) services.	What are the main service gaps for children and families in remote and rural Australia?	What does the evidence say about ways of improving health and development outcomes for children in rural and remote Australia?

2. Methodology

The review used four approaches to collate information and inform findings:

2.1 Identifications of 'hot spots'

The review identified 'hot spot' LGAs in rural and remote Australia where children were found to be most developmentally vulnerable, *and* where they were most likely to face adverse social determinants known to significantly impact developmental outcomes. This was done to provide insight into the complexities and challenges affecting communities.

Eight key indicators were used to identify these LGAs in rural and remote New South Wales (NSW), Victoria (VIC), Queensland (QLD), Western Australia (WA), South Australia (SA) and Tasmania (TAS).
Each 'hot spot' was selected based on meeting the following criteria:

1. It was in the 10 LGAs that have the highest proportion of children developmentally vulnerable on one or more AEDC domain in their respective jurisdiction;

2. It was in the 10 LGAs that have the highest proportion of children developmentally vulnerable on two or more AEDC domain in their respective jurisdiction;
3. It was in the 10 LGAs that have the highest proportion of children who lived in unemployed households;
4. It was in the 10 LGAs that have the highest proportion of children who lived in single parent families
5. It was in top 10 LGAs that have the highest proportion of children where the mother has a low educational attainment;
6. It was in the 10 LGAs that have the highest proportion of socioeconomic disadvantage;
7. It was one of the worst places to be a mother in Australia, based on a 2016 study by Save the Children Australia (Harris & Wells, 2016) which used five indicators relating to child health outcomes to determine the worse LGAs across Australia to be a mother.
8. It was listed as one of the 10 LGAs with the highest concentration of disadvantage, in accordance with the 2015 "Dropping of the Edge" (Vinson, Rawsthorne, Beavis & Ericson, 2015) research which applied 20 indicators (all of which are directly related to child health and wellbeing outcomes) to identify the highest concentration of disadvantage across Australia. Again, a significant majority of the identified LGAs were in rural and remote Australia.

LGAs that were listed against each indicator were then allocated a score (all of the selected LGAs were listed against at least two, if not all, indicators). Indicators 3 to 8 were worth one point each, while the first two (AEDC outcomes) were worth 2 points each. LGAs with the highest scores were selected as the top 10 'hot spots' in New South Wales, Victoria and Queensland, while 6 LGAs were selected in Western Australia, 4 in Tasmania and 3 in South Australia. The decision to not include the same number of LGAs in all of the jurisdictions was based on several factors, namely: population size (LGAs with a very small number of children were not included); not enough LGAs (this was particular the case for Tasmania which did not have many largely populated LGAs that were in rural/remote areas); and project time constraints.

2.2 Establishing a profile

Once the location of the most 'hot spots' for developmentally vulnerable children were identified, a profile of the children who lived in this area was developed. Specifically, the review looked at:

- the number and proportion of children;
- the proportion of children experiencing poverty and social isolation;
- the proportion of children who lived in unemployed households, in single parent families and in families where the mother has a low educational attainment;
- the proportion and number of Indigenous Australians in the community; and
- the rate of child protection substantiations, reported FDV incidents and proportion of children with a disability.

Child protection, disability and in some instances FDV rates were not publicly available. Relevant government departments in each state and territory were contacted to obtain this information, and included in the analysis where provided.

2.3 Scan of available services

A complete service mapping exercise is not in the scope of this project. However, an indicative list of available and appropriate services for developmentally vulnerable children (i.e. allied health services focused on children, and paediatricians) in each 'hot spot' was identified. This was done by accessing the relevant government websites, service directories where available, and Google searches, which identified appropriate government and non-government services.

2.4 Rapid literature review

The rapid review built upon previous CCCH reviews and involved:

- A time-limited search of peer-reviewed publications and reports in academic databases such as Cochrane, Medline, PsycINFO, and CINAHL;
- A scan of key rural studies journals (Rural and Remote Health, Australian Journal of Rural Health, Australasian Journal of Regional Studies);
- A scan of websites of key research institutions (Australian Institute of Family Studies, National Centre for Social and Economic Modelling, Australian Institute of Health and Welfare, Telethon Kids institute, Centre for Community Child Health); and
- A scan of websites of relevant peak bodies and networks (eg. National Rural Health Alliance, Australian Rural Health Education Network, Australasian Telehealth Society, Services for Australian Rural and Remote Allied Health)

3. Limitations

The coverage of the rapid review was limited by two factors. The first was that, as Smith (2016) has noted, there are few current resources to support studies in rural and remote healthcare, and some of the key questions regarding services to rural and remote families have not been thoroughly researched. The second limitation was the time constraints on the review itself, necessitating a rapid search methodology that may have missed some studies.

The review identified significant gaps in the availability of data (particularly recent data) relating to Australian (in particular Indigenous and refugee) children. While the lack of recent and reliable data relating to children across Australia is of significant concern, the dearth of data pertaining specifically to children in rural and remote areas is perhaps even more alarming- given the disproportionate rate of adverse outcomes for children in these areas. Where available, data is often dispersed, difficult to locate and dated.

4. Findings

4.1 Where are they?

The tables and figures following represent the most recent available data. However, it is important to note that certain relevant data, particularly those relating to Indigenous children, are a) not available past a certain point in time; and b) are only reflective of a certain point in time. With that in mind, the following is the most current information relating to the distribution of children in Australia:

4.2 Distribution of children by state and territory and remoteness

- As of 2016, children aged 0-14 years made up 18.8 per cent of the total Australian population (ABS, 2016).
- In 2016, Victoria recorded the largest percentage increase in the number of children aged 0-14 years (2.5 per cent), followed by the Australian Capital Territory (2.0 per cent). Tasmania and the Northern Territory recorded largest decrease (0.1 and 0.2 per cent respectively).

Outlined in Table 2 is the percentage of children aged 0-14 in each state and territory; and the distribution of children aged 0-14 across all states and territories.

Table 2: Distribution of children aged 0-14 across the states and territories, 2016

	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	AUS
Percentage of state/territory population [5]	18.6	18.3	19.7	17.5	19.2	18.1	22	18.9	18.8
Percentage of Australian population aged 0-14[6]	31.8	24.6	20.9	6.6	11.1	2.1	1.2	1.6	100

In 2010, two-thirds (67 per cent) of all Australian children aged 0–14 lived in major cities; 30 per cent lived in rural areas; and 3 per cent lived in remote and very remote areas. Outlined in Table 3 is the number and proportion of children (aged 0-14) who lived in rural and remote areas in each state and territory in 2010. In total, 1,198,219 children were living in rural and remote areas of Australia in 2010.

[5] The denominator is the relevant total state/territory population

[6] The denominator is the total Australian population aged 0–14 years

Table 3: Number and percentage of children aged 0-14 who live outside major cities in each state and territory

	VIC	NSW	QLD	SA	WA	ACT	TAS[7]	NT[8]
Total number of children in rural / remote areas	254,454	360,743	352,700	83,439	114,269	185	32,429	Outer regional: 25,381 Remote/very remote: 23,761
Percentage of children in rural / remote areas	25.4	27	40.2	29	25.9	0.2	34.5	Outer regional: 51.6 Remote/very: 48.3

4.3 Distribution of Indigenous children by state and territory and remoteness

The most recent data source on the geographical areas in which Indigenous children live is the 2011 Census. According to this source:

- 4.9 per cent of all Australian children are Indigenous.
- Indigenous children (0-14) make up 36 per cent of the entire Australian Indigenous population (ABS, 2011) (who account for 3 per cent of the total Australian population).

Depicted in Figure 1 is the distribution of Indigenous children aged 0-14 across Australia. The majority of Indigenous Australian children reside in New South Wales, followed closely by Queensland. Conversely, of all the Indigenous Australian children, a noticeable minority reside in the Australian Capital Territory and Tasmania.

[7] The ABS does not classify any areas of Tasmania as a "major city". Classifications for Tasmania include: Inner/outer regional and remote and very remote. As such, for the purpose of this document, data from Hobart, Launceston and Devonport (categorised as inner regional by the ABS) was applied to calculate children in "major cities"; while data from outer regional, remote and very remote TAS reflects the number and percentage of children in "rural/remote" TAS.

[8] The ABS does not classify any areas of the northern Territory as a "major city" or "Inner regional". Classifications for the NT include: outer regional, remote and very remote. As such, for the purpose of this document, data from remote and very remote NT reflects children in "rural/remote" areas; while data from "outer regional" NT has been included separately.

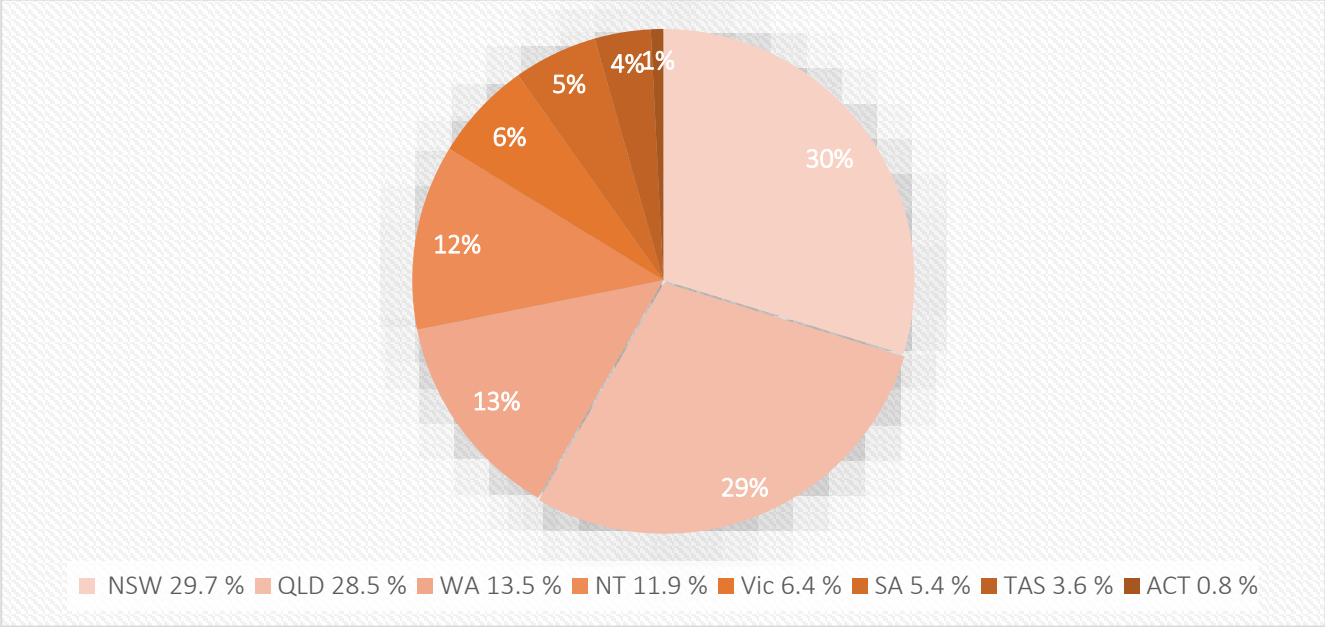

Figure 1: Distribution of Indigenous children by state and territory

While NSW has the greatest number of Indigenous children, Indigenous children makeup the largest proportion of the total Indigenous population in Queensland (37.5 per cent). Table 4 outlines the percentage of Indigenous children, as a proportion of the total Indigenous population in each state and territory.

Table 4: Percentage of Indigenous children as a proportion of each state and territory's Indigenous population

	QLD	NSW	TAS	WA	VIC	SA	NT	ACT	AUS
Percentage of Indigenous children as a proportion of the entire Indigenous state/territory population	37.5	36.3	35.3	35.2	35.2	34.7	33.2	32.6	35.9
Total number of Indigenous children	70,796	75,652	8,647	30,889	16,934	13,089	22,519	2,006	240,532

Almost one-third (32 per cent) of Indigenous children (0-14 years) live in major cities, 44 per cent live in rural Australia and almost one-quarter (24 per cent) live in remote Australia (ABS, 2011). As a proportion of its entire Indigenous child (0-14 years) population, the Northern Territory has the largest proportion of Indigenous children living in a rural and remote area (79.5 per cent). Figure 2 depicts the proportion of all Indigenous children in each state and territory who live in rural or remote areas (ABS, 2011).

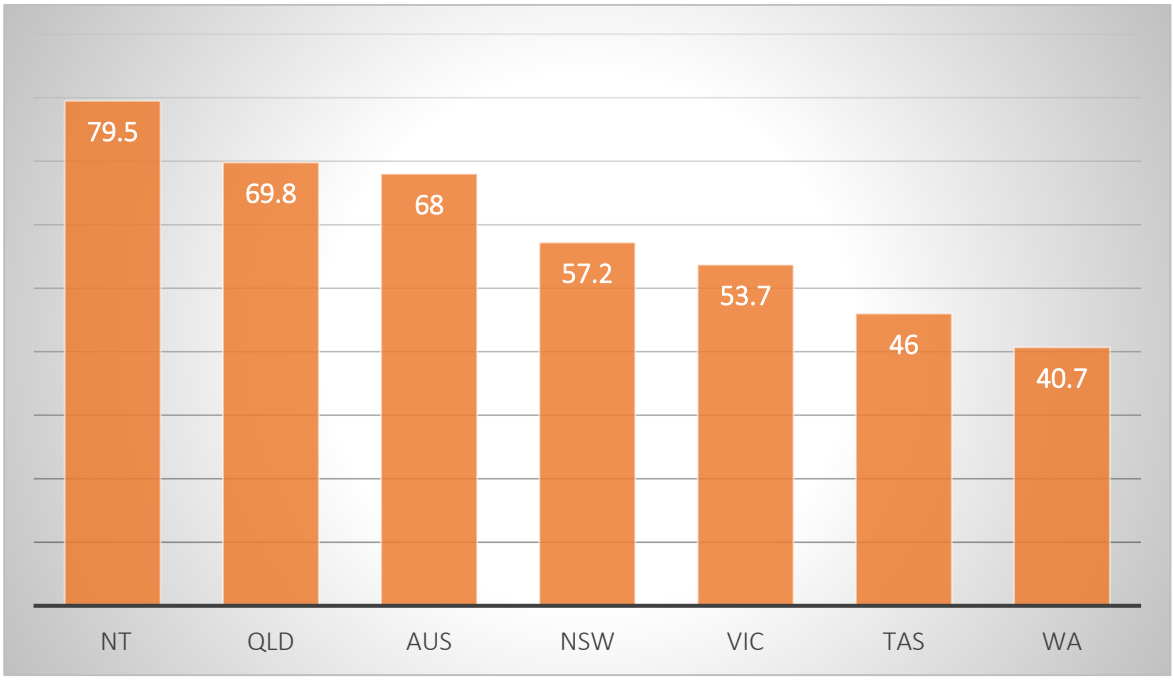

Figure 2: Proportion of Indigenous children (aged 0-14) living in a rural or remote area by state and territory, June 2011[9]

4.4 Developmental vulnerability (in their first year of school) by remoteness

According to the AEDC, in 2015, 62,960 (22 per cent) of children in Australia were vulnerable on one or more developmental domains in their first year of school (AEDC, 2015); while 31,754 (11.1 per cent) were developmentally vulnerable on two or more domains. The Northern Territory has the highest *proportion* of developmental vulnerability in both one or more and two or more domains; while New South Wales has the largest *number* of children who are vulnerable for both one or more and two or more domains (but has the second lowest proportion of vulnerability in one or more domains and the lowest proportion of vulnerability in two or more domains).

Table 5 reflects the total number and percentage of children who are developmentally vulnerable when they start school on one or more and two or more domains, in each state and territory.

[9] Remoteness Area data are not provided by the ABS for the ACT

Table 5: Number and proportion of children developmentally vulnerable in their first year of school by state and territory

		AUS	NSW	VIC	QLD	WA	SA	TAS	ACT	NT
Developmentally vulnerable on 1 or more domains	Total	62,960	18,378	13,465	16,220	6,895	4,338	1,296	1,161	1,207
	%	22	20.2	19.9	26.1	21.3	23.5	21	22.5	37.2
Developmentally vulnerable on 2 or more domains	Total	31,754	8,733	6,707	8,713	3,403	2,259	657	531	751
	%	11.1	9.6	9.9	14	10.5	12.2	10.7	10.3	23.1

The AEDC data indicates developmental vulnerability increases with remoteness. Children living in Very Remote areas in Australia in 2015 were twice as likely as those living in Major Cities to be developmentally vulnerable on one or more domain(s) (47.0 and 21.0 per cent) in their first year of school. They were also three times more likely to be developmentally vulnerable on two or more domains (31.8 and 10.2 per cent). Compared with 2012, a higher proportion of children who live in Remote or Very Remote areas were developmentally vulnerable on one or more and two or more domains in 2015. Children in Inner Regional areas show a significant increase in the proportion who were developmentally vulnerable (AEDC, 2015). Figure 3 reflects the proportion of children with at least one developmental vulnerability, by remoteness.

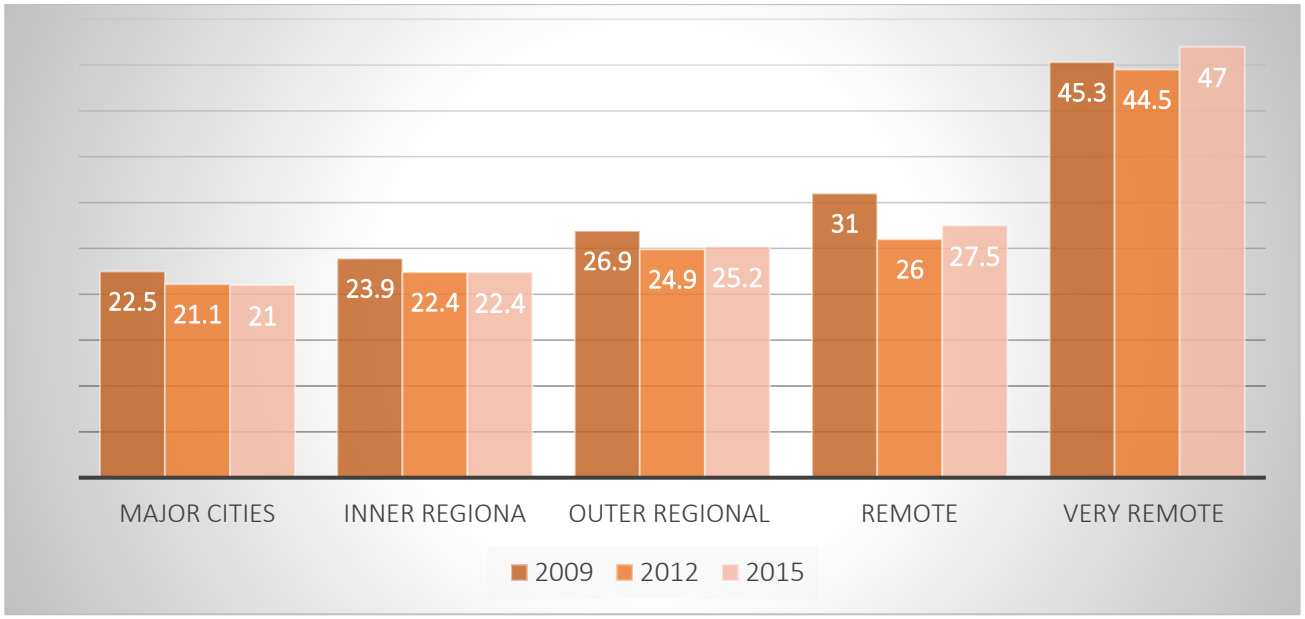

Figure 3: Proportion of children with a developmental vulnerability by remoteness

4.5 Developmental vulnerability in rural and remote areas by LGA

Which LGAs have the greatest concentration of children with significant developmental vulnerabilities? What are the disparities between Indigenous and non-indigenous children?

Drawing on the methodology outlined in section 2.1, LGAs with the greatest proportion of children with poor developmental outcomes AND those with the greatest risk of poor developmental outcomes were identified in all States.[10]

Child outcomes in the NT were reviewed as part of a Territory-wide analysis, while the ACT was omitted from the analysis review due to its limited rural population. Given that New South Wales, Victoria and Queensland are home to the majority of Australian children, a total of ten LGAs in each of these states were selected and analysed. In Western Australia, only the bottom six were selected, given the particularly large size of the state, and the notably sparse number of children who lived in many of these areas. Moreover, given the large landmass in each identified LGA and their particularly small population, only four LGAs were selected in Tasmania, and three in South Australia.

NSW summary and analysis

Where

Of the 10 LGAs in NSW identified as having the greatest risk of poor developmental outcomes in children, 6 are located in the Western NSW District[11]. While LGAs in the Western district continued to be identified against most of our set of vulnerability indicators (e.g. high rates of childhood poverty, disproportionately poor AEDC outcomes etc.), it is important to note that this district contains significantly more LGAs than the other 3 districts that also came up in our search. However, results from the 6 LGAs in the Western district are reflective of disproportionately high rates of disadvantage in this area of NSW. LGAs in the Far West, Northern and Mid-North Coast districts are also included, indicating an over-representation of vulnerability in selected pockets of these districts.

What

There are several factors that children living in all 10 LGAs have in common, which increase the risk of ongoing developmental vulnerability and poor developmental outcomes.

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[10] It is important to reiterate that while the review set out to find rural and remote LGAs in each state that had a) the greatest proportion of children with developmental vulnerabilities; and b) the greatest risk factors associated with developmental vulnerabilities, LGAs in metropolitan areas were not omitted from our search. However, upon analysis of the data, we found that LGAs that met the above noted requirements (i.e. had the greatest proportion of children with developmental vulnerabilities and the greatest risk factors associated with developmental vulnerabilities) were overwhelmingly located in rural and remote Australia.

[11] Each of the 10 selected LGAs are tied to a unique 'district' in NSW, reflecting geographical boundaries set by the NSW Department of Family and Community Services (FACS) and the NSW Health Department.

Aboriginality. There is a high concentration of Indigenous children. In 3 of the 10 LGAs, over 50 per cent of the children who participated in the AEDC are Indigenous. The proportion of Indigenous children in the other LGAs are anywhere between 20-45 per cent of the AEDC population.

Poverty. Children in these LGAs experience disproportionately higher rates of poverty than their adult counterparts. While poverty data is not available by Aboriginality, it is important to note that more Indigenous Australians (19.3 per cent) live below the poverty line than their non-Indigenous counterparts (12.4 per cent) (ACOSS, 2014). Overall, NSW has the second largest proportion of childhood poverty (after Tasmania), exceeding the national average.

Sole parent households. Children in these areas are more likely to live in single parent families. This is significant, because we know that sole parents are more likely to experience poverty (33 per cent) (ACOSS, 2014) and housing stress (Cooper, 2001).

Unemployment and mother's educational attainment. Children in these areas are more likely to live in jobless families and in families where the mother has a low educational attainment. These determinants are often interrelated and/or co-existing. For example, employment status is typically related to educational attainment, and economic status is often related to employment status and so forth.
FDV and child protection involvement. The rates of reported FDV incident and child protection involvement are substantially higher in these areas than the rest of NSW. Overwhelming evidence supports the correlation between children's exposure to FDV and the increased likelihood of adverse outcomes in all 5 domains of the AEDC (Kaufman & Henrich, 2000; De Bellis & Thomas, 2003; Bogat et al., 2003).

Preschool participation. Children in these areas have lower than average preschool participation rates. Research supports that vulnerable and disadvantaged children have the most to gain from participating in quality early childhood education (ECE). Despite this finding, children in these areas are under-represented in ECEC services. This is also significant as many of the children in these areas required further assessment to determine their special needs status, something which is more likely to have been established if a child regularly attends preschool in the year before school. Alarmingly, ABS data reveal that the proportions of children enrolled for 15 or more hours of preschool each week are similar across the SEIFA quintiles in all states and territories except for New South Wales, which has a gap of 13 percentage points between the least disadvantaged and most disadvantaged areas (74.5 and 61.5 per cent respectively) (ABS, 2016).

Deteriorating developmental outcomes. Overall, emerging trends in all 10 LGAs indicate an increase in the number and proportion of children who are developmentally vulnerable across all 5 AEDC domains.

Gaps vs needs

While there are some services in each of the noted districts, particular gaps are evident between the accessibility and availability of appropriate services and the prevalent needs of children in these areas:

- *Distance.* Low population density and large distances mean that specialised services (i.e. allied health/ paediatricians) are generally not provided in close proximity to where they are needed most. Overall, most of the services listed are located anywhere between one to six hours away from some of the LGAs they cover. This is a significant burden on families to who need to access these services and the lack of reliable public transportation further compounds this issue. This is of significant concern, given the total number of children identified in the AEDC as developmentally vulnerable who would benefit from professional support.
- *Sessional care.* Most of the services listed above appear to provide allied and paediatric health services on a sessional basis (in some instances only once a month) and generally not on an out-reach basis. There are various consequences of providing sessional care, most importantly: limited opportunity for health professionals to gain adequate knowledge of the client (and their community), which is required for providing informed care; longer wait times for specialised services; and in some cases, inability to provide care in a way that reflects the needs of the child and family and improves outcomes
- *Service availability.* Overall, with the exception of only a few LGAs,[12] allied and mental services simply do not exist in most of the identified LGAs. Although there are services which extend their service range to these LGAs, factors listed above (distance, sessional care, waiting times) make it challenging for families to access these services in a timely, economically feasible, and comfortable manner.
- *Telehealth.* A 2015 review (Nous Group, 2015) of telehealth in NSW found that telehealth uptake across Local Health Districts (LHDs) and Specialty Health Networks (SHNs) is variable and that at a state-wide level, the maturity of telehealth services in NSW compared to other Australian (particularly Queensland and WA) and international jurisdictions is mid-range. Current telehealth initiatives operate across a range of clinical specialties, clinical service types and non-clinical uses, but often as pilots or separate 'telehealth' projects (as opposed to business as usual) and uptake remains patchy across NSW. Usage varies across LHDs and SHNs, and by remoteness.

  Moreover, the review found that telehealth facilities are mostly available in majority hospitals and community health centres, and tend to be concentrated in public health care facilities. In some cases, they are also used by paediatricians. However, it was found that the level of integration of telehealth-enabled models of care between LHDs, and service providers and receivers across NSW is relatively low. This is primarily due to inconsistencies in infrastructure which result in a lack of interoperability.

  Various private service providers and NGOs do provide developmental services to children and families in the identified LGAs using technology (telehealth or telecare). However, there are a number of barriers to scaling these services, most notably funding.

[12] e.g. Far West has 3 services which are actually located in Broken Hill, however, given that these services are providing support to other LGAs in the Far West, particular consideration should be given to things such as waiting time and availability

Victoria summary and analysis

Where

Of the ten selected LGAs in Victoria, two are located in remote Victoria, while the rest are found in "inner" or "outer" regional Victoria (described as "rural" Victoria for the purpose of this document).
LGAs are spread out evenly across Victoria and cover a large geographic area.

What

More children. Overall, the number of children included in the AEDC data and the number of children experiencing (or at risk of) vulnerability in each LGA was greater in the Victorian group, as compared to NSW. This is likely to be the result of LGAs that have a greater population density.

Lower proportion of Indigenous children. The proportion of Indigenous children in each LGA (and in the AEDC) was significantly lower in Victoria, as compared to NSW. However, this was to be expected given that 6.4 per cent of all Indigenous children live in Victoria, as opposed to 29.7 per cent who live in NSW. Despite this, the proportion of Indigenous children included in the AEDC in each LGA was overall higher than the proportion of all Indigenous people in that area. This is reflective of the fact that Indigenous children makeup a significant proportion (36 per cent) of the entire Indigenous population.

Poverty, unemployment and mother's educational attainment. Disproportionately higher rates of child poverty, as compared to the entire population, continue to be an issue in each of the selected Victorian LGAs. This demonstrates that children in these areas experience poverty at greater rates than their adult counterparts in their communities. Higher rates of unemployment and lower rates of educational attainment amongst mothers are also reoccurring factors in these LGAs.

Sole parent households. Similar to NSW, children in these Victorian LGAs are more likely to be living in single parent households than their state counterparts, with the corresponding implications for poverty and housing stress. This is significant because we know that sole parents are more likely to experience poverty (33 per cent) (ACOSS, 2014) and housing stress (Cooper, 2001). We also know that Indigenous children are more likely to live in single parent households (ABS, 2012) and experience poverty than their non-Indigenous counter parts. As such, it is likely that many of the children who are experiencing poor developmental outcomes are exposed to multiple and concurrent risk factors.

FDV. While child protection data is not available at the LGA level in Victoria, the rates of reported DV incidents are substantially higher in these areas than the rest of Victoria, increasing the likelihood of adverse developmental outcomes in all 5 domains of the AEDC (Kaufman & Henrich, 2000; De Bellis & Thomas, 2003; Bogat et al., 2003).
Preschool participation. On average, children in these areas have lower preschool participation rates than the Victorian average. This is of concern because research indicates that vulnerable and disadvantaged children have the most to gain from participating in quality ECEC. Victoria does not collect Indigenous enrolment rates by LGA, however, we know that Indigenous children in Victoria (and across Australia) have a notably smaller participation rate in ECE services than their non-Indigenous counterparts. It should also be noted that

attendance rates are generally lower that enrolment rates and the proportion of children meeting the objective of 15 hours of attendance per week are lower still, particularly for Indigenous children.

Deteriorating developmental outcomes. - Overall, emerging trends in all 10 LGAs indicate either a stagnation in vulnerability rates or (for the most part) an increase in the number and proportion of children who are developmentally vulnerable across all 5 AEDC domains.

Gaps vs needs

Compared to NSW, allied and mental health services (including Indigenous specific services) appear to be located within the identified LGA more frequently in Victoria. This is likely the result of several factors, including the greater population density in each of the Victorian LGAs; and the smaller geographic area that each Victorian LGA covers. Victoria appears to have employed a wider and more efficient use of telehealth than in NSW and development of models of care for rural and remote communities that have telehealth as a central component of delivering care is increasingly growing in Victoria.

Although, it might seem that this would address issues relating to distance and travel time, in reality, service gaps for children are still present in Victoria.

Factors contributing to existing gaps include (but are not limited to):

- *Distance*: It is evident (from the estimated distance between each service and its respective LGA) that families are still expected to travel on average 100-200 KM to reach the required service. Families who do not have access to personal transportation face longer times and distance, as a direct route between the LGA and the service may not be available. A 2016 review of Victoria's rural and regional health system (Deloitte, 2016) found that providing local access as a blanket strategy across Victoria is not always viable, hence the availability of services locally would be made a) where it is safe to provide the service locally, and b) when the care is accessed frequently. For all other scenarios, families may have to travel or technology must be used to access care, and the healthcare system must endeavour to provide all necessary supports to ensure access. The degree to which this is taking place is unknown. However, given the disproportionately poor child outcomes in the 10 selected LGAs, it is reasonable to conclude that there is room for greater improvement.
- *Sessional care*- Similar to NSW, where available, allied health services and paediatricians servicing the identified LGAs are often only available on a sessional basis, and do not provide frequent interventions, in particular to support more intensive therapy where needed.
- *Service availability*- While mental and allied health services seem to be more centrally located for LGAs in Victoria, it is important to acknowledge that these services provide support to a large geographic area (contributing to greater demand and waiting times). Moreover, available allied health services do not specifically cater to children and young people, but rather serve the entire community, raising questions about the suitability /quality of the service for children with more complex needs. Of great concern is what appears to be a large gap in the availability of paediatric services. Where available,

paediatricians appear to only be provided in hospital settings and even then, arduous travel times are a common factor.

- *Preschool availability*- The Municipal Association of Victoria (MAV), a leading provider of early education services in Victoria, highlights a distinct lack of diversity of early childhood education services and providers, particularly long day care providers, which would enable families to have choice of ECEC in rural and remote areas. They call for a multi-level government response to address existing issue around service accessibility for children living in rural and remote areas.

Overall, there is an observed gap between service availability/accessibility and the need for appropriate early intervention services amongst some of the most vulnerable and disadvantaged areas across Victoria.

Queensland summary and analysis

Where

Of the ten selected LGAs in QLD, nine are remotely located and one is located in outer regional QLD. Far North, North and South West Queensland each have more than one associated LGA, while the rest are evenly distributed between Central, South East and Northern regions.

What

Overwhelming rates of vulnerability. Overall, the number of children included in the AEDC and the number of children experiencing (or at risk of) vulnerability in each LGA was similar to that of NSW, and smaller than VIC. However, the proportion of vulnerability, captured in the percentage of children developmentally vulnerable across one or more domains, was significantly higher in QLD, with many LGAs showing over 50 per cent vulnerability across one or more domains.

Majority Indigenous population. While NSW has the highest number of Indigenous children, the LGAs which were identified in QLD have a much larger proportion of Indigenous children and families, possibly because QLD has more very remote areas (which have higher proportions of Indigenous people) than NSW. In fact, a significant number of the selected LGAs are Indigenous communities, where over 90 per cent of the population are Indigenous.

Disproportionate exposure to risk factors. Disproportionately higher rates of child poverty, social exclusion and family unemployment are present in each of the selected QLD LGAs. Children in these areas experience poverty and exclusion at greater rates than their adult counterparts. This is clearly linked to the alarmingly high proportions of children who experience developmental vulnerabilities across multiple domains.

Early intervention. A significant proportion of children in the selected LGAs are identified by the AEDC as needing further assessment to determine their health and development status (i.e. to determine whether or not they are of special needs status). The remote geographic location of these LGAs, coupled with disproportionately low preschool enrolment rates, raises serious concerns about the nature of early childhood services and supports in these highly vulnerable communities across QLD.

Preschool participation. Preschool enrolment rates in the year before school are particularly low (overall lower than Victoria and New South Wales) for the ten selected QLD LGAs. Enrolment rates, as low at 37 per cent, raise questions about the accessibility of early childhood education (ECE) services in areas that are experiencing poor outcomes across a host of social determinants of health and well-being.

Deteriorating developmental outcomes. Similar to Victoria and New South Wales, emerging trends across all 10 LGAs indicate either a stagnation in vulnerability rates or (for the most part) an increase in the number and proportion of children who are developmentally vulnerable across all 5 AEDC domains.

Gaps vs needs

Compared with New South Wales and Victoria, QLD appears to have a larger number of Aboriginal Community Controlled Health Services (ACCHS) supporting the selected LGAs. This is well-aligned with the fact that a significant majority of children and families living in the ten selected LGAs are Indigenous Australians.

However, while ACCHSs provide the majority of primary healthcare services to Indigenous Australians, specialist services in remote Queensland are primarily delivered through Hospital and Health Services (HHS). Being Australia's second largest state in terms of geographical area covered, distance plays a significant factor in families' ability to access services. To address this issue, the Queensland Rural and Remote Health Service Framework, developed in 2014, provides extensive consideration of the role of Telehealth in service delivery. Notably, Queensland operates one of the largest managed telehealth networks in Australia. A scan of available allied health services reflects this, with an overwhelming majority of services (including mental health services) providing telehealth options.

Telehealth is of particular importance in the context of Queensland for three primary reasons: 1) the significant geographical land mass that Queensland covers; 2) the Indigenous majority population of remote QLD; and 3) the urgent need for specialised services as reflected in the disproportionately poor health and well-being outcomes in these areas.

A 2016 systematic review of telehealth for the provision of healthcare to Indigenous people found that telehealth provides a wide range of advantages for Indigenous healthcare service delivery. Notably, it found: a reduction in travel time equated to greater access to specialist care; less mental distress and alienation from families having to transfer from local community to regional centres to access health specialists; and decreased failed to attend rates and improved screening rates (Caffery, Bradford, Wickramasinghe, Hayman & Smith, 2016). These findings echo other studies which have found that poor access to culturally appropriate health services, dislocation from cultural support systems and poor communication with mainstream healthcare providers negatively affect Indigenous people's health and well-being (Aspin, Brown Jowsey, et al, 2012). Specialist services delivered by telehealth to a family may obviate these negative effects, especially if communication with the healthcare provider is aided by a local Aboriginal Health Practitioner (Taylor, Thompson, Smith, et al, 2009).

While Queensland continues to expand its incorporation of telehealth, there are existing gaps between what is provided and what is noticeably needed. For example, similar to New South Wales and Victoria, a significant number of allied health (including mental health) services are provided on a rotational basis, even when provided through telehealth. Issues associated with this, such as extended waiting times and the quality of the service provided, have been discussed in earlier sections of this report.

While a scan of appropriate services in this report did not include early childhood education and care services, preschool enrolment rates in these ten selected LGAs, highlighted by the AEDC, clearly reflects a disconnect between available ECE services and community needs. This does not relate only to the physical availability of ECE services, but also to the quality and accessibility (including cultural safety) of the service provided. While a review of ECEC services are beyond the scope of this report, this is a significant point of consideration, given the particularly large Indigenous populations in these areas. Studies show that while Indigenous preschool participation rates are influenced by the same factors as non-Indigenous households (parental education, household income etc.), the influence of these variables are greater in Indigenous households (Biddle, 2007).

Overall, issues relating to distance, sessional care, availability of appropriate services and the context in which services are provided (e.g. cultural safety), all contribute to existing gaps between community needs and service provision. These gaps are manifested in disproportionately poor health and developmental outcomes among children who reside in these areas. Given that in Queensland an overwhelming majority of these children are Indigenous, particular consideration must be provided to the social and economic inequalities that are experienced by Indigenous Australians. Better outcomes for Indigenous children in particular cannot be appropriately addressed without addressing the underlying social determinants of their health and developmental outcomes.

Western Australia summary and analysis

Where

Of the six selected LGAs, all bar one is located remotely. Of these, four are in the Kimberley region, one in the Pilbara (directly beneath the Kimberley region) and one in the Great Southern region.

What

Landmass and geographic isolation. WA is the largest state in Australia with a total land area of 2.5 million square kilometres. While WA's Western Australia's population represents 11 per cent of Australia's total population, it is sparsely populated, with a rate of 1.0 person per square kilometre (the second lowest of all States and Territories following the NT, and compares with 3.1 people per square kilometre for the nation) (Government of Western Australia Mental Health Commission, 2015).

Similar to Queensland, Western Australia covers a significantly large area of land and the distance between the identified LGAs and major towns, where most services are delivered, is a significant determinant of timely access to relevant services.

Increasing rates of vulnerability. Emerging trends from the AEDC indicate an alarming increase in children's developmental vulnerability rates in their first year of school across all five developmental domains in all six LGAs. These results are reflective of poor outcomes across a host of social determinants of health and well-being, such as childhood poverty, family unemployment and statutory child protection involvement.
Large Indigenous representation. Indigenous people make up approximately 3.8 per cent of Western Australia's population (ABS, 2011), however comprise anywhere between 78 per cent and 91 per cent of the total population in each identified LGA. This highlights a distinct relationship between Aboriginality, socioeconomic disadvantage and disproportionately poor developmental outcomes.

Alarmingly, an overwhelming majority of children in out of home care in all four identified regions are Indigenous (99 to 100 per cent in the Kimberley). For many Indigenous people, the ongoing effects of separating children from their families compounds other social disadvantages.
Research shows that Indigenous peoples in WA also experience higher levels of psychological distress than non-Aboriginal people. Indigenous peoples also have higher exposure to a range of risk factors for mental ill health, compared to non-Indigenous people (AIHW, 2013).

Low preschool enrolment. While preschool enrolment rates are overall higher than those in the Queensland LGAs, they remained lower than the Western Australian and national average. It is important to note that enrolment rates are not reflective of attendance rates, which are often lower. It is widely recognised that Indigenous preschool enrolment and participation rates are notably lower than that of non-Indigenous children.

In Western Australia, the overall rate of preschool attendance amongst Indigenous children was 87.7 per cent compared to 96 per cent across the State. Low preschool engagement makes early intervention and prevention much more challenging and contributes to the widening gap between Indigenous and non-Indigenous health and well-being outcomes.

Special needs status. In all the identified LGAs, the AEDC highlights a noticeable trend in the proportion of children who have special needs status AND those who required further specialised assessment. While the proportion of children are of special needs status is consistently low, the proportion of those needing further assessment remains consistently high across all six LGAs. This raises questions about the accessibility of appropriate services and the supports available to children and their families.

Poverty. Similar to children in the selected LGAs in New South Wales, Victoria and Queensland, children in Western Australia experience poverty at a noticeably higher rate than their adult counterparts who reside in the same LGA. Children in these LGAs are particularly vulnerable to poverty given that factors such as living in single parent households, Aboriginality, and family unemployment significantly increase a child's risk of experiencing prolonged poverty (Australian Council of Social Service, 2016).

Gaps vs needs

The dire need for accessible and quality services in these remote and largely indigenous regions of Western Australia is undeniable. For example, research from the Western Australian Aboriginal Child Health Survey (WAACHS) show that Indigenous children in more isolated areas are not only at greater risk of impaired hearing, but that risk occurs at an earlier age (Zubrick et al., 2004). Alarmingly, the co-existence of multiple types of infection in children are found to positively correlate with level of family financial strain. Hearing problems have adverse consequences for language development and learning, which in turn are reflected in alarmingly poor AEDC outcomes for children in these regions. Moreover, AEDC results indicate that overall, existing gaps between children in remote and rural areas and those in metro areas are becoming progressively larger.

Such consistently poor outcomes raise questions about the accessibility and quality of appropriate services for children and their families in these areas. According to a new classification of geographic remoteness from services, the Level of Relative Isolation (LORI), designed by WAACHS, all bar one (Katanning) of the identified LGAs experience high to extreme isolation from appropriate health services (Zubrick et al., 2004). This classification uses categories which are responsive to trends in accessibility to services and facilities (the distance by road to the nearest service centre; adherence to Indigenous culture and language; and health outcomes for Indigenous people).

A scan of available services in the three outlined regions echoed these classifications, resulting in minimal findings. We found that there was a scarcity of information about the existence of paediatric health services in these remotely situated communities. Surprisingly, unlike New South Wales, Victoria and Queensland, accessing information regarding available services in the six LGAs (and in the three regions) was particularly challenging. While the WA Country Health website[13] offers a directory of available services by region, our search resulted in a very limited number of matches. Moreover, where a match was found, there was generally minimal information provided regarding the nature of the service, how to access a website for the service, and referral information. Overall, it appeared that a majority of available services provide general health care support (e.g. General Partitioner, Nurse and Aboriginal Health Worker), while a limited few offer allied health services on a sessional basis.

Mental health support for children 0-12 was significantly difficult to find, particularly anywhere outside of major townships. While Child and Adolescent Mental Health Services (CAMHS) are available in Broome and South Hedland, they are considerably far from remote communities and often have considerable wait times. A recent inquiry by the Commissioner for Children and Young People in Western Australia (CCYPWA) found that CAMHS is significantly under resourced and that because priority is given to urgent and severe concerns, there is limited capacity to provide early intervention and treatment services for mild to moderate mental health problems (CCYPWA, 2013). A lack of systematic identification and assessment processes and lengthy delays for referrals are also identified.

[13] http://www.wacountry.health.wa.gov.au/index.php?id=433&no_cache=1

Moreover, research carried out by CCYPWA (2012) reflects our challenge in finding mental (and other allied health) services that cater for children in these regions. The Commission found overwhelming evidence regarding the lack of services and programs in regional and remote communities to address the mental health and overall wellbeing of children and young people. They also found that the significant travel distances by mental health professionals to deliver a service in regional and remote areas have a negative impact on already limited service capability, and that a lack of access to mental health professionals meant that it was not possible to arrange referrals when mental health issues are first identified.

We were also unable to identify any specialist services (for children with learning disabilities and/or developmental delay) in or near the identified LGAs in WA.

South Australia summary and analysis

Where

Of the three identified LGAs, one is located remotely and two are in outer regional SA, indicating a high level of geographic isolation.

What

Landmass and small communities. The identified communities have a small population density and cover approximately one million square kilometres, making service accessibility particularly challenging. There is a lack of suitable public transport options across country South Australia, particularly for those residing in the remotest parts of the state (Government of South Australia, 2008).

Large Indigenous representation. The disproportionate concentration of vulnerabilities (and exposure to co-occurring determinants known to impact health and wellbeing outcomes) in Indigenous communities is a reoccurring theme which extends to South Australia. While South Australia accounts for only 5.4 per cent of the Indigenous child population, Indigenous children represent up to 94.4 per cent of all children in some of these most disadvantaged communities in SA.

Language barriers. 39 per cent of all children in the APY Lands are non-English proficient. The Coordinator General for Remote Indigenous Services (2012) found that South Australia's use of Indigenous language interpreters was a critical component of successful community engagement (Government of South Australia, 2012).

Child protection. The issue of child sexual abuse is ever present in the Lands. The Children on APY Lands Commission of Inquiry (Commission of Inquiry South Australia, 2008) concluded that many children in the Lands live in dysfunctional communities where there is considerable violence and fear, drug and alcohol abuse and a sense of hopelessness.

Increasing rates of vulnerability. Emerging trends from the AEDC indicate an alarming increase in vulnerability rates of children when they start school across all five developmental domains in all six LGAs.

Special needs status. The proportion of children who are either of special needs status or require further assessment by a specialist is noticeably high in all three areas.

Poverty. Similar to children in the four jurisdictions thus far, children in South Australia experience poverty at a noticeably higher rate than their adult counterparts who reside in the same area.

Gaps vs needs

For children and families who live in these identified areas, geographic isolation and long distances are part of the everyday reality of accessing appropriate services. Limited resources, Lack of suitable public transport options, lower socioeconomic status, increased family breakdown and social isolation only add to these challenges. Again, Indigenous children face a much greater chance of being exposed to these negative social determinants of health and face disproportionately high developmental vulnerabilities and risk of poorer outcomes.

The presence of Aboriginal Community Controlled Health Services (ACCHS) is vital in light of research which shows that its focus on prevention, early intervention and comprehensive care can reduce Indigenous specific barriers to access, progressively improving health outcomes for Indigenous families (Panaretto, Wenitong, Button & Ring, 2014). As such, working in partnership with ACCHS is central to successfully engaging Indigenous families in prevention and early intervention services and improving developmental outcomes for Indigenous children. Supporting a strong Indigenous workforce, creating opportunities for career advancement, and the implementation of selection processes that are culturally suitable are also important for positive Indigenous child health and development outcomes into the future. The principles for facilitating Indigenous employment across the health system includes access and equity, responsiveness, cultural suitability and respect, effective service responses and accountability (Health Performance Council, 2013). Particular attention must be given to the high rates of Indigenous children in care (In South Australia, Indigenous children are 10 times as likely as non-Indigenous children to live in out-of-home care) (South Australia Department of Health, 2010) and the impact that this has on health and developmental outcomes. Without addressing these social determinants of health, in conjunction with issues of service accessibility, improving outcomes for Indigenous children will be difficult.

Moreover, the Australian Institute of Health and Welfare (2011) showed that Indigenous Australians have substantially higher disability rates at younger ages than non-indigenous Australians. This was reflected in the AEDC which showed a large number of children in need of further assessments to determine their health and developmental status (and needs). In its South Australian Market Position Statement (MPS), the National Disability Insurance Agency (NDIA, 2016) highlights a lack of provider choice by participants in remote and very remote areas with many would be providers not yet accessing the NDIS.

Access to mental health services is also an issue for children and families in remote and rural SA. According to a 2013 review by the SA government (Health Performance Council, 2013), the lack of available services, and knowledge of available services (and how to access them) creates an accessibility barrier for rural and remote populations in SA, which is often magnified by stigma and a culture of self-sufficiency. This is even more

prominently experienced by specific populations, particularly Indigenous and culturally and linguistically diverse people.

The review also highlighted issues associated with the aging workforce in rural/remote SA, noting that over 60 per cent of the doctors in these areas are aged 45 and above. This means that SA will lose a substantial number of highly qualified and experienced health professionals (from its already over-stretched workforce) in the coming years. Replacing them will present challenges to the health system as a whole, particularly the pending retirement of many health professionals (Health Performance Council, 2013).

Tasmania summary and analysis

Where

Tasmania has a small, widely distributed population. The population is one of the most regionally dispersed of any state or territory and has the highest proportion of its population residing outside the greater capital city. Of the four identified LGAs, all bar one is located in the Southern region of Tasmania.

What

Comparatively larger communities. Compared with the other states, the identified LGAs in Tasmania are overall more densely populated. This was reflected in the larger number of children in the 2015 AEDC (e.g. there were 309 children who were included in the 2015 AEDC in Brighton 596 children in Glenorchy).

Large Indigenous representation. Despite the fact that only 3.6 per cent of all Indigenous children reside in Tasmania, the proportion of Indigenous children represented in the AEDC in TAS is noticeably large. Overall, Tasmanian rural communities have a higher proportion of self-identifying Indigenous peoples (5.7 per cent) compared with Australian rural communities overall (3 per cent) and this proportion increases to 7 per cent in remote areas (Primary Health Tasmania, 2016).

Moreover, despite the fact that Indigenous peoples accounted for less than 8 per cent of the population in the identified LGAs, Indigenous children made up to 15.2 per cent of the children who were included in the 2015 AEDC.

Family violence. While we could not access recent child protection data in Tasmania, we do know that a significant majority (over 70 per cent) of all child protection notifications involve an incident of FDV to which a child is exposed. Rates of FDV are higher in regional, rural and remote areas (Campo & Tayton, 2015). Geographical isolation is also a barrier to accessing support or disclosing violence (George & Harris, 2015).
Increasing rates of vulnerability. Emerging trends from the AEDC indicate an alarming increase in vulnerability rates across all five developmental domains in all bar one LGA. The reason for a notable decrease in this one area is not known.

High rate of preschool enrolment. The proportion of children in the AEDC enrolled for preschool in the year before school was noticeably high across all four LGAs, compared to the state and national average. This was in direct contrast to LGAs in all other jurisdictions that have been reviewed thus far. It is possible that this

because Tasmania is one of only two jurisdictions where preschool services are provided at no compulsory cost to parents.

However, we know that enrolment does not always equate to attendance, and the disproportionately high rates of developmental vulnerably in these areas raise questions about the quality and accessibility of ECEC services in these areas and also the amount of time spent in ECEC. For example, children enrolled in preschool for 20 hours or more per week in the year before school (2011) have the lowest proportion of developmental vulnerability on two or more domains (4 per cent), followed by those enrolled for 11 to 14 hours (8 per cent). Children enrolled in preschool for between 1 and 10 hours per week have the highest proportion of developmental vulnerability on two or more domains (14 per cent) (ABS, 2014).

Poverty. Tasmania has the highest proportion of people who experience socioeconomic disadvantage, compared to other states in Australia. Socio-economic disadvantage is more common in rural communities. Similar to children in the other states, children in the identified LGAs experience poverty at a noticeably higher rate than their adult counterparts who reside in the same LGAs, and children in other parts of the state.

Gaps vs needs

Health services in Tasmania's rural and remote communities are predominantly primary health services.

A scan of available services in the selected regions produced minimal results, particularly for appropriate mental health services. While CAMHS is available, as previously noted, this service works predominantly with acute cases and often does not have the capacity to provide prevention or early intervention services. Furthermore, there are no dedicated child and adolescent mental health inpatient units in Tasmania. When admission is necessary, this either occurs on the paediatric wards or they are specialled in the adult mental health unit. Tasmania has below national average expenditure by state government on child mental health services (in Tasmania, general adult services may care for older persons and children and adolescents).

Overall, there are more generalist service providers, such as general practitioners and registered nurses, with limited availability of allied health professionals. Most specialist services are provided on rotation by visiting professionals. The Rural Health Outreach Fund (RHOF) facilitates the delivery of outreach services by some of the above noted service providers, given that two of the four priority areas of the RHOF are mental and paediatric health.

The use of telehealth services in the selected LGAs appears limited. Results are reflective of a 2015 review by the Tasmanian Government (Department of Health and Human Services, 2015) which found that telehealth facilities are used well for departmental meetings and clinical networks, but not so well for patient care. It noted that the current process remained complicated, time intensive, and inadequately supported to position telehealth as a practical alternative to face to face consultation where clinically appropriate.

4.6 Summary

The review sought to identify LGAs in all five Australian states that had the highest proportion of children who were developmentally vulnerable, as well as LGAs with the largest concentration of adverse social

determinants known to negatively impact childhood developmental outcomes. We found that LGAs in rural and remote Australia consistently made up an overwhelming majority of those LGAs that met these criteria.

The review supported AEDC findings which showed that the proportion of all children experiencing developmental vulnerabilities increased exponentially with remoteness: children in remote areas in all jurisdictions are twice as likely as children in major cities to be developmentally vulnerable on one or more domain(s) (47.0 and 21.0 per cent), and three times as likely to be developmentally vulnerable on two or more domains (31.8 and 10.2 per cent). It also supported the large body of evidence which shows that Indigenous children are not only more likely to experience inferior developmental outcomes, but are also significantly more likely to reside in areas where they are exposed to concurrent and long-term factors which can significantly increase the likelihood of adverse developmental (and other lifelong) outcomes. This is likely the result of multiple co-occurring factors, including (but not limited to) the fact that Indigenous children are more likely to reside in remote and very remote areas (where they have limited access to services- particularly culturally appropriate services).

Overall, from 2009 to 2015, the gap between the proportions of developmentally vulnerable children in the most disadvantaged areas (including those in rural and remote areas), relative to the least disadvantaged areas, widened across all five domains. For example, for the language and cognitive skills domain, children in very remote areas in 2009 were 3.8 times more likely than children in major cities to be developmentally vulnerable, increasing to 4.8 times more likely in 2015 (AEDC, 2015).

Children living in very remote Australia were 2.6 times more likely to be developmentally vulnerable than children living in major cities. The increase in developmental vulnerability between 2012 and 2015 was not restricted to children in remote and very remote locations (AEDC, 2015). Children who live in rural areas also recorded a significant increase in the proportion who were developmentally vulnerable on two or more domains (11.2 to 11.7 per cent in 2015). The gap between developmental outcomes for children who live in major cities and those in outer regional (rural) and remote areas has not closed since 2009 (AEDC, 2015). Additionally, children in the identified LGAs (in all 5 states) overall experienced a significant increase in vulnerability rates across all 5 domains from 2012 to 2015. Of the children in these LGAs who were not assessed as developmentally vulnerable, a significant proportion of them were assessed as being at risk[14] of developmental vulnerabilities. As such, the proportion of children who were assessed as being developmentally on track was overall low, compared to the national and state average, across a significant majority of the identified LGAs in all 5 states.
Overall, the percentage of children in rural and remote areas, who were developmentally vulnerable or developmentally at risk was significantly higher in 2015 than 2012. Children in rural areas tended towards an increase in the proportion who were developmentally at risk (15.2 to 16.5 per cent).

[14] The AEDC defines children who are 'at risk' of developmental vulnerability as those who experience some challenges that interfere with their ability to cope with various aspects of their school day (in line with the 5 key outcomes areas). For further information please refer to: http://www.aedc.gov.au/resources/detail/about-the-aedc-domains

The proportion of special needs status children decreased slightly from 4.9 per cent in 2012, to 4.7 per cent in 2015. The proportion of children identified by teachers as requiring further assessment increased from 10.3 per cent in 2012, to 11.6 per cent in 2015.

Moreover, the review found that while Indigenous children accounted for 5.7 per cent of all children in the 2015 AEDC, they comprised up to 94.4 per cent of children in areas with some of the highest rates of developmental vulnerability. Overall, in 2015, Indigenous children were twice as likely as non-Indigenous children to be developmentally vulnerable on one or more (42.1 and 20.8 per cent) and two or more domains (26.2 and 10.2 per cent) at the time they started school. The largest difference between Indigenous and non-Indigenous children was on the language and cognitive skills domain where Indigenous children are nearly four times more likely to be developmentally vulnerable than non-Indigenous children (20.2 and 5.7 per cent respectively).

Indigenous children are also significantly more likely to experience risk factors associated with increased likelihood of adverse health and developmental outcomes in early childhood. For example, they are seven times more likely than non-indigenous children to have involvement with child protection services (AIHW, 2016) and eleven times more likely to be placed in out-of-home care (often with non-Indigenous families outside of their community). Evidence shows that these numbers are steadily increasing (AIHW, 2016).
The review also supported a growing body of evidence which consistently highlights the struggle of families in rural and remote Australia in accessing appropriate services in a timely and convenient way. It is evident that the small population base across all of the identified LGAs (and indeed all of rural and remote Australia) simply does not support the range of specialist services that many families with young children need to access. Paediatricians, allied health professionals, and early intervention services are particularly challenging to access in rural/remote Australia, despite the fact that they play a significant role in supporting families and assisting in the development of children, particularly those with additional support needs.

Overall, children who experienced the most inferior developmental outcomes in all the states were children who lived in rural and remote areas- where outcomes became progressively worse with remoteness. Lack of appropriate services, long travel distances, lack of appropriate public transportation, long waiting lists, and not having access to a paediatrician who could make a referral to other required services, were just some of the issues which were consistently echoed across all the states.

5. Who are they?

This section looks at the overall profile of children residing in rural and remote areas in each Australian jurisdiction.

The review found that children in rural and remote areas share some common characteristics.

5.1 They experience poverty at disproportionately higher rates

Children in remote and rural areas across Australia experience poverty at disproportionately higher rates than children in major cities (Harding, McNamara, Tanton, Daly & Yap, 2006; Phillips, Miranti, Vidyattama & Cassells, 2013). Children in these areas also face higher rates of poverty than their adult counterparts living in the same area (Phillips, Miranti, Vidyattama, & Cassells, 2013).

According to the Productivity Commission (2013) those in small country towns and rural areas face the highest rates of economic exclusion, compared to their inner city counterparts (McLachlan, Gilfillan & Gordon, 2013). Moreover, the costs of essentials such as food and petrol increase with remoteness, so that in very remote areas they are respectively about 15–20 per cent and 10 per cent more expensive than in capital cities (National Rural Health Alliance, 2015). The cost of health care (including associated travel and accommodation) also increases with increasing remoteness. In some states, energy costs are also higher in rural and remote areas than metropolitan areas (National Rural Health Alliance, 2015). A 2014 Ernst and Young survey found that people in regional areas are considerably less likely to report they can afford their electricity bill than their city dwelling counterparts (78 per cent in regional areas, compared to 49 per cent in cities) (Ernst and Young, 2014).

Those who are disproportionately more vulnerable to poverty are sole parents, unemployed people, families relying on social security, Indigenous people and people living with a disability. There is a higher proportion of all of these population groups in rural and remote areas than in major cities (National Rural Health Alliance, 2015). A recent study by Zhao and colleagues (2013) found socioeconomic disadvantage in the Northern Territory accounted for 42 to 54 per cent of the life expectancy gap between Indigenous and non-Indigenous Australians (Zhao, Wright, Begg & Guthridge, 2013).

A significant body of evidence highlights the strong correlation between childhood poverty and adverse health and developmental outcomes in later life (Goldfeld & West, 2014; Kruk, 2013; Hertzman et al., 2010; Strategic Review of Health Inequalities in England post-2010 Committee, 2010). Research shows that children who experience poverty are less likely to live in cognitively stimulating environments, have less access to books, fewer age-appropriate toys, fewer informal learning settings, fewer educational materials, and spent more time in front of the television (Bradley & Corwyn, 2002; Evans, 2006; Duncan, Ziol-Guest & Kalil, 2010).

In Australia, the link between childhood poverty and poor developmental outcomes can be seen in the AEDC outcomes, which clearly show an increase in the proportion of children experiencing developmental vulnerability with increased socioeconomic disadvantage. Children living in the most socioeconomically disadvantaged locations in 2015 were twice as likely as those from the least disadvantaged areas to be developmentally vulnerable on one or more domain(s) (32.6 and 15.5 per cent respectively). They were three times more likely to be developmentally vulnerable on two or more domains (18.4 and 6.7 per cent respectively) (AEDC, 2015). This is depicted in Figure 4.

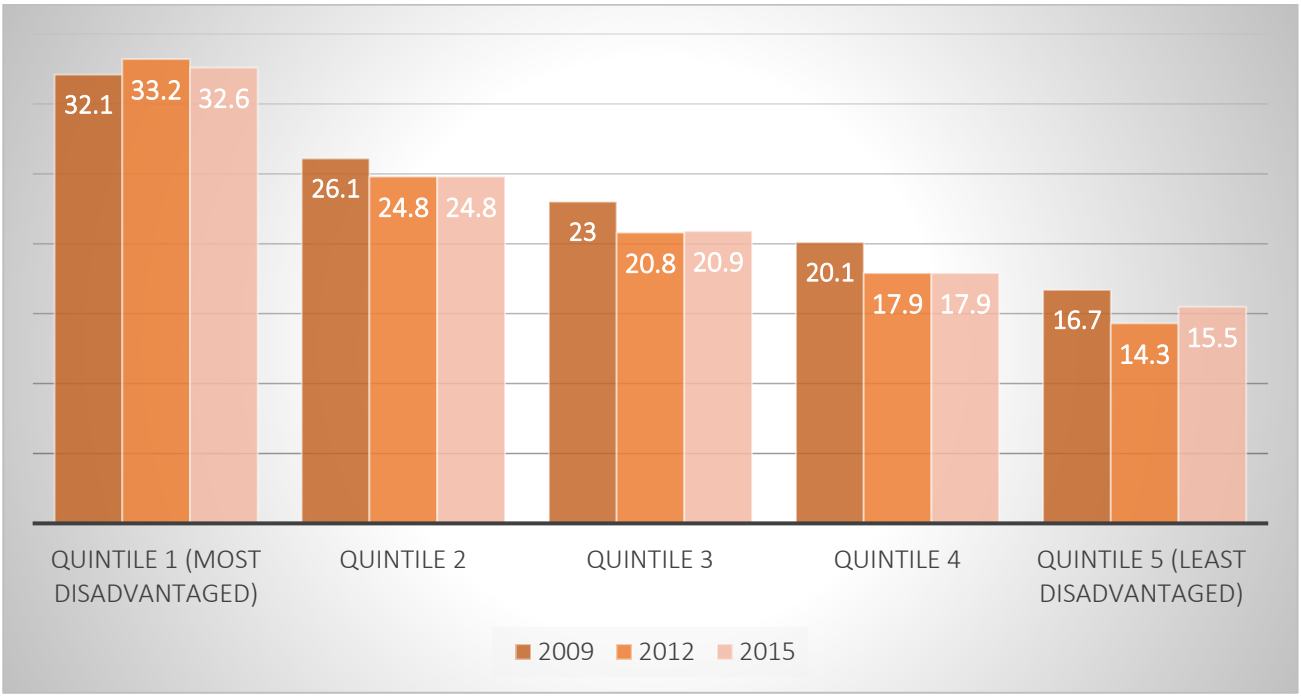

Figure 4: Proportion of children with one or more developmental vulnerabilities in the first year of school, by socioeconomic status

While persistent poverty during childhood has a cumulative negative impact on development, prolonged poverty during later stages of life is less likely to have a significant impact on future life outcomes (Dickerson & Popli, 2012). Equally, relieving poverty has been shown to increase birth weight and other outcomes, which can reduce the likelihood of negative outcomes in later life (Strully, Rehkopf & Xuan, 2010). For example, Costello and colleagues (2003) found that even a minor increase in income amongst families experiencing poverty resulted in decreased rates of childhood mental ill health (Costello, Compton, Keeler & Angold, 2003).

Research shows that while children from high income families with developmental delays are likely to catch-up to their peers in later life, children of low income families are much less likely to do so and in fact, the gap between them and their more affluent counterparts is likely to grow exponentially (Feinstein, 2003).

5.2 They are more likely to live in unemployed households, with single parent families, and in families where the mother has a low educational attainment

While the distribution of family types between major cities and rural areas appear to be largely similar, this is not so for those in remote areas, where an overwhelming majority of children are born and raised in families with high levels of unemployment, sole parent families, and in families where maternal educational attainment is low. These particular household characteristics are also strongly associated with poverty and poor developmental outcomes.

This is possibly because a higher proportion of the population in remote areas are Indigenous (Baxter, Hayes & Gray, 2011). In remote areas, 35 per cent of Indigenous children live in one-parent families compared to 9 per cent of non-Indigenous children, and in very remote areas, 30 per cent of Indigenous children live in one-parent families compared to 7 per cent of non-Indigenous children (Baxter et al., 2011).

Higher levels of maternal education is associated with many positive outcomes for children throughout development: higher maternal education has been associated with more advanced language production (Dollaghan et al., 1999) and cognitive skills (Magnuson, Sexton, Davis-Kean, & Huston, 2009). However, this does not necessarily imply that maternal education is the direct *cause* of children's outcomes, but rather, it supports that maternal education is associated with a number of different characteristics, such as income- which is also associated with child outcomes (Harding, Morris & Hughes, 2015). Upon examining the 2011-12 Survey of Income and Housing (ABS, 2012), the National Centre for Social and Economic Modelling (NATSEM) found that a family with at least one university level qualification is less than half as likely to experience poverty as the rest of the population: a family with a post-graduate qualification has a child poverty rate of only 3.3 per cent, while a family with less than Year 12 education face a child poverty rate of anywhere between 35 to 56 per cent (Phillips, Miranti, Vidyattama & Cassells, 2013).

The United Nations Children's Fund (UNICEF, 2012) reports that the risk of child deprivation is on average five times higher for children in jobless households than for children in general. In part, this is likely to be associated with the underlying factors that impact both the likelihood of parental unemployment and child health (e.g. parental mental ill health and substance misuse); however, it is also likely that unemployment may weaken family conditions (e.g. lead to financial stress), as a result of lost earnings for example, and thus have a negative impact on child health (Mörk, Sjögren & Svaleryd, 2014). Parental unemployment also increases the risk of child maltreatment, limits parental capacity to provide for the basic needs of their children (food, shelter, medical care, etc.) and increases parental stress, which can adversely impact parenting capacity (Doidge et al., 2017).

Indigenous employment rates are noticeably influenced by remoteness: In 2014-15, 49 per cent of Indigenous people of working age living in major cities were employed; compared to 36 per cent in remote areas (ABS, 2016).

5.3 They are more likely to be Indigenous

Indigenous children account for 38 per cent of all children in remote areas, despite making up less than 5 per cent of all children in Australia (ABS, 2011). Indigenous children are almost 8 times as likely to live in remote areas (24 per cent) as all Australian children (3 per cent) (ABS, 2011). Indigenous children in some of the most remote areas of Australia comprise over 50 per cent of all children included in the 2015 AEDC. This is particularly so for the Northern Territory, South Australia, Queensland, New South Wales and Western Australia (AEDC National report, 2015).

According to the Steering Committee for the Review of Government Service Provision (SCRGSP), outcomes for Indigenous people living in remote areas are significantly inferior than for those who living in major cities and rural areas (SCRGSP 2014b). Indigenous children are significantly more likely to experience concurrent developmental vulnerabilities.

As discussed throughout this report, there are a wide range of co-occurring factors that contribute to the overwhelmingly adverse health and developmental outcomes of Indigenous children. These include (but are not limited to): lower health (physical and mental) of their parents or carers; prolonged exposure to multiple life stressors (e.g. family deaths, violence); poorer family functioning, as well as higher incidence of sole parent and non-original parent care; residential instability; substance misuse; racism; and intergenerational effects of trauma associated with forced removal (Dockery, 2017; Zubrick et al. 2005).

5.4 They are more likely to be socially isolated

Children living in rural and remote Australia are more likely to experience social exclusion (Mohanty, Edvardsson, Abello & Eldridge, 2016; Phillips, Miranti, Vidyattama & Cassells, 2013). In applying a multidimensional measures of child wellbeing, the NATSEM report (2013) defines social exclusion or 'risk' of social exclusion as taking place when an individual or group of people face a multitude of often co-occurring risks, such as: unemployment, low income, low educational attainment, limited access to services and social supports, and adverse physical and mental health (Phillips et al., 2013). Adelman and Middleton (2003) maintain that when children experience social isolation, they are exponentially more likely to be excluded from social activities (playgroups, swimming, school trips, etc.); local services (library access, public transport etc.); and school resources (teacher shortages, sharing school books, not enough computers at school, large class sizes, school buildings in disrepair) (Adelman & Middleton, 2003).

The NATSEM (2013) found that while only 17 per cent of children (0-15 years of age) in major cities across Australia face the greatest risk of social exclusion, the percentage increases by more than double for children living in remote areas (46.5 per cent) and by more than four times for children living in very remote areas (71.6 per cent). Moreover, none of the children who reside in either remote or very remote areas are in the least excluded category (Phillips et al., 2013).

Outlined in Table 6 is the proportion of children (0-15 years of age) across Australia, in each social exclusion quintile, according to remoteness. Quintile 1 signifies the bottom, or most excluded quintile, and represents 20 per cent of all Australian children facing the greatest risk of social exclusion. Conversely, quintile 5 (the least excluded quintile) represents 20 per cent of all Australian children facing the lowest risk of social exclusion (Phillips et al., 2013).

Table 6: Child Social Exclusion rates by remoteness

	Major Cities of Australia %	Inner Regional Australia %	Outer Regional Australia %	Remote Australia %	Very Remote Australia %
Quintile 1 (most excluded 20%)	17.3	20.3	30.2	46.5	71.6
Quintile 2	14.9	27.3	46.2	27.4	14.9
Quintile 3	20.9	22.6	9.3	6.1	5.3
Quintile 4	17.1	26.1	13.0	20.0	8.1
Quintile 5 (least excluded 20%)	29.9	3.7	1.3	0.0	0.0

In applying the latest 2014 data, the Brotherhood of St Laurence and the Melbourne Institute of Applied Economic and Social Research (MIAESR) (2016) found that almost 40 per cent of Indigenous Australians experience social exclusion, compared to 22 per cent of all Australians. They also found that 51 per cent of Australians who have a long-term health condition or disability experience some level of exclusion (Brotherhood of St Laurence & MIAESR, 2016). Data regarding the concentration of social exclusion (overall and pertaining to children) according to remoteness area was not available in this particular study.

5.5 They are more likely to be exposed to FDV and have contact with child protection services

While child protection and reported DV data is not publicly available in all jurisdictions, available data depicts a clear relationship between children living in rural and remote Australia, and increased rates of child protection substantiations and higher incidents of reported FDV (Campo, Kaspiew, Moore & Tayton, 2014; Royal Commission into Family Violence, 2016; Wendt, Chung, Elder & Bryant, 2015). Children in remote areas are four times as likely as those in major cities to be the subject of a substantiation and twice as likely to be in out-of-home care (AIHW, 2016). Indigenous children living in remote and very remote areas are nine times more likely to be in out-of-home care than their non-Indigenous counterparts. Figure 5 depicts the rate (per 1,000) of child protection substantiations by remoteness area.

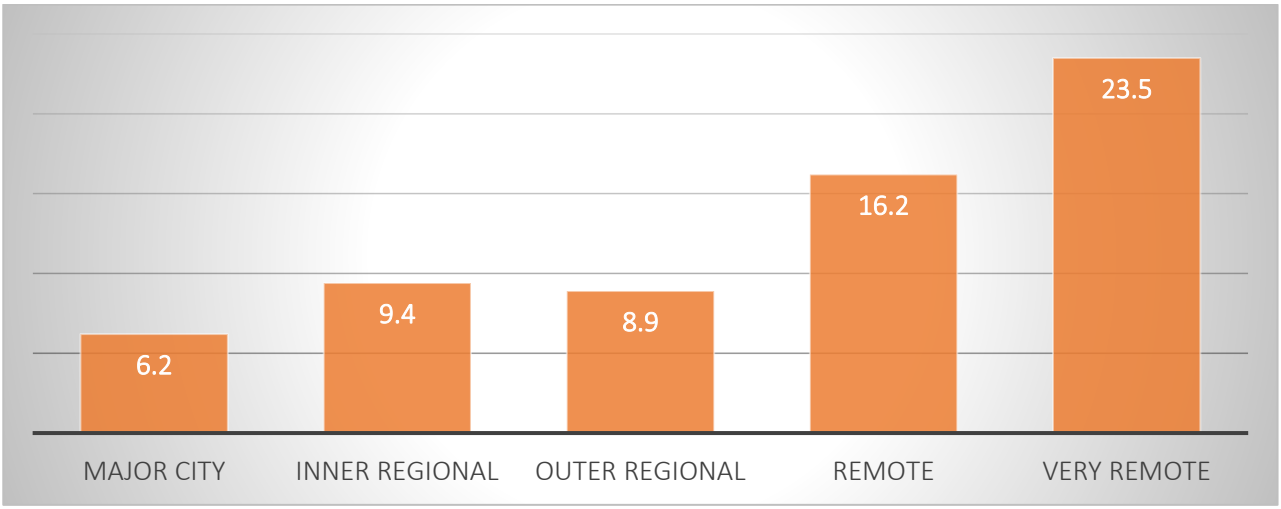

Figure 5: Number per 1,000 child protection substantiations by remoteness area

Recent statistical evidence shows that significant numbers of Australian children are exposed to FDV in the home. The 2012 Australian Bureau of Statistics' (2014) Personal Safety Survey found that of those women who had experienced violence by a current partner, 54 per cent had children in their care at the time of the violence and 31 per cent of the children had seen or heard the violence. Of the women who had experienced violence by a former partner, 61 per cent had children in their care at the time of the violence and 48 per cent of the children had seen or heard the violence (ABS, 2014). Moreover, the Australian Institute of Family Studies (AIFS) Longitudinal Study of Separated Families (Kaspiew et al., 2009) found that of the parents who reported experiencing physical violence, 72 per cent of mothers and 63 per cent of fathers stated that their children had witnessed the violence (Kaspiew et al., 2009). Similar findings are described by the Victoria Police (2014) Family Violence Incidence Report, which showed that children are present during 34 per cent of FDV incidents (Victoria Police, 2014).

Overwhelming evidence supports the correlation between children's exposure to FDV and the increased likelihood of adverse lifelong outcomes (Humphreys, 2007; The Australian Domestic & Family Violence Clearinghouse, 2011). Even at a very young age, infants who hear or witness anger and/or violence, or a parent being hurt can show symptoms of Posttraumatic Stress Disorder (PTSD), including eating problems, sleep disturbances, lack of typical responses to adults and loss of previously acquired developmental skills (Hamby, Finkelhor, Turner & Ormrod, 2010; Vickerman & Margolin, 2007). Indigenous children are more likely to be experience FDV (Australian Institute of Health and Welfare, 2016).

Rates of FDV are also higher in rural and remote areas (Campo & Tayton, 2015). While obtaining accurate rates of FDV in any context is challenging, as many women do not make disclosures (Phillips & Vandenbroek, 2014), women in rural and remote areas are even less likely to disclose incidents of FDV (Hogg & Carrington, 2006; Ragusa, 2013). Despite this, various studies have found that rates of FDV are notably higher with increased remoteness (The ABS' Personal Safety Survey, 2013; Mishra et al., 2014; Grech & Burgess, 2011).

The unique characteristics and social norms and values in rural and remote communities are key to understanding the specific experience of FDV in these areas (Campo & Tayton, 2015). Such norms and values can contribute to a lack of perpetrator accountability, act to minimise the experience of FDV, and prevent women from disclosing FDV and seeking support (George & Harris, 2015).

5.6 They are less likely to engage in Early Childhood Education and Care (ECEC) services

A significant body of evidence suggests that engagement with quality ECEC services can enhance children's early development, particularly for children who do not live in a rich home learning environment (Sylva, 2010; Moore and McDonald, 2013).

Children living in remote areas have the lowest levels of participation in ECEC compared to those living in major city areas (O'Connell, Fox, Hinz & Cole, 2016; Baxter & Hand, 2013). In their 2013 study, Baxter and Hand found that long travel time and distance were significant contributing factor to lower ECEC participation rates in remote areas; however, they also found that as remoteness increases, population density decreases, and because of the larger distribution of the population, smaller number of services are funded to meet the needs of families in remote areas, again possibly increasing the distances families need to travel (Baxter & Hand, 2013). Finding and retaining adequately qualified and experienced staff is also identified as an ongoing issue for remote area service provision (O'Connell et al., 2016; Baxter & Hand, 2013). Even where ECE teachers are available, the continuing turnover of staff can contribute to lowering the quality of service provided.

Indigenous children have lower levels of participation in ECEC than those of non-Indigenous children (Biddle, 2007). This is in part due to a higher proportion of Indigenous families living in remote areas. However, it is also likely that given their own poor experiences with institutionalised education systems, Indigenous parents do not entirely trust, or understand, the education system (Shepherd &Walker, 2008). Moreover, while enrolment rates (for both Indigenous and non-Indigenous children) may appear to be high, attendance rates are often up to 6 per cent lower, while the proportion of children who meet the objective of 15 hours of attendance per week is lower still, particularly for Indigenous children (O'Connell et al., 2016; ABS, 2016).

Under the National Partnership Agreement on Universal Access to Early Childhood Education (NP UAECE), all states and territories are required to (amongst other things) develop Implementation Plans, in partnership with the Australian Government, detailing strategies and actions that will ensure access to quality early childhood education programmes for all children living in remote Indigenous communities (National Partnership Agreement on Universal Access to Early Childhood Education, 2016). While a review of this commitment is out of the scope of this paper, results from our review clearly indicate an overall lower preschool participation rate among children (including Indigenous children) in rural and remote Australia.

6. What are the gaps versus the needs?

As noted earlier, the primary objective of this review is not to focus on primary and acute health issues (and broader health services), but instead, to review matters pertaining to children's developmental, behavioural and mental health status/needs, and existing gaps in the provision of appropriate services relating specifically to these particular issues. This section of the report focuses on the main service gaps for children and families in remote and rural Australia.

6.1 Access to early childhood intervention (ECI) services

Early childhood intervention (ECI) refers to the process of providing specialised support and services for infants and young children (and their families and communities) who have developmental delays and/or disabilities, in order to support their development, well-being and community participation (Early Childhood Intervention Australia, 2017; Moore, 2012). Access to allied health (including mental health) services and paediatricians are central in the effective provision of ECI. Early detection and intervention programs have economic and social benefits at the individual, familial, community and national level (Community Affairs References Committee, 2014).

Children with developmental issues in rural and remote Australia face multiple and concurrent barriers to accessing ECI services as a direct consequence of their geographical location (Hanft, 2014). These include (and are not limited to): travelling long distances, extensive waiting times and workforce shortages resulting in complications accessing therapy, resulting in high levels of unmet need (Dew, Bulkeley, Veitch, Bundy, Gallego, et al., 2013). A lack of local therapy options (e.g. occupational therapy, speech pathology, physiotherapy, and psychology) often means that people (particularly children) with additional support needs in rural and remote areas often do not receive the quantity or quality of services and supports they require to live a good life (Hines et al., 2015). This is a particular issue for early intervention services, where time and quality is of the essences and offers a high rate of return. Evidence supports that interventions during later stages of life are often less effective and that many children are unable to catch up to their peers if intervention occurs in later life (Early Intervention Foundation, 2015).

The gaps in early intervention services in rural and remote settings are particularly visible amongst allied (including mental health) and paediatric services: in 2014, the number of practicing physiotherapists per 100,000 people varied from 90 in major cities to 36 in remote Australia (AIHW, 2014). It is important to note that these figures are not reflective of paediatric physiotherapists, whose are even more difficult to access in rural and remote areas (85 per cent of physiotherapists in rural areas are considered to be generalists) (Sheppard, 2001). Paediatrics is a specialty area of physiotherapy practice (Australian Physiotherapy Association, 2017) and requires a specific level of practical and theoretical expertise. However, because current paediatric rural services are fragmented and largely not available, many physiotherapists in rural and remote settings extend the boundaries of their practice to meet service demands (Maher, 2009).

Similar issues exist in the availability and delivery of other allied and paediatric health services. A 2014 study by the Services of Australian Rural and Remote Allied Health (SARRAH) found that lack of access to paediatricians for diagnosis, lack of allied health providers and fragmentation of service provision posed the most significant barriers to children in rural and remote areas accessing the supports they needed. Occupational therapy, speech pathology, mental health and physiotherapy are identified as the services most urgently required in the provision of effective early childhood intervention in rural and remote settings.

6.2 Access to allied health services

While there are significant gaps in the number of studies (and quality and availability of data) focusing specifically to children with a disability and/or developmental vulnerabilities in rural and remote Australia, existing evidence highlights a substantial gap in the availability of allied health professionals and paediatricians (Hanft, 2014; Meadan, Meyer, Snodgrass, & Halle, 2013). This was supported by our review which found that a significant majority of the rural and remote communities which are identified in this study only have access to paediatricians and allied health professionals on a sessional basis (sometimes less than once per month). Additionally, available allied health services in rural and remote settings often work in a generalist capacity (i.e. their client caseload consists of children of any age, all adult age groups, as well as elderly clients). However, in major cities, allied health professionals tend to have an area or age of practice/speciality (e.g. paediatric disability). This raises concerns about scope of practice and the ability to support children with more complex developmental issues (Services for Australian Rural and Remote Allied Health, 2014).

Where available, information regarding the availability of relevant healthcare providers was retrieved from the websites of each relevant service provider (e.g. Ingham Health Service in North Queensland). As noted earlier in this report, sessional availability can impact the quality of the service provided and mean longer wait times.

These issues with access in allied health are reflected in access to services more broadly, as reflected in Figure 6 Medicare claim rates for private specialist care among Indigenous Australians that show higher claim rates in major cities (544 per 1,000) and lowest in remote areas (107 per 1,000) (Department of Prime Minister and Cabinet, 2014).

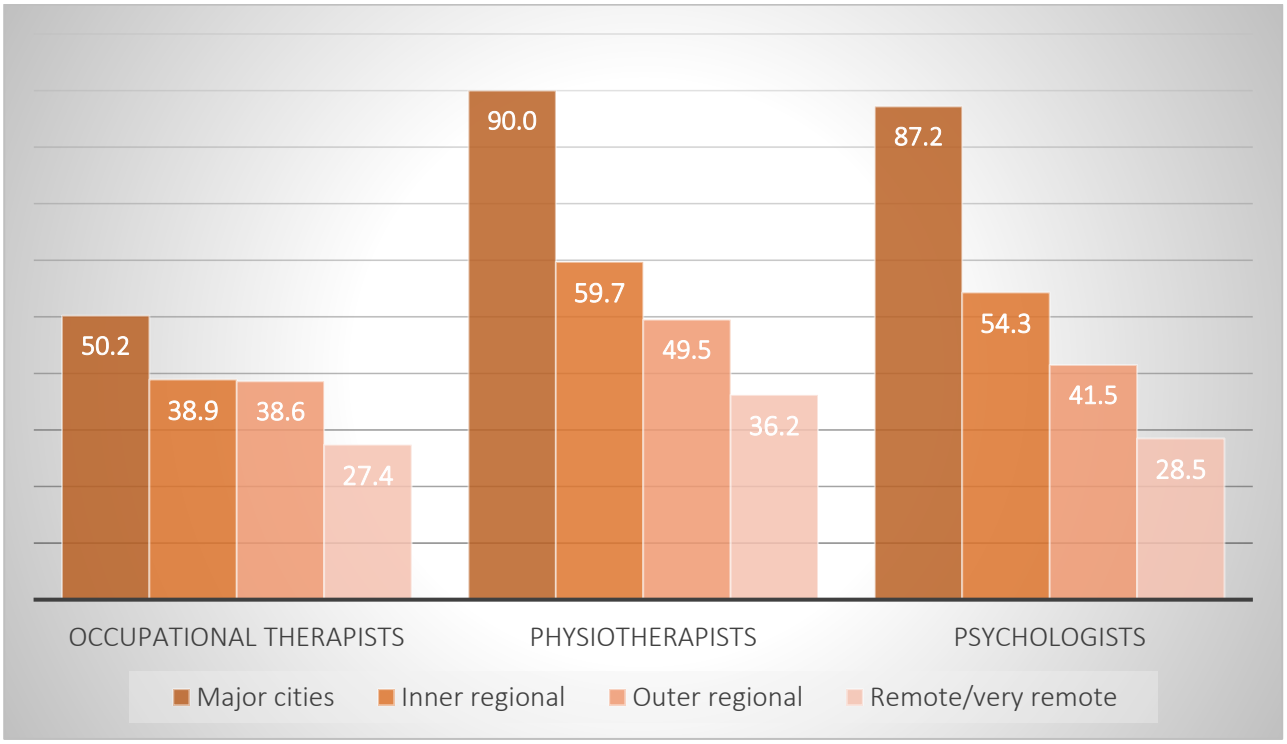

Figure 6: reflects the numbers of full-time equivalent (FTE) Occupational therapists, Physiotherapists, Psychologists (per 100,000 population) by remoteness in 2014 (AIHW, 2014).

While lack of access to allied health professionals impacts all children, Indigenous children are particularly affected for a number of reasons. Most notably because they: a) are significantly more likely to reside in rural and remote settings; b) experience higher prevalence of developmental delay(s) (Bennett, McDonald, Knight, Comino & Henry, 2010); c) are 4 to 5 times more likely to have intellectual disability than the general population (Calma, 2008); and d) are significantly more likely to suffer from middle ear disease (up to 91 per cent) (Williams, Coates, Pascoe, Axford &Nannup, 2009). Middle ear disease is known to often lead to hearing difficulties (and loss) and consequently, speech and language delays, literacy difficulties, adverse cognitive development and various social and emotional issues in later life (Williams & Jacobs, 2009).

Children's disability services in rural and remote locations are even more challenging to source and appeared to be largely missing as an available option from the range of available health directories (managed by each jurisdiction's respective health department). While these services may be 'hidden' under different search categories, locating them in the provided search engines proved to be a challenging exercise.

6.3 Access to paediatricians

According to the Australian Paediatric Society (APS, n.d.), the capacity to recruit and retain paediatricians in remote and rural Australia is a significant problem. As with other specialists, increased workload and greater working hours, social isolation, and lack of financial incentive (due to reduced income and greater cost of living) have been identified as some of the key contributing factors to the current state of affairs (APS, n.d.). In their response to the Federal Senate Inquiry on the state of rural child health and rural paediatrics, the APS

maintain that children with complex developmental disabilities and needs, such as autism, are entering adulthood with few facilities or services available to support them. They also convey that behaviour disorders and school learning issues such as Attention Deficit Hyperactivity Disorder (ADHD) have increased in prevalence and are almost exclusively managed by paediatricians in rural areas. Despite the growing demand, there has been no additional support to meet the increased demand for Paediatricians in these areas (APS, n.d.). There are also large numbers of communities that do not have access to a paediatrician at all.

The APS further assert that as a result of this, there are substantial deficits in the paediatric service models of state public health systems. They note that, as it stands, it can take up to two years for a child in rural Australia suspected of having autism to be assessed, and up to six months to receive early intervention services for developmental disability. In public hospitals, it can take several years to have a regular general Paediatric outpatient appointment (APS, n.d.)

While workforce data relating specifically to Paediatricians is not available, recent data from the Health Workforce Australia (2014) shows that the disparity between the number of doctors per head of population in metropolitan and remote Australia persists (AIHW, 2016).

Lack of access to paediatricians means that obtaining a diagnosis, which is required for a referral to appropriate allied health services, is much less likely. A late diagnosis invariably leads to later access to paediatric allied health intervention services. A survey by Hanft (2014) found that rural families of children with a disability are up to 23 per cent less likely to register with federal government's Helping Children with Autism (HCWA) and Better Start funding programs and that they access up to 60 per cent less funding than their urban peers. The report also found that the individual funding model that lies at the heart of HCWA and Better Start (the precursor to the NDIS), which is based on the idea of choice and empowerment of clients, is failing in rural children (Hanft, 2014).

6.4 Access to mental health services

The review found that mental health services for children 0-12 are particularly difficult to source across all jurisdictions. The few services which were found are predominantly located inside hospitals in major townships and require long distance travel for many communities. The core mental health service available to children in rural and remote areas is the Child and Adolescent Mental Health Service (CAMHS), or Child and Youth Mental Health Service (CYMHS). However, these services are also generally located in major towns and conduct limited outreach. Moreover, a review of CAHMS in WA identified that it is significantly under resourced and that because priority is given to urgent and severe concerns, there is limited capacity to provide early intervention and treatment for mild to moderate mental health concerns (Commissioner for children and young people WA, 2013; Women's and Children's Health Network, 2014). Issues regarding long wait times and lengthy delays for referrals have also been identified (Commissioner for Children and Young People WA, 2013).

The Australian Paediatric Society (APS, n.d.) maintains that there is an alarming lack of child mental health services in rural areas (most regions have chronic understaffing of mental health workers let alone a trained

child psychiatrist or clinical psychologist), making the provision of adequate mental health care tremendously difficult. They assert that the almost complete absence of such vital child health services in rural and remote areas will undoubtedly lead to a generation of "disturbed adolescents and dysfunctional adults" (APS, n.d.). Further, child mental health services in these areas often operate without contact with other paediatric services, creating silos and disconnections between services.

Recruiting and retaining staff in rural and remote mental health services is also a significant and continuing challenge, with chronic staffing issues being widely reported. This is also true of all allied health staff. Long-term unfilled positions are common in many rural and remote CAMH/CYMH services and have been identified as negatively impacting clinicians' job satisfaction, attributing to burnout and high staff turnover (Perkins, Larsen, Lyle & Burn, 2007). Figure 7 reflects the numbers of FTE Psychiatrists, Mental health nurses and Psychologists per 100,000 population by remoteness in 2014 (AIHW, 2014).

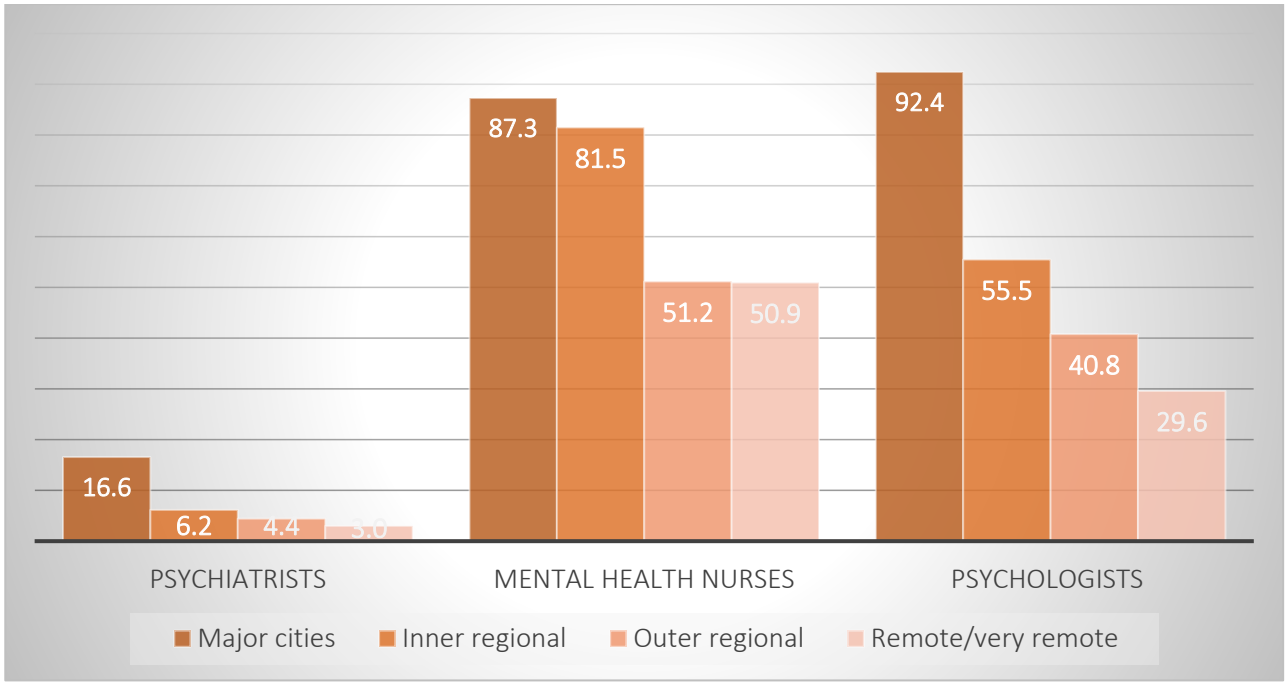

Figure 7: The numbers of FTE Psychiatrists, Mental health nurses and Psychologists per 100,000 population by remoteness in 2014.

A study by Barton and colleagues (2015) into the status, needs and availability of services for people living with disability and/or mental illness in rural and remote Australia found a significant gap in studies relating to people with a disability and/or mental illness in rural and remote Australia (Barton, Robinson, Llewellyn, Thorncraft, Smidt & Maleny, 2015). An audit of studies between 2000 and 2013 only found 30 which are related to mental illness and disability in rural or remote Australia, and only 9 that specifically explored psychosocial disability (Barton et al., 2015). It is unclear how many of these studies pertained to children in rural and remote areas.

Without research that specifically addresses the needs, issues and the lived experiences of those in rural and remote areas, it is impossible to fully understand the extent of challenges and realities that come from living with mental illness and disability in rural or remote Australia. We also lack the contextual knowledge required to begin to develop and evaluate supports and systems that will facilitate the participation of rural and remote Australians with additional support needs. This is a clear gap in the literature which urgently requires redress (Barton et al., 2015).

6.5 Families and professionals need to travel long distances

The review found that most allied and paediatric health services who work with children aged 0-12 are located in major towns – some of these services provide outreach into surrounding communities, but this is patchy at best. A Google search for the distance between many of the services that included rural and remote areas in their catchment areas found that it was not unusual for families to face travel distances of over 100 KM (each way) to reach an appropriate service provider. Families who do not have access to personal transportation face longer travel times and distance, as a direct route between them and the service may not be available via public transportation.

There is also evidence that travel costs and significant travel distances by health professionals have a negative impact on the already limited service capacity of the sector: high costs make it unprofitable for therapists to provide outreach services (Hanft, 2014).

6.6 Indigenous children with a disability face greater challenges

While data relating to the number or proportion of children with a disability is not available (due to issues of confidentiality), research shows that Indigenous people have substantially higher disability rates at younger ages than non-Indigenous Australians (AIHW, 2011). Research also highlights that Indigenous children with a disability living in rural and remote Australia often face, in addition to geographical isolation, cultural and linguistic barriers (Hanft, 2014).

A search for culturally appropriate disability services for Indigenous children mostly resulted in Aboriginal Community Controlled Health Services (ACCHS) which have visiting paediatric and allied health specialists on a sessional basis. While the reluctance of some Indigenous people to use mainstream services has been well documented (Hanft, 2014) many Indigenous families in remote areas may lack the confidence or know-how to advocate for themselves before the service bureaucracies or simply not be aware of service options and their rights to access appropriate services (O'Neill, Kirov & Thomson, 2004).

6.7 Telehealth services are not always available or appropriate

Telehealth provides a potential solution to some of the above challenges with workforce and service access. However, it has its limitations and is not always appropriate children with a disability/developmental vulnerability. Firstly, children may be too young or otherwise unable to videoconference successfully with therapists, making face-to-face contact and assessment necessary. Secondly, many remote areas do not have

the requisite broadband internet and the necessary technological equipment that is necessary to enable telehealth services (Moffatt & Eley, 2010).

Moreover, while jurisdictions such as Queensland and Western Australia have made good progress in embedding telehealth services as an essential component of everyday service delivery, including for children, other states such as New South Wales, South Australia and Tasmania are still incorporating telehealth sporadically and as separate projects (as opposed to business as usual) (Nous Group, 2015). Telehealth is discussed at greater length in section 7.4.

7. What does the evidence say?

So, what does the evidence say about ways of improving health and development outcomes for children in rural and remote Australia?

A rapid review was carried out to address this question. While a rapid review uses similar methods and principles to a systematic review, it makes concessions to the breadth and depth of the process, in order to be completed within a short timeframe. The methodology for the rapid review is outlined in section 2.

7.1 The social and financial implications of failing to respond

There have been many analyses of the economic benefits of investing in children's health and development (eg. Belli, Bustreo & Preker, 2005; Executive Office of the President of the United States, 2014; Fox et al., 2015; Heckman, 2008, 2012; Karoly, 2016; Kilburn and Karoly, 2008). Belli, Bustreo and Preker (2005) conclude that making greater investments in children's health results in better educated and more productive adults, sets in motion favourable demographic changes, and shows that safeguarding health during childhood is more important than at any other age because poor health during children's early years is likely to permanently impair them over the course of their life. Children born into poor families are at particular risk: they have poorer health as children, receive lower investments in human capital, and have poorer health and economic productivity as adults.

Others have analysed the benefits of investing in early intervention and early education (Heckman, 2012; Karoly, 2016; Kilburn and Karoly, 2008). Heckman (2012) argues that investing in early childhood education is a cost-effective strategy for promoting economic growth, and that the highest rate of return in early childhood development comes from investing as early as possible, from birth through age five, in disadvantaged families. Similarly, Kilburn and Karoly (2008) report that a growing body of program evaluations show that early childhood programs can generate government savings that more than repay their costs and produce returns to society that outpace most public and private investments.

There do not appear to be any economic analyses that have been conducted on the economic benefits of investing in rural and remote services for children specifically.

7.2 Strategies shown to be effective in improving health and development outcomes for children in rural and remote Australia

The main strategies discussed here are outreach and fly-in-fly-out (FIFO) / drive-in-drive-out (DIDO) services, and telehealth / teleintervention services.

Outreach services[15]

Outreach services are one of the possibilities to improve access to services. Improved mobilisation of urban services to remote and rural areas is a strategy to improve access to services to families and children in these areas (WHO, 2011).

Evidence of the efficacy of an outreach service comes from a recent study by Weber et al. (2017) which compared the outcomes for children with cystic fibrosis receiving outreach care with those treated at a specialist cystic fibrosis centre. Although centre-based care is generally considered ideal for this condition, children living in regional Australia need to rely on outreach care supported by academic centres. After controlling for the possible confounding effects of socio-economic status and distance from a major urban centre, this study found no difference in clinical and lung function outcomes in children with cystic fibrosis who received outreach care, supported by an academic centre, compared to those receiving care through an academic cystic fibrosis centre.

To support the development of outreach services, Battye and McTaggart (2003) offer a model that can act as a template for sustainable delivery of outreach allied health services to remote areas, as one way to improve service access and outcomes. This model takes into account the incidence of disease, the context for service delivery addressing community concerns with visiting services, recruitment and retention of health professionals, and integration with resident and visiting health and community services.

7.3 Fly-In-Fly-Out (FIFO) and Drive-In-Drive-Out (DIDO) services

The benefits and disadvantages of the FIFO and DIDO model have been discussed by Hussain, Maple, Hunter, Mapedzahama and Reddy (2015) who suggest that this form of service can have short-term benefits by increasing equity and accessibility to services and reducing the need to travel long distances for health care. However, significant disadvantages need to be considered in the longer term: There is a potential for burnout among health professionals who travel long distances and work long hours, often without adequate peer support or supervision, in order to deliver these services. A further disadvantage is the lack of development of a sufficiently well-resourced local primary healthcare system in small rural communities. There is also limited evidence of the impact of FIFO and DIDO on health outcomes, particularly for children with developmental issues.

[15] The term “outreach services” is used to describe any type of health service that mobilizes health workers to provide services to the population or to other health workers, away from the location where they usually work and live (WHO, 2011).

Given the potential negative consequences for both health professionals and rural Australians, Hussain and colleagues caution against the increasing use of FIFO and DIDO services, without the concurrent development of well-resourced, funded and staffed primary healthcare services in rural and remote communities.

Wakerman, Curry, and McEldowney (2012) note that there will always be a need for visiting services to settlements where population size does not enable a full range of primary and specialist services. These services will vary according to the needs of different communities, and can take number of different forms:

- specialist outreach services
- hub-and-spoke or outreach arrangements for various allied health and specialist programs, such as women's health educator or mobile dental service
- 'orbiting staff' who spend significant periods of time (12 months or more) in one or two specific communities, self-regulate stress levels and work elsewhere for periods, then return to the same communities where orientation is not required
- long-term shared positions, such as month-on/month-off, where the same practitioners service the same communities
- short-term locum or agency staff who move from place to place or as a one off.

Both of these analyses of the FIFO/DIDO model conclude that, for this form of service to be successful and for community healthcare needs to be met, there needs to be strong resident primary healthcare teams in the target communities.

7.4 Telepractice / telehealth

Telehealth is coordinated and managed differently across the States and Territories in Australia (Bywood, Raven, & Butler, 2013). In some jurisdictions, telehealth is centrally coordinated (e.g. NSW Telehealth Network), while in others it is managed by general practitioners (GPs) and community centres (Tasmania), the Rural Health Alliances (Victoria), or through individual hospitals (South Australia, Western Australia).

According to the Department of Health,

> Telehealth services use information and communications technologies (ICTs) to deliver health services and transmit health information over both long and short distances. It is about transmitting voice, data, images and information rather than moving care recipients, health professionals or educators. It encompasses diagnosis, treatment, preventive (educational) and curative aspects of healthcare services and typically involves care recipient(s), care providers or educators in the provision of these services directed to the care recipient.
> (http://www.health.gov.au/internet/main/publishing.nsf/content/e-health-telehealth)

Recent rapid advancements in these technologies have created huge potential for re-shaping the way health care services are delivered (Bradford et al., 2016; Comer & Myers, 2016; Iacono et al., 2016; Myers & Comer, 2016; Nous Group, 2013). In tele-practice, professionals may interact with clients in several different ways (Myers & Comer, 2016; Snodgrass et al., 2016):

- *synchronous support* – providing intervention directly to clients by interacting with them via videoconference
- *asynchronous support* – incorporating online tools and apps that have been created to help clients access the telepractice intervention
- *consultative support* – providing training and support to a caregiver who then works directly with the client.

Tele-practice has been promoted as a means of overcoming some of the challenges of in-home or clinic-based services (Behl et al., 2017; Blaiser, Behl, Callow-Heusser & White, 2013; Bywood, Raven & Butler, 2013; Cheek et al., 2014; Johnson, 2016; Meadan et al., 2013; Snodgrass et al., 2016). Some proposed benefits of this approach include:

- overcoming the shortages of personnel available and trained to serve children in remote and/or rural areas
- enhancing client satisfaction through reduced waiting times and increased convenience
- earlier and more frequent access to services across the care continuum leading to improved physical and psychological wellbeing and outcomes
- reducing the expense and time associated with travel and with rescheduling cancelled or missed appointments
- reduced environmental costs of the travel involved in accessing health and other services in rural and remote areas
- increasing access to services for clients living in rural areas or in neighbourhoods perceived as unsafe by service providers
- providing options for clients who do not have access to a service provider from their own culture or one who speaks their own language
- clients who cannot travel to receive services as a result of a disability or financial hardship might also benefit from using tele-practice
- consultation, training and support to clients, caregivers and other professionals – primary health care providers benefit from being present at specialist consultations through enhanced understanding of specialty areas and improved job satisfaction.

There is good evidence of the efficacy of telehealth services in Australia and elsewhere with adults (Bywood et al., 2013). Telehealth has been used in a range of specialist services for acute and chronic care, including:

mental health/psychiatry, paediatrics, radiology, dermatology, pathology, endocrinology, oncology, neurology, dentistry, burns and wound care (Bywood et al., 2013). For the most part, the evidence indicates that there are no significant differences in diagnostic accuracy between video consultation and face-to-face consultation, and the rates of recommended follow-up are sometimes higher.

Video consultations are not necessarily intended to totally replace face-to-face consultations, but rather to provide timely access to health care in circumstances where face-to-face consultations are not available due to distance or other barriers.

Satisfaction levels of teleconsultation patients are generally high, and sometimes significantly higher than those of patients receiving traditional face-to-face specialist consultation (Bywood et al., 2013; Moffatt & Eley, 2010). A literature review by Moffat and Eley (2010) identified a number of benefits attributed to telehealth for people living and professionals working in rural and remote areas of Australia. Patients are reported to have benefited from lower costs and reduced inconvenience while accessing specialist health services; improved access to services; and improved quality of clinical services. Health professionals are also reported to have benefited, from having greater access to continuing education and professional development; provision of enhanced local services; and experiential learning, networking and collaboration.

Telehealth and children

There is evidence that tele-practice is acceptable to parents of children (Bywood et al., 2013; Edirippulige et al., 2016; Fairweather et al., 2016; Nelson et al., 2017).

According to Nelson and colleagues (2017), patients and families give several reasons for participating in tele-mental health and report high satisfaction with this form of service. The reasons they give include the following:

- conveniently finding high-quality services close to home;
- decreasing time away from both work and school;
- decreasing costs associated with traveling miles for care;
- decreasing stresses of travel with a child with a behaviour disorder and siblings;
- decreasing worries about navigating unfamiliar health care settings;
- allowing additional supporters to attend and work together to coordinate care; and
- decreasing stigma by connecting to child friendly settings such as schools.

Telehealth / tele-practice has been used successfully by a range of professionals working with children, including speech pathologists (Snodgrass et al., 2016; Fairweather et al., 2016), teachers of the deaf (McCarthy, Muñoz, & White, 2010; McCarthy, Duncan & Leigh, 2012), medical practitioners (Lipana, Bindal, Nettiksimmons & Shaikh, 2013), and parenting trainers (Feil et al., 2008), although there is some evidence of

underutilisation of this form of service by some groups of professionals (Edirippulige et al., 2016; Iacono et al. 2016).

Telehealth / tele-practice has been used successfully – either on its own or to complement face to face services - to address a number of health and developmental problems in children, including:

- children with health conditions (eg, cancer, congenital heart disease, cystic fibrosis, diabetes, epilepsy, irritable bowel disorder) and their carers (Nelson, Cain & Sharp, 2017)
- mental health (Jones et al., 2014; Myers and Comer, 2016; Nelson, Cain & Sharp, 2017)
- hearing loss (Behl et al., 2017; Blaiser et al., 2013; Houston & Stredler-Brown, 2012; McCarthy, Muñoz, & White, 2010; McCarthy, Duncan & Leigh, 2012)
- speech therapy (Fairweather et al., 2016)
- obesity (Lipana, Bindal, Nettiksimmons & Shaikh, 2013)
- asthma (Portnoy et al., 2016)
- cerebral palsy (Edirippulige et al., 2016)
- autism (Meadan, Snodgrass, Meyer, Fisher, Chung, & Halle, 2016; Wong et al., 2011).

However, there are challenges in using this approach with children, particularly young children. As noted by Snodgrass et al. (2016), these include:

- to engage in direct service using videoconferencing, the child must remain within view of the camera, direct his or her attention to the screen, and maintain that attention for the duration of the therapy session, which researchers have noted may be a struggle for some children
- because the professional is not in the same location, he or she cannot move throughout the environment with the child and may find it more difficult to effectively prompt the child
- the professional may still need a skilled adult present with the child to assist with technical difficulties, loss of the child's attention, or safety issues
- some children may require adaptive equipment to access telepractice technologies, or they may have an aversive response to some equipment (e.g., headphones)

Various strategies have been identified to overcome some of these challenges. One way is to use training and coaching strategies to help parents learn how to support their children's growth (Snodgrass et al., 2016). Parents and family members are the individuals who are most frequently involved in social interactions with their young children, and are readily available to encourage and promote language production in their children across multiple settings and contexts.

There is evidence that these approaches are effective (Snodgrass et al., 2016; Wong et al., 2013). Training refers to instruction in a target skill that is provided outside of the setting in which the skill will be used (e.g., teaching parents about strategies in a seminar held in a clinic conference room). Coaching is distinguished from training by including observation of the parents using the target strategies in context and providing feedback on their performance. Parents can be taught and coached to be effective implementers of a wide array of evidence-based communication interventions and strategies, such as discrete trial training, pivotal response teaching, naturalistic language strategies, and strategies such as scaffolding and use of closed-ended questions. Parent training and coaching have been shown to be effective in producing positive outcomes for parents and their children, including parents' enhanced confidence in supporting their children, children's improved expressive language, and children's increased communication initiation.

Snodgrass and colleagues (2016) describe a framework of parent training and coaching that can be used to incorporate strategies that speech pathologists use during direct service to children, into supports parents use during home-based activities with their children. By incorporating parent training and coaching into service delivery, speech pathologists can more easily use tele-practice as a means for providing services to children with communication disorders who may not be able to participate in child–therapist direct therapy via tele-practice.

This framework underpinned the development of the Internet-Based Parent-Implemented Communication Strategies (i-PiCS) program (Meadan, Meyer, Snodgrass & Halle, 2013), a US program that provides long-distance training and coaching via the Internet to parents of young children with autism spectrum disorders. In a recent trial, Meadan, Snodgrass, Meyer, Fisher, Chung, & Halle (2016) found that parents learned to implement the targeted naturalistic teaching strategies with fidelity when, and only when, they are provided with training and coaching over the Internet. The parents' implementation of these strategies also corresponded with positive changes in their children's communication skills.

A number of studies have found that tele-practice with children and their families is as effective (or even more effective) than traditional face-to-face interventions (eg. Behl et al., 2017; Grogan-Johnson, Schmidt, Schenker, Alvares, Rowan & Taylor, 2013; Portnoy et al., 2016). In a study of children with asthma, Portnoy and colleagues (2016) demonstrated that telemedicine is as effective as in-person visits. In another study, Grogan-Johnson and colleagues compared the relative efficacy of intervention with children aged 6 through 10 years with speech sound impairments delivered by tele-practice and side-by-side service delivery models. They found that children in both service delivery models made improvement in their speech sound production during the program, and there were no significant differences between the two groups on post-intervention assessments including standardized assessment and listener judgments of word productions.
Similarly, in a study involving families of infants and toddlers who are deaf or hard of hearing, Behl et al. (2017) found that families and children receiving services via tele-practice had at least the same if not better language outcomes and auditory skills than children who received services solely through traditional in-person visits. The parents receiving tele-practice services felt equally supported, knowledgeable, and confident in fostering their children's development as families who received in-person services.

This study also demonstrated the capacity of tele-practice to promote the practice of coaching families within the context of natural environments. In spite of this being widely accepted as best practice, past research has reported that the use of coaching has been a challenge during traditional home visits. This is because many practitioners have persisted to demonstrate child-directed intervention with the parents observing, rather than supporting the family's active involvement as the child's natural teachers.
Recent research found that the amount of time spent on parent–child interactions is associated with higher quality visits and that both the parenting environment and child language development are predicted by home visiting quality, particularly parent engagement. In this study by Behl and colleagues, the families who received services via tele-practice were more engaged in the intervention than the families in the in-person group, and providers were more responsive to the families when providing services via tele-practice compared with those they served in the in-person group. This is likely because practitioners are forced to rely more on working with and through the parent when using telehealth mechanisms. As Cromer and Myers (2016) have noted, the exciting potential of tele-practice is not simply the ability to extend the reach of evidence-based care, but also the ability to enhance the ecological validity of care by treating child problems in children's natural settings (e.g., homes, schools, public settings).

Telehealth in child mental health

Further support for using synchronous videoconferencing to deliver family-based services comes from the mental health field. Crum and Comer (2016) argue that there are a number of reasons for involving families in children's tele-mental healthcare:

- First, caregivers play an essential role in children's daily lives and functioning, and children rarely self-refer for mental healthcare. Caregivers are typically instrumental in all stages of a child's mental healthcare including treatment initiation, treatment participation, and ongoing engagement, and providing feedback on clinical response.
- Second, younger children, in particular, lack the developmental competencies required to adequately participate independently in psychotherapies developed for older populations.
- Third, parenting practices are commonly associated with the development and/or maintenance of child problems, and failure to address such maintaining factors can substantially limit expected treatment gains.
- Fourth, many children—particularly younger children—are inadequately equipped to interface independently with technology, and require adult assistance to participate in tele-mental healthcare.
- Fifth, technology can afford unprecedented windows into children's natural functioning in ways that were previously unimaginable. By providing care directly to families in non-mental health settings, tele-mental health treatments can now directly intervene with children in their natural settings, and can directly target naturalistic parent–child relationships, which provide the primary context of child development.

However, as Crum and Comer (2016) note, delivering family-based tele-mental health care is challenging for several reasons:

- Varying technological literacy across generations of participants. Technological literacy varies greatly across individuals and developmental stages. Although children today are growing up with technology, younger children require parental assistance to log on, or even to orient themselves toward a computer screen. Treatment for very young children will require parents to control the keyboard and the mouse or touch pad throughout the entirety of sessions.
- Child care logistics. In office-based care, clinic staff are often available to help with siblings, but such options are not available in VTC-facilitated home-based care. Families participating in tele-mental health care may need to make special arrangements with neighbours, babysitters, or other family members for siblings during sessions.
- Ensuring safety in family-based care. Tele-mental healthcare providers have less control over the family's treatment environment, and, accordingly, it can be more difficult than in traditional care to ensure safety. Providing care to families in relatively unsupervised settings—such as the home—carries risks not seen in office-based care. Certain high-risk families, such as families with abuse histories, may consequently be inappropriate for remote tele-mental healthcare
- Therapeutic alliance and matters of treatment process. Video-based formats can also present unique obstacles to the successful management of therapeutic alliance in family-based treatments.
- Privacy concerns. In addition to the security and privacy concerns relevant to all tele-mental healthcare, the conducting of child tele-mental healthcare requires special considerations regarding privacy of clinical information within the family.

Cromer and Myers (2016) argue that we need to adopt a more nuanced approach to the question of efficacy of telemedicine and tele-mental health:

> The question should not be simply whether tele-mental health strategies are supported, but rather when, under what circumstances, and for whom tele-mental health formats may be most indicated. For example, tele-mental health may show a large advantage over clinic-based treatment for managing child behaviour problems — particularly if tele-mental health services are remotely delivered directly to the home where child symptoms are most problematic … — but only among families who have relatively high technological literacy and who live in rural or other remote communities that are regionally underserved by quality mental healthcare. Among families dwelling in regions with quality mental healthcare who show more limited technological literacy, clinic-based care may considerably outperform tele-mental healthcare. And among families dwelling in regions with quality mental healthcare who show high technological literacy, the effects of tele-mental healthcare and clinic-based care may be rather comparable.

Cromer and Myers (2016) suggest that, as innovations evolve, the boundaries between clinic-based and tele-mental healthcare will likely become increasingly fuzzy. Recent practices in clinic-based care are increasingly incorporating mobile technologies to complement and augment the scope of ongoing face-to-face services.

Topol (2015) describes a number of ways in which doctors and patients could make use of new smartphone technologies to collaborate in managing their health conditions.

Telehealth challenges

Although tele-practice approaches have great potential, they are not necessarily simple or cheap to establish. Key challenges of establishing and running telehealth / tele-practice services include the following (Bywood, Raven, & Butler (2013):

- costs: start-up costs; equipment maintenance and repair; internet connectivity; and staff training
- technology: poor quality transmission; and data security
- inter-professional conflict: lack of confidence in other providers' skills
- organisational issues: lack of guidelines; cultural differences and lack of readiness for change; and lack of adequate facilities dedicated to telehealth
- privacy, ethics, liability issues: privacy and confidentiality may be compromised; and potential for misdiagnoses due to inability to examine patients
- patient issues: patients may feel obliged to accept a telehealth consultation despite preferring a face-to-face appointment; and assessing some patient behaviours (eg. facial expressions, body position) may be impaired.

A review of telehealth in New South Wales conducted by the Nous Group (2015) identified the most commonly cited barriers to the adoption of telehealth practices as:

- Need for strong and clear central governance to provide strategic direction and guidance
- Financial disincentives created by the MBS discourage clinicians from using telehealth in situations where it is appropriate and would provide considerable benefits
- Uncertainty about the impact of ABF on funding for services provided using telehealth
- Need for access to adequate and appropriate technology, including bandwidth, to support quality and reliable communication
- Need for systems to support effective scheduling of telehealth consultations, including a global contact list.

Perhaps the biggest challenge of these is the issue of incomplete or unreliable broadband coverage in rural and remote regions. Rennie and colleagues (2016) have documented the particular difficulties in ensuring reliable internet access and usage in remote Indigenous communities.

Telehealth and cost-benefit analysis

Cost is another big challenge, but the start-up costs could be offset by savings once the service is established, assuming telepractice services are cost-effective. However, as Bywood and colleagues (2013) note, while telepractice has the capacity to increase the cost-effectiveness of healthcare delivery, its cost-effectiveness is influenced by many factors, including local conditions and economies of scale, so it cannot be taken for granted and needs to be evaluated on a case-by-case basis.

What, then, is the evidence that telehealth / tele-practice services are cost-effective, and, if so, under what conditions? This question has been considered by a number of groups, including Blaiser, Behl, Callow-Heusser & White (2013), Bywood, Raven & Butler (2013), and Wade, Karnon, Elshaug & Hiller (2010).

One evidence review (Bywood et al., 2015) found there was limited evidence of cost-effectiveness of telehealth and that the quality of existing studies are poor-to-average. However, another evidence review (Wade, Karnon, Elshaug & Hiller, 2010), found that approximately 60 per cent of the identified studies found telehealth to be less costly than the non-telehealth alternative; 30 per cent found greater costs; and 10per cent found the same or mixed results.

Moreover, while one third of the studies showed improved health outcomes for telehealth over non-telehealth service, 58 per cent found outcomes were not significantly different. This review also found that the organisational model of care was more important in determining the value of the service than the clinical discipline, the type of technology, or the date of the study. Thus, telehealth was cost-effective for home care and access to on-call hospital specialists, showed mixed results for rural service delivery, and was not cost-effective for local delivery of services between hospitals and primary care.

A study by Blaiser and colleagues (2013) focused specifically on the relative costs of teleintervention versus traditional in-person home visits when serving families of children who are deaf/hard-of-hearing. They found that cost savings associated with providing services via tele-intervention increased as the intensity of service delivery increased. Overall, the results indicate that teleintervention is a promising cost-effective method for delivering high quality early intervention services to families of children with a hearing loss.

What can we conclude regarding teleintervention services? Overall, the evidence regarding teleintervention services suggests that these represent a highly promising strategy for supporting children and families living in rural and remote areas. As Nelson, Cain and Sharp (2017) note, this form of service is likely to continue to grow because of the increasing workforce gaps between need and service. This growth is likely to be facilitated by the continued evolution of secure, high-speed, mobile videoconferencing options across the range of current and future devices.

However, with this expansion comes the need for careful consideration and evaluation of services to ensure that children and families benefit, that no harm is done, and that different models of care for different populations are evaluated and modified. Nelson and colleagues (2017) suggest that there will be an important role for professional organisations in providing training and quality assurance.

Guidance for practitioners on how to provide tele-mental health services have been provided by Luxton, Nelson & Maheu (2016) and Nelson, Cain & Sharp (2017). Specific guidelines for establishing a tele-mental health program to provide evidence-based therapy for trauma-exposed children and families have been developed by Jones and colleagues (2014). Both the Australian College of Rural and Remote Medicine (http://www.acrrm.org.au) and the Royal Australian College of General Practitioners (http://www.racgp.org.au/) promote telehealth solutions and provide specialist provider directories on their websites.

8. Gaps in our knowledge

8.1 Telehealth / tele-practice with families of young children

There is a wide variety of telehealth services being provided in rural and remote areas of Australia, and there is great potential to increase this number by scaling up and replicating successful services (Bradford, Caffery & Smith, 2016). More research in tele-practice is needed, using broader outcomes measures than have been used to date (eg. capacity building and care coordination) (Bradford, Caffery, & Smith, 2016), and more models of service targeting children and families.

While some uses of tele-practice are backed by a respectable body of evidence, others are relatively poorly researched. For instance, as Comer and Myers (2016) note, tele-mental healthcare field is still at the earliest stages of evaluating the potential of applying technologies to expand the reach and scope of children's mental health services. More evidence is needed before tele-mental health practices can be considered a well-established vehicle for the systematic delivery of children's services. The use of tele-practice in supporting those with lifelong disabilities is another area that has not been investigated extensively (Johnson, 2016).

8.2 Place-based approaches in rural and remote areas

There are a number of place-based initiatives currently in Australia, mostly in disadvantaged urban areas with only a few in rural and remote areas. Place-based (or collective impact) approaches are well suited to addressing the problems faced by disadvantaged communities such as individual LGAs identified in this study. Further research and trialling of these strategies is warranted, drawing on the evidence already emerging.

8.3 How to address and prevent FDV

This is a challenge regardless of where families live, but, for families living in non-urban communities, there is limited evidence regarding the effectiveness of different models of service provision for addressing and preventing FDV (Campo & Tayton, 2015; Tayton et al., 2014). However, there are some key points that should be considered and the issue deserves more focus (though as previously stated, regional, rural and remote communities are not homogenous and therefore services and responses to FDV need to be tailored to the specific contexts in which FDV occurs in non-urban communities (Wendt, 2010)).

8.4 How to improve access and availability to quality data

In order to ensure that all policies and practices are based on the latest and most reliable evidence, we need access to the right (and most recent) data. Not only does quality data allows us to evaluate the effectiveness of our approach, but it also highlights emerging trends and patterns which have direct relevance to the lives of children in rural and remote Australia. Data also helps to shape professional's understanding of their patients, the health needs of their community and the evaluation of their interventions or services. According to the Australian Institute of Health and Welfare (AIHW), data specific to rural, and remote health information is particularly challenging to obtain because: the data do not exist; the data exist, but it is considered to be inaccurate; the data is available for some jurisdictions, but not nationally; the data does not contain a geographic identifier (for example, postcode) with which to allocate a remoteness category (The Australian Institute of Health and Welfare, 2008).

9. The way forward

Findings from the literature and our analyses of vulnerable LGAs across Australia echo a similar story: children who live in rural and remote areas are likely to share many common experiences. In particular, they are likely to: be developmentally vulnerable when they start school; be Indigenous; live in low income and single parent households; experience greater social isolation; be exposed to family and domestic violence and have contact with child protection services; and to live (at least for a period of time) in out of home care. They are also less likely to engage with early childhood education and care (ECEC) services.

In general, children living in rural and remote areas have less access to basic and specialist services than do their counterparts in urban areas. There are persistent shortages in early childhood intervention services, with Indigenous children with disabilities the most disadvantaged. There are also shortages in paediatric, allied health services, and mental health services for children. In addition, families and professionals often need to travel long distances to access or provide services. Other forms of service that might be able to bridge the gap, such as telehealth services, are not always available or appropriate.

Together this means that rural and remote children are at much greater risk of poorer developmental outcomes, and poorer lifelong health and well-being outcomes.

What can be done to improve outcomes for children in rural and remote regions? Listed below are a number of key strategies that have been identified. The evidence for these strategies does not necessarily come for studies of rural and remote services, but from analyses of disadvantaged communities more generally. However, they certainly apply to the communities described in this review, since these are doubly disadvantaged – first, by virtue of high levels of poverty and lack of social capital, and second, by the tyrannies of distance, and the difficulties in accessing basic and specialist services.

9.1 Focus on prevention

In a guide to the delivery of health care in rural and remote Australia, Smith (2016) distinguishes between upstream, midstream and downstream approaches to health:

- *Upstream approach* – a population or public health approach that aims to prevent illness occurring across the whole population, and dealing with the causes of ill health and disability from the social, political, economic or cultural aspects.
- *Midstream approach* – a behavioural, health promotion and prevention approach that addresses the lifestyle and behaviours of the individual with a health problem
- *Downstream approach* – a biomedical approach that deals with the presenting health problems of individuals on a one-to-one basis

The current system of intervention and support services in developed countries such as Australia is predominantly geared towards the downstream approach, focusing on the presenting problems rather than the underlying causes that lead to families having problems in the first place (O'Connell et al., 2009; Maziak et al., 2008). Direct interventions to address complex problems such as child abuse and FDV will always struggle to achieve sustainable results while the conditions that led to the problem remain unchanged (Braveman et al., 2011; Moore & McDonald, 2013; Stagner & Lansing, 2009).

There is widespread consensus that the best way to ensure positive outcomes for children is adopt an upstream approach, seeking to provide children and families with the conditions and assistance they need before problems escalate into crises (Braveman et al., 2011; Cohen et al., 2010; Cowen, 2000, 2016; Manchanda, 2013; Shonkoff & Richter, 2009; Stagner & Lansing, 2009). As we have seen the critical role that social factors play in determining health and wellbeing outcomes is now well understood (Braveman et al, 2011; The Marmot Review, 2010), and it has become increasingly apparent that too little attention has been given to the upstream social determinants of health, such as economic resources, education, and racial discrimination (Braveman et al., 2011).

An alternative to the downstream direct intervention is an approach that seeks to address the underlying causes of problems – the 'causes of the causes' (Braveman & Gottlieb, 2014; Marmot, 2015). This known as 'pre-prevention' or 'true prevention' (O'Connell et al., 2009; Maziak et al., 2007; Stagner & Lansing, 2009), or the public health approach (Barlow & Calam, 2011; Mistry et al., 2012). The pre-prevention approach seeks to transcend the traditional 'silos' within which services traditionally operate by establishing systems of collaboration that address long-term underlying problems and thereby prevent future ones (Stagner & Lansing, 2009). Barlow and Calam (2010) argue that 'a public health approach to safeguarding is the only way of ensuring that all children are protected within a population, including children at high risk.'

As this review has shown, the conditions under which families are raising young children in rural and remote regions are worse than those faced by families in urban areas of Australia. These include poverty, social

isolation,[16] which are the causes of the causes (the factors that trigger family and domestic violence as well as child neglect and abuse, and that ultimately result in the poorer developmental outcomes manifest by the children). Unless these underlying causes are successfully addressed, children in rural and remote regions will continue to experience poorer outcomes.

Stacey Fox and colleagues (2015) have provided a useful description of what a truly prevention-focused system might look like.

9.2 Adopt a multilevel coordinated approach

Action to address the conditions under which families are raising young children or to improve service coordination at this level goes well beyond what any single organisation or government department can do. It necessarily involves multiple sectors and levels of government, as well as non-government services (CCCH, 2007, 2009; Moore & Skinner, 2010; Moore & McDonald, 2013; Trickett et al., 2011). As Trickett and colleagues (2011) have argued, 'A scientific paradigm is emerging that supports collaborative, multilevel, culturally situated community interventions aimed at creating sustainable community-level impact.'

This approach is based on an ecological understanding of child and family functioning, in which child development is seen as shaped by the combined influence of the child, the family, social networks, and wider community and society factors (Bronfenbrenner, 1979). This implies the need for interventions that are multidimensional and able to address all these levels. Moore and McDonald (2013) have proposed that this involves interventions at three levels simultaneously:

- *program and direct service level interventions* delivered directly to children and families (e.g. home visiting and parenting support). These can be universal (i.e. available to all children and families) or targeted (i.e. available to children and families at risk);
- *community and service system level interventions*, including: a) interventions that target the nature of communities in order to improve social cohesiveness and social support to children, parents and families (e.g. ensuring streets are safe and easily navigable); and b) interventions that target the service system (e.g. building more co-ordinated and effective service systems); and
- *structural and societal level system interventions* that address the wider social environments that influence child and family outcomes (e.g. introduction of new government policies and funding that address issues such as poverty).

The evidence indicates that interventions implemented through the combined efforts of health, nutrition, education, and social protection sectors are effective at improving early child development (Daelmans et al., 2015). To be fully effective, however, action at this level also needs to involve sectors responsible for the local

[16] Even extreme climate events, which are predicted to increase, can be a significant source of stress for rural and remote families.

economic, physical and social infrastructure, including employment opportunities, public transport and connectivity, and the design of residential communities (VicHealth, 2016).

9.3 Adopt a place-based approach

Place-based (or collective impact) approaches offer one way of organising a multilevel approach to address a community's collective needs and coordinating services more effectively (CCCH, 2011; Moore, 2014; Moore et al., 2014; Moore & Fry, 2011; Moore et al., 2016). Place-based approaches involve stakeholders engaging in a collaborative process to address issues as they are experienced within a geographic space, such as a neighbourhood, a community or an ecosystem (Bellefontaine & Wisener, 2011). These approaches are designed specifically for geographical areas that are experiencing many challenges, and are not needed in all localities. [17]

The rural and remote LGAs that were identified through this review are prime candidates for place-based approaches. In fact, in the view of CCCH, no service innovations should be undertaken in such areas without being part of a collective effort to address local challenges.

9.4 Better integrated and co-ordinated service systems

No single service alone can meet the complex needs of any family, let alone those living in rural and remote areas. Therefore, the service system must become better integrated so as to address the multiple influences on children's development (CCCH, 2009; Moore & McDonald, 2013). Service delivery integration can take the form of 'virtual' or co-located integration. Different forms of service level integration fall along a continuum ranging from coexistence (where services operate independently) to full integration (where services merge completely to form a new entity) (Moore & Skinner, 2010).

The need for better coordinated services is particularly acute in rural and remote regions. Some remote and highly disadvantaged areas, rather than being underserviced, have an oversupply of competing government and non-government services, with much wasteful overlap. In other regions, the problem is the scarcity of services, and the need for those that are available to coordinate their support for families.

9.5 Co-design / co-production strategies

One of the key features of effective place-based approaches – and service redesign in general - is that the service systems and communities work as partners in the planning, management, delivery and evaluation of what, how, when and where services are delivered (Moore et al., 2016). Engaging communities in the co-design and co-production of services – at both individual family levels and community levels – is central to ensuring that services address local needs and are acceptable to community members (Bradwell & Marr,

[17] For an overview and examples of place-based initiatives in Australia, see Fry et al. (2014) and Laidlaw et al. (2014a, 2014b).

2008; Boxelaar et al., 2006; Boyle et al., 2010; The Health Foundation, 2017; Hopkins & Meredyth, 2008; McShane, 2010; Moore, et al., 2016; Needham & Carr, 2009).

While the principle of co-design / co-production is recommended practice for the development of services in all communities and jurisdictions, it is particularly critical for both rural / remote communities and Indigenous communities. In the case of rural and remote communities, they are all unique in their demographic and geographic composition and their particular strengths and challenges, and the actions needed to meet their needs are also unique. Identifying what will work best for each community must be done in conjunction with the community.

This is particularly true of work with Indigenous communities. Given the extensive histories of dispossession and lack of respect for Indigenous culture and attachment to country, Indigenous communities are acutely sensitive to attempts, however well-meaning, to impose solutions to the challenges they face in raising their children in ways that they (and we) would wish. Only by engaging Indigenous communities as true partners can we hope to help them achieve more positive outcomes for their children.

9.6 Adapt a model of progressive universalism

Although children in the most disadvantaged areas are more likely to experience developmental vulnerabilities, some children at every socio-economic level in society will do so. This suggests that we need to build a service system based on provision of universal services for all families, with additional services being provided to those with greater needs (CCCH, 2006). This approach is known as *progressive* or *proportionate universalism* (Barlow et al., 2010; Boivin & Hertzman, 2012; Feinstein et al., 2008; Human Early Learning Partnership, 2011; Marmot Review, 2010; Statham & Smith, 2010), and is based on the provision of high-quality core services for all children, supplemented by progressively more intensive forms of intervention for those for whom the core services are insufficient. To identify those children who require additional support because of their health or developmental needs, the service system needs to be able to detect emerging problems promptly. Services that are provided in response to needs identified by families are more effective than those based on professional judgments of family needs (Boivin & Hertzman, 2012; Moore & McDonald, 2013).

While surveillance and screening services need to be available to all children living in rural and remote areas, they are particularly important for those children who have developmental difficulties and disabilities.

9.7 Children with developmental difficulties and disabilities

When young children experience developmental difficulties and when their families face challenges, early detection and intervention are essential. The evidence we have reviewed clearly indicates that the current service system is less able to detect when children living in rural and remote areas are experiencing or at risk of developmental difficulties and to respond promptly and effectively. As we have seen, the reasons for this include the tyrannies of distance and the shortage of appropriately trained staff. Research shows that early intervention is the most effective strategy for supporting children with a disability and/or developmental

delays. Despite this, it is apparent that children in rural or remote settings are likely to be identified later and to have less access to appropriate services.

Children experiencing developmental difficulties, delays and disabilities fall on a spectrum – there are no absolute cut-off points for developmental disabilities such as cerebral palsy, autism, ADHD or intellectual disability. The children who are most at risk of not being identified as needing help and then not receiving the support they need are not those at the far end of the spectrum – children who have significant disabilities and major health issues – but those in the middle of the spectrum.

Children with developmental disabilities are more likely to be identified earlier and eventually will be eligible for support through the National Disability Insurance Scheme (NDIS), although it is an open question at this stage whether the specialist support services they need will be available to them where they live. However, those children with developmental difficulties that are not severe enough to qualify for NDIS support are even less likely to receive support. Yet appropriate support in the early years is exactly what these children and their families need if the problems they are experiencing are not to escalate and compromise their subsequent development.

Additional or alternative ways of identifying and supporting children with developmental difficulties and disabilities need to be explored as a matter of urgency. These might involve mobile services, such as the Healthy Kids Bus Stop service in New South Wales, provided by a partnership between Royal Far West and Ronald McDonald House Charities Families. This provides a comprehensive mobile screening and healthcare service, delivered with in rural and remote communities, that aims to identify developmental issues and provide a pathway to care for 3-5 year old children. However, this service is only available in New South Wales, and only in selected communities.

9.8 Indigenous children

A wide host of factors are known to contribute to the inferior health and wellbeing outcomes of Indigenous children, especially those in rural areas. These include higher prevalence in the rates of factors that have already been discussed (poverty, parental unemployment status etc.), and others such as lower physical and mental health of parents or carers and the intergenerational effects of trauma associated with the stolen generation (Zubrick et al. 2005).

Indigenous children are also significantly more likely to be exposed to risk factors that increase the likelihood of disability (low birthweight, infectious diseases, violence etc.) (AIHW, 2015) and have a higher prevalence of disability. They also encounter higher rates of hearing loss (associated with high prevalence of middle ear diseases such as otitis media); have significantly higher prevalence of communication disorders; and are 1.3 times more likely to require assistance with self-care, mobility or communication than other children.

Early intervention is critical given that high rates of disability can have adverse effects on education, speech, social development, and other lifelong outcomes and with the right support, these effects can be lessened. However, the current complex and fragmented culture of service delivery often makes access to appropriate

services incredibly challenging. Moreover, Indigenous families face the unique burden of navigating through a system that is not always attuned to their cultural and linguistic needs; and can experience direct and indirect racism, which has been linked to distrust of mainstream organisations and providers.
Addressing the influence of social determinants of health on Indigenous childhood development and disability requires a shift in thinking as they are often considered indirect to the traditional responsibilities of health, education, and social service sectors. The need for collaboration across all sectors and levels of Government for effective service coordination have been recognised nationally and internationally. Despite this, there has been no systematic attempt to elucidate how collaboration works in practice across and within sectors involved in service provision.

Further research is required into collaborations in Indigenous childhood development and disability to maximize the potential, and minimize any negative impacts, of collaborative approaches. The paucity of research on Indigenous children with a disability also means exploring the experiences of children and their families in accessing services is important to completing a holistic picture in order to improve service access.

Moreover, while there are consistent messages about effective service provision in Indigenous communities, program evaluations frequently reflect the challenges in applying these principles to everyday practice (Lowitja, 2015). Engagement in children's education by parents and the wider community, and empowerment of the community in decision-making, including in forming contextually and culturally relevant curricula, are key to successful outcomes for Indigenous children (Guenther et al., 2015). The reduced impact of the current early childhood interventions highlight the need for messages about early childhood development to be communicated in ways that echo the expectations and beliefs of Indigenous parents (Smith et al. 2003; Kruske et al. 2012).

More needs to be done to identify the factors that promote positive development outcomes for Indigenous children. An intervention's 'cultural fit' reflects its capacity to recognise and cultivate strengths and encourage change that is driven by local communities (Robertson & Zubrick 2012). Research shows that where parents place a high priority on passing on cultural knowledge and language in their children, then those children display better outcomes in school (Dockery, 2017). This relationship is most apparent for children living in more remote areas, where surprisingly, school attendance is lower. These findings strongly suggest that schools do not sufficiently meet the learning needs of Indigenous children and support the notion that education in remote areas is most effective when curricula is co-designed locally and combines traditional and mainstream learning, including local methods of instruction and incorporate assessments that measure achievement in traditional knowledge (Dockery, 2017; Guenther et al, 2015).

9.9 Alternative models of service

The challenges faced by rural and remote communities are sufficiently different from those of urban communities that different models of service are needed (Wakerman & Humphreys, 2013). These will range from traditional fixed services, to 'hub-and-spoke models, visiting services, and telehealth services that complement or substitute for face-to-face services. These alternative models may involve mobile services, such as the Healthy Kids Bus Stop service referred to earlier.

Alternative strategies for ensuring a greater supply of professionals in rural and remote areas are also needed. More needs to be done to drive specialist expertise downwards, that is, to provide training and on-line support to local staff (eg. practice nurses) in some of the core tasks usually restricted to specialists. More use should also be made of telecommunications to provide specialist oversight for rurally-based medical and allied health professionals.

9.10 Expand and support telehealth services

As this review has shown, telehealth has enormous potential to extend services to those living in rural and remote regions, but there is still a long way to go to embed sustainable, evidence-based services that can support rural children and their development needs. A national paediatric telehealth service that can act as a centre of excellence in rural services delivery and telehealth for children with development needs is one way to move this forward. This could be run as a partnership between organisations who already deliver leading telecare services to rural children, and university centres with expertise in rural health.

The biggest challenge to extending telehealth services in rural and remote Australia is access to broadband internet services. Access to high-speed broadband for medical practices has been identified as a key solution to improving regional, rural and remote health care by rural doctors across Australia (AMA, 2016). The utilisation of telehealth and telemedicine in rural and remote Australia remains patchy and is not used to full potential, because of no, or inadequate internet access. As noted in the Regional Telecommunications Review report, the ability of hospitals and clinics to support remotely located clinicians and patients via video conferencing and remote monitoring could be severely limited in areas serviced by satellite, which may not be able to consistently and reliably deliver the necessary capacity and technical capability.

If sufficiently supported, telehealth services, such as video-conferencing, could become much more effective in complementing local health services. They could be used to expand specialty care to patients in areas with shortages of health care providers as well as extend primary care to remote areas, reducing the need to travel, and increasing the frequency of patient and primary care provider interactions. By providing timely access to services and specialists, telehealth could improve the ability to identify developing conditions, and thereby reduce the need for more costly treatments and hospitalisations in the future. Telehealth could also help to educate, train and support remote healthcare workers on location and support people with chronic conditions to manage their health.

9.11 Collecting and using data

While this review identified rural and remote areas with the greatest proportion of vulnerability and need at this point in time, ongoing decisions about where the greatest need is, and where to intervene must be based on comprehensive and up-to-date data. Our experience in conducting this review is that such data is incomplete (e.g. information about the prevalence and type of disability among children, particularly Indigenous children, is limited at best); scattered (there is no one source of data relating to child health and wellbeing outcomes); often not up to date (the most recent data source on the geographical areas in which

Indigenous children live is the 2006 Census); and difficult to navigate- making the gathering of useful data extremely time consuming.

Another point of consideration is that data relating to Indigenous Australians (particularly Indigenous children) is incredibly limited. Data is often not available in a comparable way for the non-Indigenous population; when available, it is often out of date and not reflective of current circumstances; the quality of the data is frequently questionable; it is often not available at the level that is required by Indigenous communities; Indigenous-specific measures of wellbeing are frequently missing; and there is little to no data capturing the effect of particular policies or programs on Indigenous Australians (AIHW, 2014). For example, the *Growing Up in Australia* Longitudinal Study of Australian Children (LSAC) is the most comprehensive database for understanding children's development in Australia (AIFS, 2011). However, Indigenous children represented less than 4 per cent of the entire sample size (AIHW, 2014). This indisputably reduces the government (and non-government sector's) ability to deliver services and create policies that are based on reliable evidence (Moore et al, 2016).

As it stands, only a small number of national data collections are specific to the health and development of Indigenous children, while most use cross-sectional data from multiple sources to create a "snapshot" of Indigenous child health at a specified moment in time. Ongoing data collections that underpin policy development, measure the impact of interventions and document long-term changes in child health is exceptionally limited (Fremantle, Zurynski, Mahajan, D'Antoine & Elliott, 2008). Moreover, limited cost benefit data for early childhood development programs/strategies means that it is difficult to fund and implement approaches that meet the needs of communities and identify the most cost-effective way of achieving identified outcomes. Good quality data is central to accurately assessing the health and wellbeing of Indigenous children, understanding if services are accessible, and whether or not policies and programs are effective.

There is paucity of information about the existence and effectiveness of paediatric allied health therapy services in rural and remotely situated communities, possibly making it harder to design ECI therapy service programs that are as effective in the bush as they are in the city (SARRAH).

Overall, accessing reliable, comprehensive data on the health and well-being of rural children, needs, and service availability by community and region is a significant challenge, and a barrier to designing and targeting solutions that tackle the challenges outlined in this report.

Royal Far West may consider partnering with other organisations to advocate for a more streamlined national approach to this problem. For example, The Australian Bureau of Statistics and the Australian Institute of Health and Welfare developed a plan to improve identification of Indigenous status and the quality of Indigenous child health data, and to include mental health and primary care data (Phillips, 2005; AIHW, 2007). Improving Indigenous identification is also a priority for the community services sector (ABS, 2006), while the Menzies School of Health Research is working to progress the translation of health data into policy and practice (Smith, 2005).

9.12 Working with the new National Rural Health Commissioner

The Federal Government has announced the creation of a *National Rural Health Commissioner* (Department of Health, 2017). This new position will act as an independent and high-profile advocate for regional, rural and remote health reform and will represent the needs and rights of regional, rural and remote Australia. The Commissioner's first priority is the development of the medical generalist pathway to improve access to training for doctors in regional, rural and remote Australia, but the Commissioner's role will be much broader and will give consideration to the nursing, dental health, Indigenous health, mental health, midwifery and allied health needs in regional, rural and remote Australia. Once appointed, the new National Rural Health Commissioner should be encouraged to address the key issues identified above, especially the need for greater coordination of data collection, supporting place-based approaches, and building the evidence base for telehealth services.

10. Conclusions

As stated at the beginning of this review, the fact that children living in rural and remote regions in Australia have poorer health and developmental outcomes relative to their peers living in urban areas is unacceptable. Our review has clearly shown the nature and scale of the challenges faced by children and their families in the most disadvantaged rural and remote regions across the nation. The challenge facing the governments responsible for the health and wellbeing of these children and the services that support them is what can be done improve their developmental outcomes.

With the forthcoming appointment of National Rural Health Commissioner, the time is right to consider developing a national plan to address the particular needs of children living in rural and remote Australia. This should be based on the key features described above, and should address the conditions under which families are raising young children as well as the services they need.

References

Adelman, L., & Middleton, S. (2003). *Social exclusion in childhood: why and how it should be measured. Some thoughts from Britain*. Sydney. Retrieved from: https://www.aspc.unsw.edu.au/sites/www.aspc.unsw.edu.au/files/uploads/aspc_historical_conferences/2003/paper219.pdf

Alston, M. (2009). Innovative Human Services Practice: Australia`s Changing Landscape. South Yarra, Victoria: Palgrave Macmillan.

Askew, D. A., Schluter, P. J., Spurling, G. K. P., Bond, C. J. R., & Brown, A. D. H. (2013). Urban Aboriginal and Torres Strait Islander children's exposure to stressful events: A cross-sectional study. *Medical Journal of Australia, 199*(1), 42–45.

Australian Paediatric society. (n.d.). *Response to the Federal Senate Inquiry on the state of rural child health and rural paediatrics.* *https://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwiPiOvqzsnUAhUHqJQKHS7PA6MQFggoMAA&url=http%3A%2F%2Fwww.aph.gov.au%2FDocumentStore.ashx%3Fid%3Da3125b69-c441-4563-adce-4d5fa2b512ee&usg=AFQjCNH2kuPkRtQVKSYlWJ4_v58j2eqKEA&sig2=bsXqpC_yG7bOFrBhT3lAmw*

Australian Bureau of Statistics. (2011). *Estimates of Aboriginal and Torres Strait Islander Australians. (Cat. no. 3238.0.55.00)*. Retrieved from: http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3238.0.55.001June%202011?OpenDocument

Australian Bureau of Statistics (2006). *Experimental Estimates of Aboriginal and Torres Strait Islander Australians, June 2006* (cat. no. 3238). Retrieved from: http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4725.0Chapter120Apr%202011

Australian Bureau of Statistics (2010). *Australian Demographic Statistics* (cat. no. 3101.0.). Retrieved from: http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Jun%202010?OpenDocument

Australian Bureau of Statistics. (2016). *Australian Demographic Statistics, Jun 2016. (Cat. no. 3101.0)*. Retrieved from: http://www.abs.gov.au/ausstats/abs@.nsf/0/1CD2B1952AFC5E7ACA257298000F2E76?OpenDocument

Australian Bureau of Statistics. (2011). *Estimated population, Aboriginal and Torres Strait Islander Australians, Remoteness Areas, 2001 to 2011*. (Cat. no. 3238) Retrieved from: http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3238.02001%20to%202026?OpenDocument

Australian Bureau of Statistics. (2016). *National Aboriginal and Torres Strait Islander Social Survey, 2014-15* (Cat. no. 4714) Retrieved from: http://www.abs.gov.au/ausstats/abs@.nsf/mf/4714.0

Australian Bureau of Statistics. (2013). Survey of Income and Housing 2011-12. (Cat. no. 6523.0). Retrieved from: http://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/370DA673844C5651CA257EB50011CAC2?opendocument

Australian Bureau of Statistics. (2016). National Aboriginal and Torres Strait Islander Social Survey, 2014-15. (Cat. no. 4714) Retrieved from: http://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/4714.0

Australian Bureau of Statistics. (2016). Preschool Education, Australia, 2016. (Cat. No. 4240). Retrieved from: http://www.abs.gov.au/ausstats/abs@.nsf/mf/4240.0

Australian Bureau of Statistics. (2013). *Personal Safety Survey, Australia, 2012*. (Cat. No. 4906). Retrieved from: http://www.abs.gov.au/ausstats/abs@.nsf/mf/4906.0

The Australian Domestic & Family Violence Clearinghouse. (2011). *The Impact of Domestic Violence on Children: A Literature Review.* The University of New South Wales. Retrieved from: http://earlytraumagrief.anu.edu.au/files/ImpactofDVonChildren.pdf

Australian Early Development Census. (2015). *National report. A Snapshot of Early Childhood Development in Australia*. Retrieved from: https://www.aedc.gov.au/resources/detail/2015-aedc-national-report

Australian Institute of Health and Welfare. (2016). Child protection Australia 2014–15. Child welfare series No. 63. Retrieved from: http://www.aihw.gov.au/publication-detail/?id=60129554728

Australian Institute of Health and Welfare. (2016). *Family violence prevention programs in Indigenous communities Resource sheet no. 37.* produced by the Closing the Gap Clearinghouse. Retrieved from: http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129557831

Australian Institute of Health and Welfare. (2014). *Dynamic data display: Australia's registered health workforce by location*. Retrieved from: http://www.aihw.gov.au/workforce-data/

Australian Institute of Health and Welfare (AIHW), 2011. *The health and welfare of Australia's Aboriginal and Torres Strait Islander people. An overview.* AIHW: Canberra.

Australian Institute of Health and Welfare. (2011). *Aboriginal and Torres Strait Islander people with disability: wellbeing, participation and support*. Canberra: AIHW. Retrieved from: http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=10737418952

Australian Institute of Health and Welfare. (2011). *The health and welfare of Australia's Aboriginal and Torres Strait Islander people. An overview*. AIHW: Canberra. Retrieved from: http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=10737418950

Australian Institute of Health and Welfare. (2008). *Rural, regional and remote health: indicators of health system performance.* AIHW: Canberra.

Australian Institute of Health and Welfare. (2013). *Aboriginal and Torres Strait Islander Health Performance Framework 2012 report: Western Australia.* AIHW: Canberra.

Australasian Telehealth Society (2013). Towards a national strategy for telehealth in Australia 2013-2018. Australasian Telehealth Society. Retrieved from: http://www.aths.org.au/wp-content/uploads/2016/06/TelehealthStrategy.pdf

Barlow, J. and Calam, R. (2011). A public health approach to safeguarding in the 21st century. *Child Abuse Review, 20* (4), 238–255.

Barton, R., Robinson, T., Llewellyn, G., Thorncraft, K., Smidt, A. (2015). Rural and remote perspectives on disability and mental health research in Australia: 2000-2013. *Advances in Mental Health, Maleny 13.1*, 30-42.

Battye, K.M. and McTaggart, K. (2003). *Development of a model for sustainable delivery of outreach allied health services to remote north-west Queensland, Australia*. Rural and Remote Health (Internet), 3: 194. Retrieved from: http://www.rrh.org.au/articles/subviewnew.asp?ArticleID=194

Baxter, J. (2008). *Growing Up In Australia: The Longitudinal Study of Australian Children, Annual Report 2006–07*. Melbourne, Victoria: Australian Institute of Family Studies. Retrieved from: http://www.aifs.gov.au/growingup/pubs/ar/ar200607/breastfeeding.html.

Baxter, J., Hayes, A., & Gray, M. (2011). *Families in regional, rural and remote Australia (Facts Sheet).* Melbourne, Victoria: Australian Institute of Family Studies. Retrieved from: https://aifs.gov.au/publications/families-regional-rural-and-remote-australia

Baxter, J. & Hand, F. (2013). *Access to early childhood education in Australia, Research Report No. 24,* Australian Institute of Family Studies, Melbourne. Retrieved from: https://aifs.gov.au/publications/accessearly-childhood-education-australia/executive-summary

Behl, D.D., Blaiser, K., Cook, G., Barrett, T., Callow-Heusser, C., Brooks, B.M., Dawson, P., Quigley, S. and White, K.R. (2017). A multisite study evaluating the benefits of early intervention via telepractice. *Infants and Young Children, 30* (2), 147-161.

Belli, P.C., Bustreo, F. and Preker, A. (2005*). Investing in children's health: what are the economic benefits?* Bulletin of the World Health Organization, 83: 777-784. Retrieved from: http://www.who.int/bulletin/volumes/83/10/777.pdf

Bennett, B., McDonald, J., Knight, J., Comino, E., & Henry, R. (2010). Assessing development of urban Aboriginal infants. *Journal of Paediatric Child Health, 46* (7–8), 384–91.

Biddle, N. (2007). Indigenous Australians and preschool education: Who is attending? *Australian Journal of Early Childhood, 32*(*3), 9-16.*

Blaiser, K., Behl, D., Callow-Heusser, C., & White, K. (2013). Measuring costs and outcomes of teleintervention when serving families of children who are deaf/hard-of-hearing. *International Journal of Telerehabilitation, 5* (2), 3–10.

Boxelaar, L., Paine, M. and Beilin, R. (2006). Community engagement and public administration: Of silos, overlays and technologies of government. *Australian Journal of Public Administration, 65* (1), 113–126.

Boyle, D. and Harris, M. (2009). The challenge of co-production: How equal partnerships between professionals and the public are crucial to improving public services. London, UK: nef (new economics foundation) and NESTA. Retrieved from: http://b.3cdn.net/nefoundation/312ac8ce93a00d5973_3im6i6t0e.pdf

Bradford, N. K., Caffery, L. J., & Smith, A. C. (2016). Telehealth services in rural and remote Australia: a systematic review of models of care and factors influencing success and sustainability. *Rural & Remote Health, 16* (4), 3808.

Bradley H. R., Corwyn F. R. (2002). *Socioeconomic Status and Child Development. Annual Review of Psychology, 53*, 371-399.

Bradshaw, S., Hellwig, L., Peate, D. and Wilson, A. (2015). Promoting the uptake of preventative Aboriginal child health policy in Western Australia. *Australian Journal of Rural Health, 23* (6), 313–317. doi:10.1111/ajr.12221

Bradwell, P. and Marr, S. (2008). *Making the most of collaboration: an international survey of public service co-design.* Demos Report No. 23. London, UK: Demos. http://www.demos.co.uk/files/CollabWeb.pdf

Braveman, P., Egerter, S. and Williams, D.R. (2011). The social determinants of health: Coming of age. *Annual Review of Public Health, 32*: 381-98.

Braveman, P, Egerter, S., and Barclay, C. (2011). *What shapes health-related behaviors? Exploring the social determinants of health*: issue brief no. 1. Princeton, New Jersey: Robert Wood Johnson Foundation. Retrieved from: http://www.rwjf.org/content/dam/farm/reports/issue_briefs/2011/rwjf70442

Braveman, P. and Gottlieb, L. (2014). The social determinants of health: it's time to consider the causes of the causes. *Public Health Reports, 129* (Suppl. 2), 19-31.

Bywood, P., Raven, M. & Butler, C. (2013). *Telehealh in primary health care settings within Australia and internationally*. PHCRIS Policy Issue Review. Adelaide, South Australia: Primary Health Care Research & Information Service. Retrieved from: http://www.phcris.org.au/phplib/filedownload.php?file=/elib/lib/downloaded_files/publications/pdfs/phcris_pub_8403.pdf

Calma, T. (2008). *Preventing crime and promoting rights for Indigenous young people with cognitive disabilities and mental health issues*. Sydney: Australian Human Rights Commission.

Campo, M., Kaspiew, R., Moore, S., & Tayton, S. (2014). *Children affected by domestic and family violence. A review of domestic and family violence prevention, early intervention and response services.* Australian Institute of Family Studies. Retrieved from: https://aifs.gov.au/publications/children-affected-domestic-and-family-violence

Campo, M., & Tayton, S. (2015). *Domestic and family violence in regional, rural and remote communities: An overview of key issues*. Australian Institute of Family Studies. Retrieved from: https://aifs.gov.au/cfca/publications/domestic-and-family-violence-regional-rural-and-remote-communities

Centre for Community Child Health (2011). *Place-based approaches to supporting children and families*. CCCH Policy Brief No. 23. Parkville, Victoria: Centre for Community Child Health, The Royal Children's Hospital. http://www.rch.org.au/uploadedFiles/Main/Content/ccch/Policy_Brief_23_-_place-based_approaches_final_web2.pdf

Centre for Community Child Health (2006). *Services for young children and families: an integrated approach.* CCCH Policy Brief No. 4. Parkville, Victoria: Centre for Community Child Health, The Royal Children's Hospital. http://www.rch.org.au/emplibrary/ccch/PB4_Children-family_services.pdf

Centre for Community Child Health (2009). *Integrating services for young children and their families.* CCCH Policy Brief No. 17. Parkville, Victoria: Centre for Community Child Health, The Royal Children's Hospital. http://www.rch.org.au/emplibrary/ccch/PB_17_FINAL_web.pdf

Centre for Community Child Health (2011). *Place-based approaches to supporting children and families.* CCCH Policy Brief No. 23. Parkville, Victoria: Centre for Community Child Health, The Royal Children's Hospital. http://www.rch.org.au/emplibrary/ccch/Policy_Brief_23_-_place-based_approaches_final_web.pdf

Cheek, C., Skinner, T., & Ellis, I. (2014). Measuring the environmental cost of health-related travel from rural and remote Australia. *Medical Journal of Australia, 200 (5*), 260-262.

Cohen, L., Chehimi, S. and Chavez, V. (2010). *Prevention is Primary: Strategies for Community Wellbeing* (2nd. Ed.). Hoboken, New Jersey: Jossey-Bass.

Comer, J. S. and Myers, K. (2016). Future directions in the use of telemental health to improve the accessibility and quality of children's mental health services. *Journal of Child and Adolescent Psychopharmacology, 26* (3), 296-300.

Community Affairs References Committee. (2014). Prevalence of different types of speech, language and communication disorders and speech pathology services in Australia. The Senate Community Affairs Committee Secretariat, Canberra. Retrieved from: https://www.downsyndrome.org.au/documents/submissions/health/Senate_report_Speech_Pathology.pdf

Commission for Children and Young People Western Australia. (2012). Children and young people living in regional and remote areas. Policy brief. Retrieved from: https://www.ccyp.wa.gov.au/media/1297/policy-brief-mental-health-regional-and-remote-areas-october-2012.pdf

Commission for Children and Young People Western Australia. (2013). Prevention and early intervention for mental health problems and disorders in children and young people. Policy brief. Retrieved from: https://www.ccyp.wa.gov.au/media/1296/policy-brief-mental-health-prevention-and-early-intervention-for-mental-health-problems-and-disorders-in-children-and-young-people-november-2013.pdf

Commission of Inquiry South Australia. (2008). *Children in State Care and Children on APY Lands*. Adelaide, SA.

Costello E., Compton, S. N., Keeler, G & Angold, A. (2003). Relationships between poverty and psychopathology: a natural experiment. *The Journal of the American Medical Association, 290* (15), 2023-9.

Cowen, E. L. (2000). Now that we all know that primary prevention in mental health is great, what is it? *Journal of Community of Psychology, 28*, 5–16.

Crum, K.I and Comer, J.S. (2016). Using synchronous videoconferencing to deliver family-based mental health care. *Journal of Child and Adolescent Psychopharmacology, 26* (3): 229-34.

D'Aprano, A., Silburn, S., Johnston, V., Bailie, R., Mensah, F., Oberklaid, F., and Robinson, G. (2016). *Challenges in monitoring the development of young children in remote Aboriginal health services: clinical audit findings and recommendations for improving practice*. Rural and Remote Health (Internet), 16: 3852. Retrieved from: http://www.rrh.org.au/articles/subviewnew.asp?ArticleID=3852

Daelmans, B., Black, M.M., Lombardi, J., Lucas, J., Richter, L., Silver, K., Britto, P., Yoshikawa, H., Perez-Escamilla, R., MacMillan, H., Dua, T., Bouhouch, R.R., Bhutta, Z., Darmstadt, G.L. and Rao, N. (2015). Effective interventions and strategies for improving early child development. *British Medical Journal, 351:*

Department of Education and Training (2015). Australian Early Development Census – *National Report 2015: A Snapshot of Early Childhood Development in Australia.* Canberra, ACT: Department of Education and Training. Retrieved from: https://www.aedc.gov.au/resources/detail/2015-aedc-national-report

Department of Health (n.d.). *Telehealth*. Canberra, ACT: Department of Health. Retrieved from: http://www.health.gov.au/internet/main/publishing.nsf/content/e-health-telehealth

Department of Health (2017). Australia's First National Rural Health Commissioner: *The Champion of Regional and Rural Health Reform*. Assistant Minister for Health press release, 8 February. Canberra, ACT: Department of Health. Retrieved from: http://www.health.gov.au/internet/ministers/publishing.nsf/Content/health-mediarel-yr2017-gillespie005.htm

Department of Prime Minister and Cabinet. (2014). Aboriginal and Torres Strait Islander Health Performance Framework 2014 Report. Retrieved from: https://www.pmc.gov.au/sites/default/files/publications/indigenous/Health-Performance-Framework-2014/tier-3-health-system-performance/314-access-services-compared-need.html

Dew, A., Bulkeley, K., Veitch, C., Bundy, A., Lincoln, M., Brentnall, J., Gallego, G. & Griffiths, S., (2013). Carer and service providers' experiences of individual funding models for children with a disability in rural and remote areas, *Health and Social Care in the Community, 21*(4), 432-441.

Dickerson, A., & Popli, G. (2012). Persistent poverty and children's cognitive development Evidence from the UK Millennium Cohort Study. Centre for Longitudinal Studies. London. Retrieved from: http://www.cls.ioe.ac.uk/news.aspx?itemid=2013&itemTitle=Persistent+poverty+damages+young+children%E2%80%99s+cognitive+development%2c+study+finds&sitesectionid=905&sitesectiontitle=Press+Releases

Dockery, M. (2017). *Culture, housing, remoteness and Aboriginal and Torres Strait Islander child Development Evidence from the Longitudinal Study of Indigenous Children.* Cooperative Research Centre for Remote Economic Participation Working Paper CW028. Retrieved from: http://apo.org.au/system/files/73490/apo-nid73490-40301.pdf

Dogar, F., Kruger, E., Dyson, K., and Tennant, M. (2011). *Oral health of pre-school children in rural and remote Western Australia.* Rural and Remote Health (Internet), 11: 1869. Retrieved from: http://www.rrh.org.au/articles/subviewnew.asp?ArticleID=1869

Dollaghan, C. A, Campbell, T.F., Paradise, J.L., Feldman, H.M., Janosky, J.E., Pitcairn, D.N., et al. (1999). Maternal education and measures of early speech and language. *Journal of Speech, Language, & Hearing Research, 42*, 1432–1443.

Doidgea, J.C, Higgins, D. J., Delfabbroe, P., Edwardsc, B., Vassalloc, S., Toumbourouf, J. W., Segala, L. (2017). Economic predictors of child maltreatment in an Australian population-based birth cohort. *Children and Youth Services Review, 72*, 14-25.

Duckett, S., Breadon, P. and Ginnivan, L. (2013). Access all areas: new solutions for GP shortages in rural Australia. Parkville, Victoria: Grattan Institute. https://grattan.edu.au/wp-content/uploads/2014/04/196-Access-All-Areas.pdf

Duncan GJ, Ziol-Guest KM, Kalil A. (2010). Early childhood poverty and adult attainment, behavior, and health. *Child Development, 81*, 306–325.

Early Childhood Intervention Australia. (2017). what is early childhood Intervention? Retrieved from: https://www.ecia.org.au/about-eci/what-is-early-childhood-intervention

Early Intervention Foundation. (2015). Making an Early Intervention Business Case: Checklist and recommendations for cost-benefit analysis. Retrieved from: http://www.eif.org.uk/publication/making-an-early-intervention-business-case-checklist-and-recommendations-for-cost-benefit-analysis/

Edirippulige, S., Reyno, J., Armfield, N. R., Bambling, M., Lloyd, O., & McNevin, E. (2016). Availability, spatial accessibility, utilisation and the role of telehealth for multi-disciplinary paediatric cerebral palsy services in Queensland. *Journal of Telemedicine & Telecare, 22* (7), 391-396.

Edwards, B. & Baxter, J. (2013). *The tyrannies of distance and disadvantage: Factors related to children's development in regional and disadvantaged areas of Australia*. AIFS Research Report No. 25. Melbourne, Victoria: Australian Institute of Family Studies. Retrieved from: http://www.aifs.gov.au/institute/pubs/resreport25/rr25.pdf

Ernst and Young. (2014). Voice of the customer is getting louder Customer Experience Series- Utilities (Wave 3). Retrieved from: http://s3.documentcloud.org/documents/1312217/ernest-amp-young-utilities-survey.pdf

Evans, G.W. (2006). Child development and the physical environment. *Annual Review of Psychology, 57*, 423-451.

Executive Office of the President of the United States (2014). *The Economics of Early Childhood Investments*. Washington, DC: Executive Office of the President of the United States. Retrieved from: https://obamawhitehouse.archives.gov/sites/default/files/docs/the_economics_of_early_childhood_investments.pdf

Fairweather, G. C., Lincoln, M. A., & Ramsden, R. (2016). Speech-language pathology teletherapy in rural and remote educational settings: Decreasing service inequities. *International Journal of Speech-Language Pathology, 18* (6), 592-602.

Feil, E.G., Baggett, K.M., Davis, B., Sheeber, L., Landry, S.., Carta, J.J. and Buzhardt, J. (2008). Expanding the reach of preventive interventions. *Child Maltreatment, 13* (4), 334 – 346.

Feinstein, L. (2003) Inequality in the early cognitive development of British children in the 1970 cohort. *Economica, 70*, 73–97.

Fox, S., Southwell, A., Stafford, N., Goodhue, R., Jackson, D. and Smith, C. (2015). *Better Systems, Better Chances: A Review of Research and Practice for Prevention and Early Intervention.* Canberra, ACT: Australian Research Alliance for Children and Youth (ARACY). http://www.community.nsw.gov.au/docswr/_assets/main/documents/early_intervention/tab_e_prevention_and_early_intervention_literature_review.pdf

Fry, R., Keyes, M., Laidlaw, B., & West, S. (2014). *The state of play in Australian place-based activity for children*. Parkville, Victoria: Murdoch Childrens Research Institute and The Royal Children's Hospital Centre for Community Child Health.

George, A., & Harris, B. (2015*). Landscapes of violence: Women surviving family violence in regional and rural Victoria*. Geelong: Centre for Rural and Regional Law and Justice, Deakin University.

Goldfeld, S., & West, S. (2014). *Inequalities in early childhood outcomes: What lies beneath. Insight, Issue 9*. Melbourne, Victoria: Victorian Council of Social Services (VCOSS).

Government of South Australia. (2008). *Strategy for Planning Country Health Services in SA*. Retrieved from: https://www.sahealth.sa.gov.au/wps/wcm/connect/

Government of South Australia. (2012). *South Australian Government Update Progress on the Anangu Pitjantjatjara Yankunytjatjara (APY) Lands Service Delivery and Development*. Aboriginal Affairs and Reconciliation Division, Department of the Premier and Cabinet. Retrieved from: http://statedevelopment.sa.gov.au/upload/aard/publications/APY-Lands_Update-eb2012.pdf?t=1486166400023

Government of Western Australia Mental Health Commission. (2015). *Western Australian Mental Health, Alcohol and Other Drug Services Plan 2015-2025: Better Choices. Better Lives.* Retrieved from: https://www.mhc.wa.gov.au/media/1307/0962-5-statewide-v5.pdf

Greenhill, J.A., Mildenhall, D., and Rosenthal, D. (2009). *Ten ideas for building a strong Australian rural health system*. Rural and Remote Health (Internet), 9: 1206. Retrieved from: http://www.rrh.org.au/articles/subviewnew.asp?ArticleID=1206

Gregory, T., & Brinkman, S. (2016). *Exploring change in the Australian version of the Early Development Instrument: The estimation of a critical difference for the "vulnerable", "at risk" and "on track" categories.* Adelaide, South Australia: Telethon Kids Institute. Retrieved from: https://www.aedc.gov.au/resources/detail/technical-report-calculation-of-the-critical-difference-february-2016

Grogan-Johnson S., Schmidt A., Schenker J., Alvares R., Rowan L., Taylor J. (2013). A comparison of speech sound intervention delivered by telepractice and side-by-side service delivery models. *Communication Disorders Quarterly, 34* (4), 210–220.

Hamby, S., Finkelhor, D., Turner, H., & Ormrod, R. (2010). The overlap of witnessing partner violence with child maltreatment and other victimizations in a nationally representative survey of youth, *Child Abuse & Neglect, 34*, pp. 734-741.

Hanft, M. (2014). *Mapping Rural and Remote Early Childhood Intervention Therapy Services.* Dickson, ACT: Services for Australian Rural and Remote Allied Health. Retrieved from: https://sarrah.org.au/sites/default/files/images/mh_report_gaps_in_ei_service_delivery_20_10_14.pdf

Harding, A., McNamara, J., Tanton, R., Daly, A. and Yap, M. (2006). *Poverty and disadvantage among Australian children: a spatial perspective.* Canberra, ACT: National Centre for Social and Economic Modelling, University of Canberra. http://www.natsem.canberra.edu.au/publications/papers/cps/cp06/cp2006_003/cp2006_003.pdf

Harding, A., McNamara, J., Daly, A. and Tanton, R. (2009). Child social exclusion: An updated index from the 2006 Census. *Australian Journal of Labour Economics, 12* (1), 41-64.

Harding, J. F., Morris, P. A., Hughes, D. (2015). The Relationship Between Maternal Education and Children's Academic Outcomes: A Theoretical Framework. *Journal of Marriage and Family, 77*(1), 60-76.

Harris, J., & Wells, M. (2016). *State of Australia's Mothers*. Save the Children Australia. Retrieved from: https://www.savethechildren.org.au/__data/assets/pdf_file/0007/143863/SOAM_report_2016.pdf

The Health Foundation. (2017). *Healthy lives for people in the UK: Introducing the Health Foundation's healthy lives strategy.* London, UK: The Health Foundation. http://www.health.org.uk/sites/health/files/HealthyLivesForPeopleInTheUK.pdf

Health Performance. Council (2013). *Mental Health in Rural and Remote South Australian Communities.* Government of South Australia.

Heckman, J.J. (2012). *Promoting social mobility*. Boston Review, Sept/Oct, 14-34.

Hertzman, C., Siddiqi, A., Hertzman, E., Irwin, L. G., Vaghri, Z., Houweling, T. A. J., Bell, R., Tinajero, A., & Marmot, M. (2010). Bucking the inequality gradient through early child development. *British Medical Journal*, 340.

Hines, M., Bulkeley, K., Gilroy, J., Dew, A., Barton, R., Bundy, A., Lincoln, M. (2015). Submission to the consultation on the Proposed NDIS Quality and Safeguarding framework – 29 April 2015. Wobbly Hub & Double Spokes Rural Research Team Faculty of Health Sciences, Sydney. Retrieved from: https://engage.dss.gov.au/wp-content/uploads/2015/04/WHRRT-Rural-NDIS-Quality-and-Safeguarding1.pdf

Hogg, R., & Carrington, K. (2006). Policing the rural crisis. Annandale: The Federation Press.
Humphreys, C. (2007). *Domestic violence and child protection: Challenging directions for practice.* Issues paper 13. Sydney: Australian Domestic & Family Violence Clearinghouse. Retrieved from: http://www.healthinfonet.ecu.edu.au/key-resources/bibliography/?lid=833

Hopkins, L. & Meredyth, D. (2008). Coordination or competition: obstacles and success factors for integrated partnerships at local level. *Journal of Urban Regeneration and Renewal, 1* (4), 316-328.
Houston, K. T., & Stredler-Brown, A. (2012). A model of early intervention for children with hearing loss provided through telepractice. *Volta Review, 112* (3), 283-296.

Hussain, R., Maple, M., Hunter, S.V., Mapedzahama, V. and Reddy, P. (2015). *The Fly-in Fly-out and Drive-in Drive-out model of health care service provision for rural and remote Australia: benefits and disadvantages*. Rural & Remote Health, 15: 3038. Retrieved from: www.rrh.org.au/articles/showarticlenew.asp?ArticleID=3068

Iacono, T., Stagg, K., Pearce, N., & Hulme Chambers, A. (2016). A scoping review of Australian allied health research in ehealth. *BMC Health Services Research, 16*: 543.

Johnson, E. (2016). *Victims of circumstance: Disability services in rural and remote areas*. Melbourne, Victoria: Child Family Community Australia, Australian Institute of Family Studies. Retrieved from: https://aifs.gov.au/cfca/2016/10/05/victims-circumstance-disability-services-rural-and-remote-areas

Jones, A. M., Shealy, K. M., Reid-Quiñones, K., Moreland, A. D., Davidson, T. M., López, C. M., Barr, S.C. & de Arellano, M. A. (2014). Guidelines for establishing a telemental health program to provide evidence-based therapy for trauma-exposed children and families. *Psychological Services, 11* (4), 398-409. doi:10.1037/a0034963

Karoly, L.A. (2016). The economic returns to early childhood education. *The Future of Children, 26* (2), 37-55.

Kaspiew, R., Gray, M., Weston, R., Moloney, L., Hand, K., Qu, L., & the Family Law Evaluation Team. (2009). Evaluation of the 2006 family law reforms. Melbourne: Australian Institute of Family Studies. Retrieved from: aifs.gov.au/publications/evaluation-2006-family-law-reforms

Kilburn, M.R. and Karoly, L.A. (2008). The Economics of Early Childhood Policy: What the Dismal Science Has to Say About Investing in Children. Santa Monica, California: RAND Corporation. Retrieved from: http://rand.org/pubs/occasional_papers/2008/RAND_OP227.pdf

Kruske, S., Kildea, S., Jenkinson, B., Pilcher, J., Robin, S., & Rolfe, M. (2016). Primary Maternity Units in rural and remote Australia: Results of a national survey. *Midwifery, 40*, 1-9.

Laidlaw, B., Fong, M., Fry, R., & West, S. (2014a). *A snapshot of place-based activity promoting children's wellbeing.* Parkville, Victoria: Murdoch Childrens Research Institute and The Royal Children's Hospital Centre for Community Child Health.

Laidlaw, B., Fry, R., Keyes, M., & West, S. (2014b). *Big thinking on place: getting place-based approaches moving*. Parkville, Victoria: Murdoch Childrens Research Institute and The Royal Children's Hospital Centre for Community Child Health.

Lincoln, M. & Hines, M. on behalf of the Wobbly Hub Research Team (2011). *Submission to the Senate Inquiry into the prevalence of different types of speech, language and communication disorders and speech pathology services in Australia*. Sydney NSW: Faculty of Health Sciences, University of Sydney.

Lipana, L. S., Bindal, D., Nettiksimmons, J., & Shaikh, U. (2013). Telemedicine and face-to-face care for pediatric obesity. *Telemedicine Journal and E-Health, 19* (10).

Luxton, D., Nelson, E., and Maheu, M. (2016). *A practitioner's guide to telemental health: how to conduct legal, ethical, and evidence-based telepractice*. Washington, DC: American Psychological Association Press. Retrieved from: http://www.apa.org/pubs/books/4317411.aspx

McCarthy, M., Duncan, J. & Leigh, G. (2012). Telepractice: The Australian experience in an international context. *The Volta Review, 112* (3), 297-312.

McLachlan, R., Gilfillan, G. and Gordon, J. (2013) *Deep and Persistent Disadvantage in Australia, rev., Productivity Commission Staff Working Paper*. Canberra. Retrieved from: http://www.pc.gov.au/research/supporting/deep-persistent-disadvantage/deep-persistent-disadvantage.pdf

McShane, I. (2010). Trojan horse or adaptive institutions? Some reflections on urban commons in Australia. *Urban Policy and Research, 28* (1), 101-116.

Magnuson, K. A., Sexton, H. R., Davis-Kean, P. E., & Huston, A. C. (2009). Increases in maternal education and young children's language skills. *Merrill-Palmer Quarterly, 55*(3), 319-350.

Manchanda, R. (2013). *The Upstream Doctors: Medical Innovators Track Sickness to its Source*. New York: TED Conferences LLC.

The Marmot Review (2010). *Fair Society, Healthy Lives: Strategic review of health inequalities in England post-2010.* London, UK: Global Health Equity Group, Department of Epidemiology and Public Health, University College London.

Marmot, M. (2004). *The status syndrome: How Social Standing Affects Our Health and Longevity.* New York, NY: Henry Holt and Company.

Marmot, M. (2015). *The Health Gap: The Challenge of an Unequal World.* London, UK: Bloomsbury Publishing.

Marmot, M. (2016). *Fair Australia: Social Justice and the Health Gap.* The Boyer Lecture Series 2016. ABC Radio National. http://www.abc.net.au/radionational/programs/boyerlectures/2016-boyer-lectures/7802472

Maziak, W., Ward, K.D. and Stockton, M.B. (2008). Childhood obesity: are we missing the big picture? Obesity Reviews, 9 (1), 35–42.

Meadan, H., Snodgrass, M. R., Meyer, L. E., Fisher, K. W., Chung, M. Y., & Halle, J. W. (2016). Internet-based parent-implemented intervention for young children with autism: A pilot study. *Journal of Early Intervention, 38* (1), 3-23.

Meadan, H., Meyer, L. E., Snodgrass, M. R., & Halle, J. W. (2013). Coaching parents of young children with autism in rural areas using internet-based technologies: A pilot program. *Rural Special Education Quarterly, 32,* 3–10.

Miranti, R., Daly, A. and Tanton, R. (2015). An area-based measure of risk of social exclusion for Australian school-age children. *Australasian Journal of Regional Studies, 21* (1), 26-49.

Mishara, G., Loxton, D., Anderson, A., Hockey, R., Powers, J., Brown, W. et al. (2014). *Health and wellbeing of women aged 18-23 in 2013 and 1996: Findings from the Australian Longitudinal Study on Women's Health*. Canberra: Department of Health.

Mistry, K.B., Minkovitz, C.S., Riley, A.W., Johnson, S.B., Grason, H.A., Dubay, L.C. and Guyer, B. (2012). A new framework for childhood health promotion: The role of policies and programs in building capacity and foundations of early childhood health. *American Journal of Public Health, 102* (9).

Moffatt, J.J. & Eley, D.S. (2010). The reported benefits of telehealth for rural Australians. *Australian Health Review, 34* (3): 276-81.

Mohanty, I., Edvardsson, M., Abello, A. and Eldridge, D. (2016). Child social exclusion risk and child health outcomes in Australia. *PLoS ONE, 11* (5).

Moore, T.G. (2012). Rethinking early childhood intervention services: Implications for policy and practice. Invited *Pauline McGregor Memorial Address* to the 10th Biennial National Early Childhood Intervention Australia (ECIA) Conference and 1st Asia-Pacific Early Childhood Intervention Conference 2012, 9th August, Perth, Western Australia.
http://www.rch.org.au/uploadedFiles/Main/Content/ccch/profdev/ECIA_National_Conference_2012.pdf

Moore, T.G. (2014). Policy and practice in implementing early childhood intervention services. Invited plenary presentation on at 5th Malaysian National Early Childhood Intervention Conference, Ipoh, Perak, Malaysia, and 7th June. Retrieved from: http://www.rch.org.au/uploadedFiles/Main/Content/ccchdev/CCCH-Tim-Moore-Malaysian-ECI-Conference-14-plenary-paper-2.pdf

Moore, T.G., Beatson, R., Rushton, S., Powers, R., Deery, A., Arefadib, N. and West, S. (2016). *Supporting the Roadmap for Reform: Evidence-informed practice*. Prepared for the Victorian Department of Health and Human Services. Parkville, Victoria: Centre for Community Child Health, Murdoch Childrens Research institute, the Royal Children's Hospital. Retrieved from: http://strongfamiliessafechildren.vic.gov.au/news-feed/news_feed/using-evidence-to-improve-outcomes

Moore, T.G. & McDonald, M. (2013). *Acting Early, Changing Lives: How prevention and early action saves money and improves wellbeing,* prepared for The Benevolent Society, Centre for Community Child Health at The Murdoch Children's Research Institute and The Royal Children's Hospital, Melbourne.

Moore, T.G., McDonald, M., Carlon, L. and O'Rourke, K. (2015). Early childhood development and the social determinants of health inequities. *Health Promotion International, 30* (suppl 2): ii102-ii115. doi:10.1093/heapro/dav031
http://heapro.oxfordjournals.org/content/30/suppl_2/ii102.full.pdf+html

Moore, T., McDonald, M., & McHugh-Dillon, H. (2015). *Evidence review: Early childhood development and the social determinants of health inequities.* Melbourne, Victoria: Victorian Health Promotion Foundation. Retrieved from: http://www.rch.org.au/uploadedFiles/Main/Content/ccch/151014_Evidence-review-early-childhood-development-and-the-social-determinants-of-health-inequities_Sept2015.pdf

Moore, T.G., McDonald, M., McHugh-Dillon, H. & West, S. (2016). *Community engagement: A key strategy for improving outcomes for Australian families*. (CFCA Paper No. 39). Melbourne, Victoria: Child Family Community Australia information exchange, Australian Institute of Family Studies.
https://aifs.gov.au/cfca/sites/default/files/cfca39-community-engagement.pdf

Moore, T.G. and Skinner, A. (2010). *An Integrated Approach to Early Childhood Development*. A Benevolent Society Background Paper. Sydney, NSW: The Benevolent Society. Retrieved from: http://www.rch.org.au/emplibrary/ccch/TM_BenSoc_Project_09.pdf

Moore, T.G. and West, S. (2016). Early intervention and the first thousand days of child development. *Developing Practice: The Child, Youth and Family Work Journal, 44 (April*), 16-24.

Moore, T.G., Yagnik, P., Halloran, D., McDonald, M., Sayers, M., D'Souza, A. and Goldfeld, S. (2012). Developing the Parent Engagement Resource: A tool for enhancing parent/professional relationships and identifying psychosocial issues in families. *Australian Journal of Child and Family Health Nursing, 9* (1), 12-16.

Moran, A. M., Coyle, J., Pope, R., Boxall, D., Nancarrow, S. A., & Young, J. (2014). Supervision, support and mentoring interventions for health practitioners in rural and remote contexts: an integrative review and thematic synthesis of the literature to identify mechanisms for successful outcomes. *Human Resources for Health, 12* (1), 10.

Mörk, E., Sjögren, A., Svaleryd, H. (2014). Parental unemployment and child health: working paper 2014:8. The Institute for Evaluation of Labour Market and Education Policy (IFAU), Uppsala. Retrieved from: http://www.ifau.se/globalassets/pdf/se/2014/wp-2014-8-Parental-unemployment-and-child-health.pdf

Myers, J., Thorpe, S., Browne, J., Gibbons, K. and Brown, S. (2014). Early childhood nutrition concerns, resources and services for Aboriginal families in Victoria. *Australian and New Zealand Journal of Public Health, 38* (4), 370-376.

Nancarrow, S. A., Roots, A., Grace, S., & Saberi, V. (2015). Models of care involving district hospitals: a rapid review to inform the Australian rural and remote context. *Australian Health Review, 39* (5), 494-507.

The National Disability Insurance Agency. (2016). *Market Position Statement. South Australia*. Retrieved from: https://www.ndis.gov.au/html/sites/default/files/South%20Australian%20Market%20Position%20Statement.pdf

National Partnership Agreement on Universal Access to Early Childhood Education- 2016 and 2017. (2016). Retrieved from: http://www.federalfinancialrelations.gov.au/content/npa/education/national-partnership/2016_2017_universal_access_NP.pdf

National Rural Health Alliance (2016). Food security and health in rural and remote Australia. Wagga Wagga, NSW: Rural Industries Research and Development Corporation. Retrieved from: http://ruralhealth.org.au/sites/default/files/publications/nrha-factsheet-poverty.pdf

Nelson, E.-L., Cain, S. and Sharp, S. (2017). Considerations for conducting telemental health with children and adolescents. *Child and Adolescent Psychiatric Clinics of North America, 26* (1), 77-91.

Nous Group (2015). *Strategic review of telehealth in NSW: Final report*. Sydney, NSW: NSW Ministry of Health. Retrieved from: http://www.health.nsw.gov.au/telehealth/Documents/strategic-review-of-telehealth-in-NSW.PDF

O'Connell, M., Fox, S., Hinz, B., Cole, H. (2016). Quality Early Education for All Fostering creative, Entrepreneurial, resilient and capable learners. Mitchell Institute, Melbourne. Retrieved from: http://www.mitchellinstitute.org.au/wp-content/uploads/2016/04/Quality-Early-Education-for-All-FINAL.pdf

O'Neill, M., Kirov, E., Thomson, N. (2004). A review of the literature on disability services for Aboriginal and Torres Strait Islander peoples, *Australian Indigenous Health Bulletin 4*(4), pp. 11-26.

Office of the Children's Commissioner. (2016). *Annual Report 2015-2016, Northern Territory Children's Commissioner.* Office of the Children's Commissioner, Northern Territory Government, Darwin.

Panaretto, K.S., Wenitong, M., Button, S., and Ring, I.T. (2014). Aboriginal community controlled health services: leading the way in primary care. *The Medical Journal of Australia*, 200(11), pp. 649-652.

Percy M. (2007). Factors that Cause or Contribute to Intellectual and Developmental Disabilities. In Brown, I., & Percy M A, editors. *A Comprehensive Guide to Intellectual and Developmental Disabilities*. Baltimore: Paul R Brookes

Perkins, D., Larsen, K., Lyle, D., Burn, P. (2007). Securing and retaining a mental health workforce in Far Western New South Wales. *The Australian Journal of Rural Health, 15*: 94–98.

Phillips, B., Miranti, R., Vidyattama, Y. and Cassells, R. (2013). *Poverty, Social Exclusion and Disadvantage in Australia. Report prepared for UnitingCare Children Young People and Families.* Canberra, ACT: National Centre for Social and Economic Modelling (NATSEM), University of Canberra. http://www.natsem.canberra.edu.au/storage/Poverty-Social-Exclusion-and-Disadvantage.pdf

Phillips, J., & Vandenbroek, P. (2014). Domestic and family violence in Australia: An overview of the issues. Parliamentary Library Research Paper, Canberra: Parliament of Australia. Retrieved from: www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/rp1415/ViolenceAust

Portnoy, J. M., Waller, M., De Lurgio, S., & Dinakar, C. (2016). Telemedicine is as effective as in-person visits for patients with asthma. *Annals of Allergy, Asthma & Immunology, 117* (3), 241-245.

Primary Health Tasmania. (2016). *Rural Primary Health Commissioning Intentions Document. Version 2.* Retrieved from: https://www.primaryhealthtas.com.au/sites/default/downloads/files/Rural%20Primary%20Health%20Commissioning_Intentions%20Document_Version%202_1%20final.pdf

Productivity Commission (2011). *Education and Training Workforce: Early Childhood Development*. Melbourne, Victoria: Productivity Commission. Retrieved from: http://www.pc.gov.au/projects/study/education-workforce/early-childhood/report

Productivity Commission (2016). *Overcoming Indigenous Disadvantage: Key Indicators 2016*. Melbourne, Victoria: Productivity Commission. Retrieved from: http://www.pc.gov.au/research/ongoing/overcoming-indigenous-disadvantage/2016#thereport

Ragusa, A. (2013). Rural Australian women's legal help seeking for intimate partner violence: Women intimate partner violence victim survivors' perceptions of criminal justice support services. Journal of Interpersonal Violence, 28(4), 685-717.

Reardon, S. F. (2011). *The Widening Academic Achievement Gap Between the Rich and the Poor: New Evidence and Possible Explanations*. Stanford University. Retrieved from: https://cepa.stanford.edu/sites/default/files/reardon%20whither%20opportunity%20-%20chapter%205.pdf

Reeve, C., Humphreys, J., Wakerman, J., Carroll, V., Carter, M., O'Brien, T., Erlank, C., Mansour, R. and Smith, B. (2015a). Community participation in health service reform: the development of an innovative remote Aboriginal primary health-care service. *Australian Journal of Primary Health, 21* (4): 409-16.

Regional Australia Institute (2017). *Human Capital Index - Developing Human Capital Across Australia*. Barton, ACT: Regional Australia Institute. Retrieved from: http://www.regionalaustralia.org.au/home/wp-content/uploads/2017/03/Human-Capital-Index_Report_final-1.pdf

Rennie, E., Hogan, E., Gregory, R., Crouch, A., Wright, A. & Thomas, J. (2016). *Internet on the outstation: The digital divide and remote Aboriginal communities. INC Theory on Demand No. 19.* Amsterdam, The Netherlands: Institute of Network Cultures. Retrieved from: http://networkcultures.org/wp-content/uploads/2016/06/TOD19-Internet-on-the-Outstation-INC.pdf

Rolfe, M. I., Donoghue, D. A., Longman, J. M., Pilcher, J., Kildea, S., Kruske, S., Kornelsen, J., Grzybowski, S., Barclay, L., & Morgan, G. G. (2017). The distribution of maternity services across rural and remote Australia: does it reflect population need? *BMC Health Services Research, 17* (1), 163.

Roufeil, L. and Battye, K. (2008). *Effective regional, rural and remote family and relationships service delivery.* AFRC Briefing No. 10. Melbourne, Victoria: Australian Family Relationships Clearinghouse, Australian Institute of Family Studies. Retrieved from: http://www.aifs.gov.au/afrc/pubs/briefing/briefing10.html

Royal Commission into Family Violence (2016). Summary and Recommendations. Melbourne, Victoria: Royal Commission into Family Violence. Retrieved from: http://files.rcfv.com.au/Reports/RCFV_Full_Report_Interactive.pdf

SARRAH (2016). *SARRAH Position Paper on Models of Allied Health Care in Rural and Remote Australia*. Dickson, ACT: Services for Australian Rural and Remote Allied Health. Retrieved from: http://sarrah.org.au/publication/sarrah-position-paper-models-care

Services for Australian Rural and Remote Allied Health. (2014). *The prevalence of different types of speech, language and communication disorders and speech pathology services in Australia*. Submission to the Senate Standing Committee on Community Affairs - References Committee. Retrieved from: https://sarrah.org.au/sites/default/files/docs/sarrah_submission_-_speech_pathology_services_in_australia.pdf

Shepherd, C., & Walker, R. (2008). *Engaging Indigenous families in preparing children for school*. Perth: Australian Research Alliance for Children and Youth.

Shonkoff, J.P. and Richter, L. (2013). *The powerful reach of early childhood development: A science-based foundation for sound investment.* In P.R. Britto, P.L. Engle and C.M. Super, C.M. (Eds.), Handbook of Early Childhood Development Research and Its Impact on Global Policy. Oxford and New York: Oxford University Press.

Smith, J.D. (2016). *Australia's rural, remote and Indigenous health* (3rd. Ed.). Chatswood, N.S.W.: Elsevier Australia.

Smith, L., Blinkhorn, A., Moir, R., Brown, N., & Blinkhorn, F. (2015). An assessment of dental caries among young Aboriginal children in New South Wales, Australia: a cross-sectional study. *BMC Public Health, 15*: 1314.

Snodgrass, M. R., Chung, M. Y., Biller, M. F., Appel, K., Meadan, H., Curtiss, S., & Halle, J. W. (2016). *Telepractice in speech-language therapy: The use of online technologies for parent training and coaching.* Communication Disorders Quarterly, published online 23rd November 2016.

South Australia Department of Health. *Aboriginal Health Care Plan 2010 – 2016.* Government of South Australia.

Stagner, M.W. and Lansing, J. (2009). Progress toward a prevention perspective. *The Future of Children, 19* (2), 19-37.

Steering Committee for the Review of Government Service Provision. (2014). *Report on government services 2014: Indigenous compendium*. Canberra: Productivity Commission.

Strully, K. W., Rehkopf, D. H., & Xuan, Z. (2010). Effects of Prenatal Poverty on Infant Health: State Earned Income Tax Credits and Birth Weight. *American Sociological Review, 75* (4), 534-562.

Strategic Review of Health Inequalities in England post-2010 Committee. (2010). *Fair Society,*

Healthy Lives (The Marmot Review). Strategic Review of Health Inequalities in England post-2010. Retrieved from: http://www.instituteofhealthequity.org/projects/fair-society-healthy-lives-themarmot-review

Sylva, K., Melhuish, E., Siraj-Blatchford, I., &Taggart, B. (2010). *Early childhood matters: evidence from the Effective Preschool and primary education project*, Routledge, London.

Taft, A, Watson, L., & Lee, C. (2004). Violence against young Australian women and association with reproductive events: A cross sectional analysis of a national population sample. *Australian and New Zealand of Journal of Public Health, 28*(4), 324-329.

Topol. E. (2015). *The Patient Will See You Now: The Future of Medicine Is in Your Hands*. New York: Basic Books.

Trickett, E.J., Beehler, S., Deutsch, C., Green, L.W., Hawe, P., McLeroy, K., Miller, R.L., Rapkin, B.D., Schensul, J.J., Schulz, A.J. and Trimble, J.E. (2011). Advancing the science of community-level interventions. *American Journal of Public Health, 101* (8), 1410-1419.

United Nations (1990). *Convention on the Rights of the Child.* Geneva, Switzerland: United Nations. http://www.ohchr.org/Documents/ProfessionalInterest/crc.pdf

United Nations Committee on the Rights of the Child (2013). *General comment No. 15 (2013) on the right of the child to the enjoyment of the highest attainable standard of health (art. 24).* Geneva, Switzerland: Office of the High Commissioner, United Nations.

United Nations Children's Fund (2012). *Measuring child poverty New league tables of child poverty in the world's rich countries*. UNICEF Innocenti Research Centre, Florence. Retrieved from: https://www.unicef-irc.org/publications/pdf/rc10_eng.pdf

Vickerman, K., & Margolin, G. (2007). Post-traumatic Stress in Children and Adolescents Exposed to Family Violence: II. Treatment. *Professional Psychology, Research and Practice, 38*(6), 620.

VicHealth (2016). Planning and designing healthy new communities: Selandra Rise. Carlton South, Victoria: Victorian Health Promotion Foundation. Retrieved from: https://www.vichealth.vic.gov.au/selandrarise?utm_source=VicHealth%20Update&utm_campaign=VH%20Update%2010%20May%2016&utm_medium=Email

Victoria Police. (2014). *Family incident reports 2009/10 to 2013/14*. Melbourne: Victoria Police. Retrieved from: http://www.police.vic.gov.au/content.asp?a=internetBridgingPage&Media_ID=72311

Vinson, T., Rawsthorne, M., Beavis, A., & Ericson, M. (2015). *DROPPING OFF THE EDGE 2015 Persistent communal disadvantage in Australia*. Jesuit Social Services & Catholic Social Services Australia. Retrieved from: http://k46cs13u1432b9asz49wnhcx-wpengine.netdna-ssl.com/wp-content/uploads/0001_dote_2015.pdf

Wade, V.A., Karnon, J., Elshaug, A.G. and Hiller, J.E. (2010). A systematic review of economic analyses of telehealth services using real time video communication. *BMC Health Services Research, 10*: 233.

Wakerman, J., Curry, R., and McEldowney, R. (2012). *Fly in/fly out health services: the panacea or the problem? Rural and Remote Health (Internet),* 12: 2268. Retrieved from: http://www.rrh.org.au/articles/subviewnew.asp?ArticleID=2268

Weber, H. C., Robinson, P. F., Saxby, N., Beggs, S. A., Els, I. and Ehrlich, R. I. (2017). Do children with cystic fibrosis receiving outreach care have poorer clinical outcomes than those treated at a specialist cystic fibrosis centre? *Australian Journal of Rural Health, 25* (1), 34–41.

Wendt, S. (2010). Building and sustaining local co-ordination: An Australian rural community responds to domestic and family violence. British Journal of Social Work, 40 (1), 44-62. DOI:

Wendt, S., Chung, D., Elder, A., & Bryant, L. (2015). Seeking help for domestic violence: Exploring rural women's coping experiences: State of knowledge paper. University of South Australia. Retrieved from: https://anrows.org.au/sites/default/files/4_1%203%20LandscapesRuralWomen%2014%207%202015.pdf

Williams, C., & Jacobs, A. (2009). The impact of otitis media on cognitive and educational outcomes. *Med J Aust, 191*(9), 69.

Williams, C.J, Coates, H.L., Pascoe, E.M., Axford, Y., & Nannup, I. (2009) Middle ear disease in Aboriginal children in Perth: analysis of hearing screening data, 1998–2004. *Med J Aust; 190*: 598-600.

World Health Organization. (2011). *Outreach services as a Strategy to Increase Access to Health Workers in Remote and Rural Areas*. Geneva. Retrieved from: http://apps.who.int/iris/bitstream/10665/44589/1/9789241501514_eng.pdf

World Health Organization Commission on the Social Determinants of Health. (2008). *Closing the gap in a generation Health equity through action on the social determinants of health*. Geneva. Retrieved from: http://www.who.int/social_determinants/final_report/csdh_finalreport_2008.pdf

Zhao, Y. Wright, J. Begg, S. & Guthridge, S., (2013). Decomposing Indigenous life expectancy gap by risk factors: a life table analysis. *Population Health Metrics, 11* (1).

Zubrick, S.R., Lawrence, D.M., Silburn, S.R., Blair, E., Milroy, H., Wilkes, T., Eades, S., D'Antoine, H., Read, A., Ishiguchi, P., Doyle, S. (20014). *The Western Australian Aboriginal Child Health Survey: The Health of Aboriginal Children and Young People.* Telethon Institute for Child Health Research. Perth.

Zubrick, S.R., Silburn, S.R., Lawrence, D.M., Mitrou, F.G., Dalby, R.B, Blair, E.M., Griffin, J., Milroy, H., De Maio, J.A., Cox, A, & Li, J. (2005). *The Western Australian Aboriginal Child Health Survey: The social and emotional wellbeing of Aboriginal children and young people.* Curtin University of Technology and Telethon Institute for Child Health Research. Perth.

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