Centre for Community Child Health

murdoch children's research institute

The importance and lifelong benefits of the early years: An analysis of the evidence

Tasmanian Core Story of Early Childhood Project

Prepared for the B4 Early Years Coalition and the Tasmanian Government Department of Education

July 2018

B4 Early Years Coalition
Supporting the early years

The Royal Children's Hospital Melbourne

The importance and lifelong benefits of the early years: An analysis of the evidence.

Version 2.1

Authors

Noushin Arefadib, Senior Project Officer, Centre for Community Child Health

Tim Moore, Senior Research Fellow, Centre for Community Child Health

This report was prepared by the Centre for Community Child Health for the B4 Early Years Coalition and the Tasmanian Government Department of Education.

Suggested citation: Arefadib, N., & Moore, T.G. (2018). *The importance and lifelong benefits of the early years: An analysis of the evidence*. Parkville, Victoria; Centre for Community Child Health, Murdoch Children's Research Institute. https://doi.org/10.25374/MCRI.15147039

The Centre for Community Child Health is a research group of the Murdoch Children's Research Institute and a department of The Royal Children's Hospital, Melbourne.

Centre for Community Child Health

The Royal Children's Hospital Melbourne

50 Flemington Road, Parkville

Victoria 3052 Australia

Telephone +61 9345 6150

Email enquiries.ccch@rch.org.au

www.rch.org.au/ccch

Contents

Preface

This research analysis is a key component of the Tasmanian Core Story of Early Childhood Project. The project aims to increase understanding of the importance of the early years in Tasmania through consistent messaging that engages and promotes action for the time from conception until 4 years of age (B4). The project involves developing an evidence-based core story of early childhood development for the B4 Early Years Coalition (B4 Coalition), a series of plain language, accessible and inspirational key messages, and recommended communication products and channels suitable for parents, families and communities.

The B4 Coalition was established to connect and support people and organisations across Tasmania, committed to supporting children from pregnancy to 4 years of age and their families. The B4 Core Story, key messages and aligned products will provide a Tasmanian early years narrative and targeted messages for stakeholders that advance the following B4 goals:

- Everyone values the early years
- Everyone supports the early years
- Everyone works together for the early years.

This analysis of key international, national and state research on the importance and lifelong benefits of the early years provides the rationale and evidence base for the B4 Core Story.

It recognises Australia's ratification of the United Nations Convention on the Rights of the Child (1990) which establishes the rights of children, including the basic human right to a high standard of health and wellbeing. The Committee on the Rights of the Child, charged by the United Nations with promoting and monitoring progress towards worldwide implementation of the Convention, has adopted a number of General Comments to guide governments in fulfilling their obligations under the Convention (Committee on the Rights of the Child, 2005, 2006, 2013). This includes:

> General Comment No. 7 (2005) – on implementing child rights in early childhood. This stresses that young children have rights from the beginning of their lives. It acknowledges the special vulnerability of the very young to poverty, discrimination and other adversities that can compromise their rights and undermine their capacities and wellbeing.
>
> General Comment 13 (2013) – on the right of the child to the enjoyment of the highest attainable standard of health. This interprets a child's right to health as an inclusive right, extending not only to timely and appropriate prevention, health promotion, curative, rehabilitative and palliative services, but also a right to grow and develop to their full potential. Subsequently this includes living conditions that enable them to attain the highest standard of health through the implementation of programs that address the underlying determinants of health.

The structure of the research analysis

The analysis includes:

- an executive summary
- an overview of the Tasmanian context for children and families
- an overview of how early experiences and environments shape lifelong outcomes
- a description of the specific factors and early experiences that shape lifelong outcomes, including social determinants, parental and caregiving factors, and individual level factors. For clarity, the analysis of evidence often considers pregnancy and childhood separately. This should not be taken to mean that these two phases of a child's development are separate: the developmental processes are seamless.
- implications for action including what parents and caregivers can do, what communities can do to support families, what role services can play, and what employers and organisations can contribute
- how collaboration between stakeholders can support optimal outcomes for children, including the role of place-based approaches.

Executive summary

This analysis provides an overview of evidence on the importance of the early years for lifelong health and wellbeing. It applies this evidence to identify practical ways that Tasmania's families, communities, services, employers and organisations can deliver what children need now, for lifelong health and wellbeing. Efforts to improve children's health and development also enhance the wellbeing and prosperity of communities: when children thrive, communities thrive.

Throughout this analysis, the 'early years' refers to the period from conception to the end of a child's fourth year.

Early experiences and environments matter

Early experiences and environments shape lifelong health and wellbeing: positive experiences and environments support healthy development and wellbeing, while sustained adverse experiences and environments can disrupt development and undermine health and wellbeing. Many of the challenges faced by adults, such as mental health conditions, obesity, heart disease, criminality, and poor literacy and numeracy, can be traced back to origins in early childhood.

As early experiences and environments are significant, families, communities, services and workplaces can have a profound influence on early years pathways for lifelong health and wellbeing.

Pathways include:

- **Developmental plasticity:** As children develop, their body adapts to social and physical environments. This includes **neuroplasticity** (our central nervous system structure and function, changes in response to experiences and environments – this happens the most during pre and postnatal brain development) and **biological embedding** (the foetus and infant adapts to environmental cues like nutrition or hormones).

- **Developmental origins of health and disease:** The foetus responds to changes in the intrauterine environment and prepares for the environment that it 'predicts' it will be born into. Exposure to stress during critical periods of development can have long-term effects on health, wellbeing and development.

- **Social determinants:** From the point of conception, the social, economic, and environmental conditions into which we are born, grow, live, and age, have the power to shape our lives, for better or worse. There is a strong correlation between poverty, housing, built environments, personal and community social support, early education and care, and adverse health and wellbeing outcomes in later life.

- **Nurturing family relationships:** A child's interaction with their caregiver is perhaps the most powerful determinant of their future health and wellbeing. Regardless of the diversity of family structures, what is most important is the quality of care that the child receives. A consistently responsive and nurturing relationship between a child and their caregiver, encourages secure attachment and facilitates the development of future relationships throughout the child's life, while providing a safe foundation for learning.

Society and governments are also facing new challenges in the 21st century – 'wicked' problems (Moore et al., 2017; Moore & Fry, 2011; Weber & Khademian, 2008). Such problems are complex, interconnected, and cannot be readily resolved through traditional governance and leadership models, nor by service-driven approaches (Grint, 2010; Moore & Fry, 2011). Examples of wicked problems include (but are not limited to) child abuse and neglect, family violence, intergenerational disadvantage, social exclusion, and health inequalities.

Take action

Collectively there is much that families, communities, services and workplaces across Tasmania can do to contribute to positive early years experiences and environments that support early pathways for lifelong health and wellbeing.

Families

Families can:

- breastfeed (where possible)
- provide nourishing food
- provide affectionate and responsive care
- minimise exposure to drugs, alcohol and cigarette smoke
- minimise stress
- provide safe housing
- talk, sing and share stories with children every day
- provide rich opportunities for learning through play
- contribute to safe and loving relationships
- engage with friends, family, services and the community.

Communities

Communities[1] can:

- work to address vulnerability and disadvantage
- encourage everyone in the community to participate
- create opportunities for families and the community to meet in places like parklands and playgrounds

[1] Community is any configuration of individuals, families, and groups whose values, characteristics, interests, geography, or social relations unite them in some way (National Academies of Sciences, Engineering, and Medicine, 2017).

- recognise and value cultural diversity
- support community groups, partnerships and networks
- adopt community-led collaborative approaches
- make early years services, places and facilities accessible
- provide affordable, secure and safe accommodation
- facilitate neighbourhood safety
- provide reliable, affordable and integrated public transport.

Services

Services can:

- provide accessible, quality preconception, prenatal and antenatal care
- provide accessible, quality early childhood education and care
- build family and community capacity to support the early years though programs, resources and support
- meet diverse needs with services, programs, resources and support that are family-centred, equitable, inclusive and responsive
- create safe, supportive and inclusive environments that enable families to seek support
- apply evidence-based approaches
- collaborate with other services for an integrated response
- respond to factors that threaten family wellbeing (e.g. poverty, violence, mental illness).

Workplaces

Workplaces can:

- provide family friendly working conditions including parental leave, flexible hours and childcare support
- prevent discrimination against pregnant women and mothers
- provide for the needs of pregnant and breastfeeding women
- ensure that policies, decisions and activities contribute to improving children's wellbeing
- engage with community groups and networks
- build community awareness of the importance of safe and supportive early years environments.

Creating change together

Families, communities, services and workplaces can take action together to amplify their reach and positive impact. This is often best achieved through **place-based early years partnerships**, where everyone works together to address concurrent, complex problems in communities with local resources. This is a promising alternative to traditional, stand-alone approaches where a single service tries to address a specific issue.

Research has identified six key factors that enable families, communities, services and workplaces to take place-based action:

1. A shared sense of urgency for change
2. A shared agenda and coherent long-term vision
3. Influential champions and strong leadership
4. Sufficient time for strong personal relationships and trust to develop between partners
5. Alignment of interventions and resources toward common goals
6. Clear governance structure and division of responsibilities.

Place-based action requires cycles of continuous improvement so that everyone is monitoring and responding to the needs of families.

Solutions are emergent rather than predetermined.

Evidence shows that improvement enablers include:

1. Continuous communication
2. Shared measurement systems
3. Developmental evaluation
4. Realist evaluation
5. Building local competencies to allow communities to develop their own solutions.

Evidence continues to grow regarding the critical significance of the period from pregnancy until 4 years of age. There is a scientific, economic and moral imperative to provide every child with the best possible opportunity to learn, grow and thrive. By optimising the health, development and wellbeing of children and families, we are also helping to ensure the wellbeing and prosperity of our communities.

By working in partnership with families, and collaborating with those who support and care for children and families, we can improve our capacity to address the needs of children and families (particularly those most vulnerable) to ensure that all children get the best possible start to life.

Introduction

Social change, the early years and Tasmania

The last several decades have given way to a series of social, economic, demographic and technological shifts, unprecedented in their rapidity and scale (Moore et al., 2017). Defined as the 'Great Acceleration' (McNeil & Engelke, 2015), these changes ascend from the same fundamental factors that have contributed to global climate change and create a form of social climate change (Moore, 2014). This has not only resulted in changes to the conditions under which families raise their children, but also to changes in families themselves (Moore et al., 2017; Golombok, 2015). For example, dramatic changes in employment opportunities and conditions for families has given rise to more parents working full time, in shift work, doing non-standard hours, working longer hours, more unemployed families, and more children being raised in poverty (Hayes et al., 2010; Richardson & Prior, 2005). Furthermore, the search for cheap housing (Zhu, 2014) and secure employment has led to families moving away from the communities in which they were raised, leaving many families isolated and lacking supportive personal networks (extended family, friends or other families of young children) (Moore et al., 2017).

The drastic rise in some of today's most commonly occurring physical and mental health problems is believed to be influenced by this social climate change, which has resulted in a mismatch between human evolutionary capacities and modern environments. This is referred to as the mismatch hypothesis and can be broken into two categories: predictive mismatch (which occurs when our bodies make adaptations based on predictions regarding the kind of environments we are going to be living in, and the environments do not match the predictions) and evolutionary mismatch (which occurs when our bodies encounter conditions for which they were not evolutionarily adapted or designed). Starting from conception, this mismatch between our evolutionary capacities and our modern living environments has given rise to chronic physical and mental health conditions known as non-communicable diseases and conditions (Moore et al., 2017).

While governments continue to strive to protect Australian families from the undesired effects of such social and economic changes, certain issues continue to persist. One of the main reasons for this is that the nature of challenges facing society and governments have changed – they are now more likely to be 'wicked' problems (Moore et al., 2017; Moore & Fry, 2011; Weber & Khademian, 2008). Such problems are complex, interconnected, and cannot be resolved through traditional governance and leadership models, nor by service-driven approaches (Grint, 2010; Moore & Fry, 2011). Examples of wicked problems include (but are not limited to) child abuse and neglect, family violence, intergenerational disadvantage, social exclusion, and health inequalities

Tasmania's children

In 2016, there were 28,469 children between 0 and 4 years of age, living in Tasmania (Australian Bureau of Statistics, 2016). See Table 1.

Table 1: Population of children aged 0 to 4 years in Tasmania, 2016, as a percentage of the total population. Source: Australian Bureau of Statistics 2016.

	2016	
Age Group	Number	%
0-4 years	28,469	5.6

In 2016, Launceston was home to the largest number of children aged 0 to 4 years (3,773), followed closely by Clarence, Glenorchy, Hobart and Kingborough (Australian Bureau of Statistics, 2016) (Figure 1).

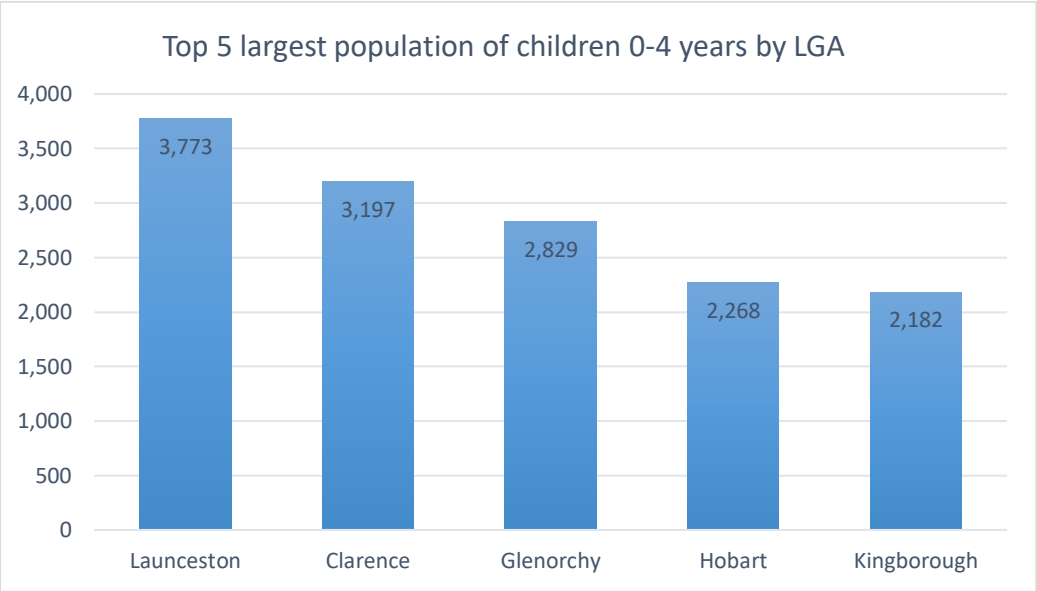

Figure 1: Five largest populations of children 0 to 4 years in Tasmania by local government area. Source: Australian Bureau of Statistics 2016.

Socioeconomic disadvantage

Overall disadvantage is higher in Tasmania than the rest of Australia (Australian Bureau of Statistics, 2016) (see Figure 2). According to the Socio-Economic Indexes for Areas (SEIFA), Tasmania had the lowest proportion of people living in the most advantaged areas (4.9 per cent) and the highest proportion of people living in the most disadvantaged areas (37 per cent). SEIFA can indicate aspects of disadvantage that relate to income and wealth, living conditions, education and engagement in skilled occupations (Australian Bureau of Statistics, 2016).

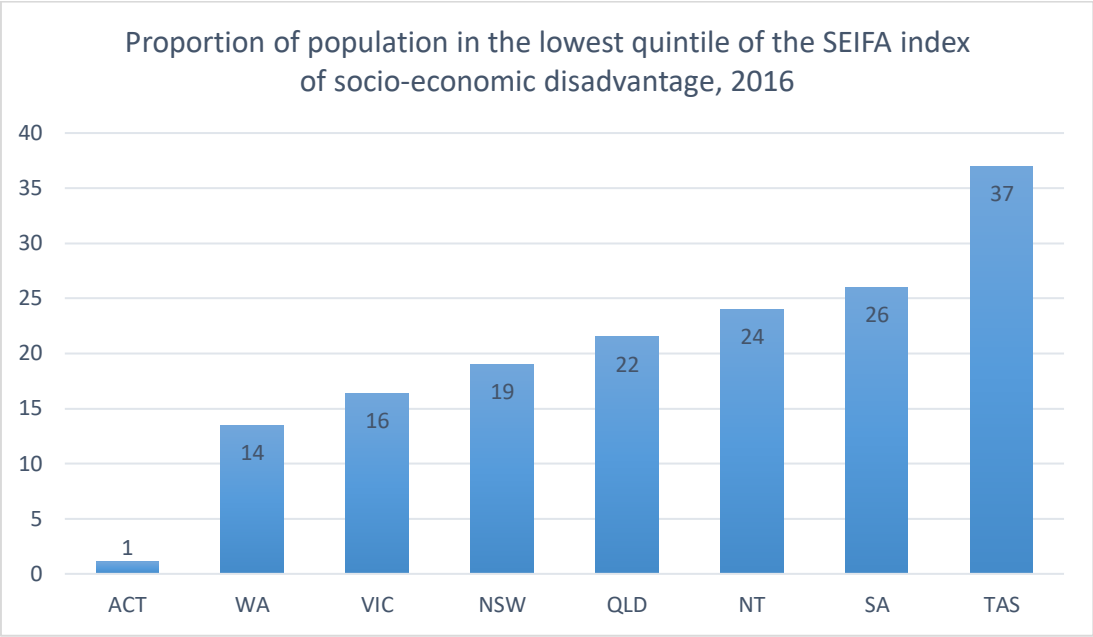

Figure 2: Proportion of Australia's population in the lowest quintile of the SEIFA index of socio-economic disadvantage, 2016. Source: Australian Bureau of Statistics 2016.

Tasmania's mothers

In 2016, Save the Children Australia (Harris & Wells, 2016) carried out an Australia-wide analysis that compared the situation of mothers and their children at both the state and local level. They found that Tasmania ranked sixth in the Mothers' Index, tied with the Northern Territory (both towards the bottom of the list). While Tasmania claims the lowest rates of maternal mortality in the country (3.3 maternal deaths per 100,000 who gave birth), it also has the lowest median household income levels in Australia, at $1,999 per week. Tasmania also ranks lowest in the country on educational status (57.1 per cent of women completed year 12). Child mortality rates and relative socio-economic disadvantage were also poor, ranking sixth on both indicators compared to other states and territories (Harris & Wells, 2016).

Early education and development

Approximately half (54.2 per cent) of Tasmanian children aged less than 4 years attend some type of early childhood care program (Commissioner for Children and Young People Tasmania, 2017). In 2015, the proportion of enrolled children aged 4 and 5 years attending a preschool program in the year before formal schooling was 98.1 per cent for Tasmania – which is higher than the national average (96 per cent).

According to the Australian Early Development Census (AEDC) – a national measure of early childhood development in Australia – in 2015 approximately 80 per cent of Tasmania's children were developmentally on track. Compared to national data for 2015, Tasmania had a lower percentage of at-risk children in the domains of physical health, social competence and communication skills, but had a higher percentage at-risk in emotional maturity, and language and cognitive skills (Commissioner for Children and Young People Tasmania,

2017). Between 2009 and 2015 the percentage of Tasmanian children developmentally on track in the AEDC increased in each of the domains – except for the emotional domain in which there was a very slight decrease (see Figure 3).

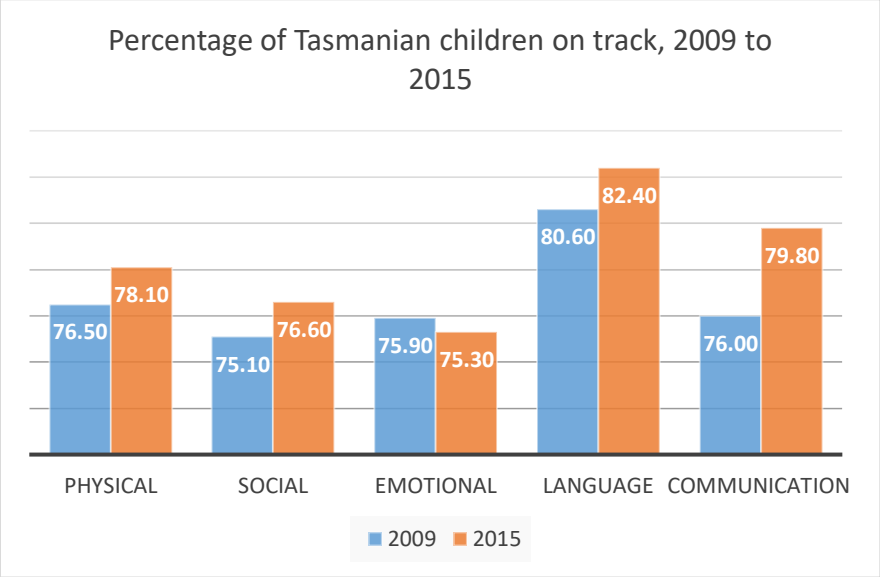

Figure 3: Percentage of Tasmanian children developmentally on track, 2009 to 2015. Source: Australian Early Development Census, 2015.

How early experiences and environments shape lifelong outcomes

There is a growing body of evidence which shows that, starting from the period of conception, experiences during the earliest stages of child development can have lifelong consequences for health and wellbeing (Moore et al., 2017; Center on the Developing Child at Harvard University, 2010; Fox, Levitt & Nelson, 2010; Moore, 2014; National Scientific Council on the Developing Child, 2005). It also shows that many challenges faced by adults, such as mental health conditions, obesity, heart disease, criminality, and poor literacy and numeracy, can be traced back to pathways that originated during pregnancy and early childhood (Moore et al., 2017).

This, coupled with a greater understanding of how early disparities in children's development can create problems for future health and wellbeing (Brinkman et al., 2012, 2013; Woolfenden et al., 2013), has led to many government initiatives, nationally (e.g. the National Early Childhood Development Strategy) and internationally.

While many of these initiatives have primarily focused on the preschool period, particularly on ensuring school readiness (e.g. the Council of Australian Governments National Partnership Agreement on Early Childhood Education), new evidence is leading to a greater focus on the earliest stages of development, including the prenatal period (Moore et al., 2017; Barouki et al., 2012; Paul, 2010; Prescott, 2015).

The phrase, 'the first 1000 days' (used to describe the period from conception to the end of the child's second year), has become a recent rallying point for a number of Australian and international initiatives. While some of these have a general focus, such as the work of a cross-parliamentary group in the UK Parliament (Leadsom, Field, Burstow & Lucas, 2013; WAVE Trust, 2013, 2015), others are more narrowly focused on issues such as nutrition (Save the Children, 2012; Thousand Days, 2016) or on specific populations such as Aboriginal and Torres Strait Islander children (Arabena et al., 2015; Arabena, Ritte & Panozzo, 2016).

By recognising that what takes place during this period can affect lifelong outcomes, and understanding the conditions and mechanisms though which this occurs, we are better placed to take action to support optimal development.

Developmental plasticity

Developmental plasticity describes the ways in which a child's brain and biological systems respond to their environments and experiences. It refers to the body's capacity to adapt to different social and physical environments (Bateson & Gluckman, 2010; Padmanabhan, Cardoso, & Puttabyatappa, 2016; Gluckman & Hanson, 2012). Adapting to the immediate environment is the major developmental goal or activity of the early years, subsequently the influence of the environment (including the mother's environment) is particularly critical at this time.

During development, there are brief critical periods during which our biological systems or organs have to mature. These occur at different times for different systems, and they occur in utero for most systems. After birth, only the brain, liver and immune system remain plastic (Barker, 2012). Thus, much of human biological development is completed during the period between conception and the end of a child's second year (Barker, 2012; Moore et al., 2017).

Neuroplasticity

There are sensitive periods (or time windows) during which the effect of experiences on brain development is unusually profound and can strongly shape the neural circuits (Ismail, Fatemi & Johnston, 2017). This is an instance of developmental plasticity, known as neuroplasticity, and refers to the capacity of the central nervous system[2] to change (structurally and functionally) in response to experience in order to adapt to the environment (Ismail et al., 2017). Neuroplasticity is greatest during pre and postnatal brain development: the young brain has a range of neuroplasticity responses that are not evident in adults which allow the young brain to develop appropriately and constantly adapt to environmental experiences and exposures (Moore et al., 2017).

This capacity to adapt makes the child both versatile and vulnerable at the same time. If the environmental experiences are positive, then any adaptations will provide a sound neurobiological base for ongoing development. However, if the environments are less than optimal, then the changes made might be adaptive for the immediate environment, but they can come with long-term costs, both psychologically and physically (Blair & Raver, 2012; Gluckman et al., 2009; Thompson, 2014). For example, in the early development of the brain, neuroplasticity can lead to various levels of maladaptive outcomes (depending on factors such as the nature and extent of adverse exposures). Patterns of abnormal neuroplasticity have been identified as core features of many paediatric disorders of the central nervous system, including cerebral palsy, intellectual disabilities, and autism spectrum disorders (Ismail et al., 2017).

Biological embedding

Another instance of developmental plasticity is biological embedding – the process whereby the foetus (and infant) in response to cues such as nutrition or hormones, adapt their phenotype[3] to their particular environment in ways that have lifelong consequences.

Starting from conception, the foetus is actively adapting to changes in the environment, using cues provided by the mother's physical and mental state to 'predict' the kind of world they will be born into and altering their bodily structures accordingly (Lane, Robker, & Robertson, 2014; Hochberg et al., 2011). This powerful capacity is a double-edged sword; adapting to adverse experiences may help in the short term, but have negative implications in the long term (Moore et al., 2017; Godfrey, Gluckman, & Hanson, 2010).

[2] Central nervous system: The brain, brainstem, and spinal cord.
[3] Phenotype: The outcome of the interaction between the genotype and the environment, and is the organism's actual physical form and behaviour.

There are three key mechanisms that facilitate this adaptation: epigenetic effects, telomere effects, and synaptic pruning.

1. Epigenetic effects

Our genes do not single-handedly determine any of our characteristics. Instead, development is a process of interplay between genes and the environment (Moore, 2015; Kundakovic, & Champagne, 2015. This means that, rather than being born with a fixed genome[4], we are born with a developing genome that changes in response to our environment – an epigenetic change.

For example, a child may have a combination of genes that predisposes them to a particular condition/behaviour, but never develop the condition/behaviour because they were never exposed to the particular environment needed to trigger this condition – the gene thus remains 'dormant' (Moore et al., 2017). Similarly, a child may be exposed to a particular triggering environment but lack the genes that would predispose them to respond adversely to that environment. When genes and environment do interact, they result in epigenetic changes[5]. In effect, epigenetic changes determine whether genes are expressed (turned on or off) [6] (Carey, 2011; Duncan, Gluckman, & Dearden, 2014; Francis, 2011; Lester, Conradt, & Marsit, 2016; Moore, 2015).

Epigenetic changes have been implicated in the development of a wide range of disorders, such as cardiovascular disease (Thornburg, 2015) and autism spectrum disorders (Loke, Hannan, & Craig, 2015; Schanen, 2006), and may be triggered by a wide range of environmental exposures and experiences (Hertzman, 2010; Keating, 2016; Martin, & Dombrowski, 2008; Robinson, 2013; Moore et al., 2017).

Epigenetic changes can start to occur shortly after conception, and continue to occur during both the prenatal and postnatal periods. Factors at conception that can affect the development of the embryo include maternal nutrition and infections. Epigenetic changes can also occur during the postnatal period. For instance, stressors such as poverty in early childhood can alter the programming of the immune system (McDade, 2012; Miller & Chen, 2013; Raposa, Bower, Hammen, Najman, & Brennan, 2014).

2. Telomere effects

Recently, another form of biological embedding – telomere effects – has been identified. This involves biologically embedding at a cellular level. Telomeres are the caps at the end of each chromosome, and can be likened to the plastic tips at the end of shoelaces (Blackburn & Epel, 2012, 2017; Blackburn, Epel & Lin, 2015;

---

[4] Genome: an organism's complete set of DNA, including all of its genes. Each genome contains all of the information needed to build and maintain that organism. In humans, a copy of the entire genome is contained in all cells that have a nucleus.

[5] Epigenetic changes: DNA modifications that do not change the DNA sequence, but can modify gene activity by helping determine whether genes are turned on or off. Epigenetic change is a regular and natural occurrence but can also be influenced by several factors including age, the environment/lifestyle, and disease state.

[6] Moore (2015) suggests that the analogy of a dimmer switch more accurately captures this effect: DNA can be turned on 'a little bit, a moderate amount, a lot, full blast, or any amount in between'.

Prescott, 2015). Over the course of our lives, our cells divide numerous times, and the function of the telomeres is to stop the DNA from unravelling during this process. Telomeres are shaped by our genes, but also respond to how we live – the foods we eat, our responses to emotional challenges, the amount of exercise we get, whether we were exposed to childhood stress, and even the level of trust and safety in the neighbourhood (Blackburn & Epel, 2017).

Shortened telomeres not only shape our health-span (how long we live a healthy life), but also our disease-span (how long we live with disease that interferes with our quality of life) (Blackburn & Epel, 2017). Telomere length can be directly transmitted from mother to child at the point of conception: if a mother's telomeres are short throughout her body (including those in the egg when she contributes the egg), the baby's telomeres will also be short. The developing child's telomeres can be further shaped by the mother's nutrition and stress levels during the pregnancy (Blackburn & Epel, 2017). Fathers can also transmit shortened telomeres, although not to the same extent as mothers. Fortunately, telomeres can be lengthened through exposure to positive environments, so the impact of early adverse experiences or inheritance can be counteracted (Blackburn & Epel, 2017; Moore et al., 2017).

3. Synaptic pruning

The third mechanism whereby environmental experiences become biologically embedded is synaptic pruning (Keating, 2016; Webb, Monk & Nelson, 2001). While a baby is born with billions of brain neurons, it has relatively few synapses[7]. However, an initial surge in synaptic connections between brain neurons occurs after birth as the child goes through a process of rapid learning. Connections are strengthened through recurrent use, while our experiences and environment determines which connections are used most. Connections that are used more become stronger and enduring, while those that are not used become weak and eventually fade away through a process called synaptic pruning (Shonkoff & Phillips, 2000; Moore et al., 2017).

The primary way that brain connections are reinforced is through the child's interaction with their caregiver(s) through a process of 'serve and return'. Children pursue interactions through facial expressions, gestures and words, and adults who are responsive 'return' these 'serves' with similar vocalising, gestures and emotional engagement (Center on the Developing Child, 2016). However, if a caregiver's response is unreliable, inappropriate or absent, this under-stimulation can disrupt the developing brain architecture and adversely affect later stages of development, learning and behaviour (Champagne, Francis, Mar, & Meaney, 2003; Center on the Developing Child, 2016; Moore et al., 2017).

Developmental origins of health and disease

The Developmental Origins of Health and Disease (DOHaD) paradigm maintains that environmental exposures such as stress during critical periods of development can have long-term effects on health and wellbeing (Davies, 2014; Prescott, 2015; Moore et al., 2017). The DOHaD paradigm also maintains that instead of being passive during pregnancy, the foetus actively responds to changes in the intrauterine environment, preparing

[7] A synapse is what allows information to flow from one brain cell (neuron) to another.

itself for the environment it 'predicts' it will be born into (Robinson, 2013; Coe & Lubach, 2008; Moore et al., 2017).

This process of predictive adaptation works in the interests of the foetus and infant when the antenatal and postnatal environments are both optimal and stable, as it ensures that any changes to the phenotype do not compromise later health and development. However, when these environments are less than optimal and when the prenatal and postnatal environments do not match (predictive mismatch[8]) there is an increased risk of non-communicable diseases in later life (Gluckman & Hanson, 2004; Prescott, 2015; Moore et al., 2017). Another form of mismatch occurs when our bodies encounter conditions for which they were not evolutionarily adapted (evolutionary mismatch[9]). This mismatch between our evolutionary capacities and our modern living environments has also contributed to a rise in non-communicable diseases (Lieberman, 2013a).

Factors and early experiences that shape lifelong outcomes

Social determinants and parental/caregiving factors profoundly affect early experiences to shape lifelong outcomes.

Social determinants

From the point of conception, the social, economic, and environmental conditions into which we are born, grow, live, and age, have the power to shape our lives for better or worse (Moore et al., 2017). These factors are known as the social determinants of health and result in a social stratification that enforces disparities in exposure to health-damaging factors/conditions and differential vulnerability, in terms of health conditions and material resource availability (Marmot, 2015; Ratcliffe, 2017; Solar & Irwin, 2010; Wilkinson & Pickett, 2009, 2018).

For example, there is considerable evidence to show that the lower a child/family's socioeconomic position (i.e. the less their physical, financial, social and emotional needs are met) the worse their health and wellbeing outcomes are likely to be (Adler & Stewart, 2010; Marmot, 2015; Solar & Irwin, 2010). This is known as the social gradient effect in health and wellbeing, and is evident from the very top of the socioeconomic spectrum to the very bottom. The following section summarises the factors (social determinants) known to significantly affect lifelong health and wellbeing outcomes at each key stage of development: poverty, housing, built environments and social support.

Poverty

A significant body of evidence highlights a strong correlation between poverty in early childhood and adverse health and wellbeing outcomes in later life (Goldfeld & West, 2014; Kruk, 2013; Hertzman et al., 2010; Marmot

[8] Predictive mismatch occurs when our bodies make adaptations based on predictions regarding the kind of environments we are going to be living in, and the environments do not match the predictions.
[9] Evolutionary mismatch occurs when our bodies encounter conditions for which they were not evolutionarily adapted.

Review, 2010). While children from high income families with developmental delays are likely to catch up to their peers in later life, children from 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).

Tasmania has the highest levels of poverty in Australia, with 15.1 per cent of persons living in poverty in 2011-12 (significantly higher than the national average of 11.8 per cent). Tasmania's child poverty rates are also higher than national averages with 15.8 per cent of children under 15 and 14.7 per cent of children and young people under 25 living in poverty (Commissioner for Children and Young People Tasmania, 2017).

Pregnancy

Poverty in pregnancy is associated with poor nutrition, obesity and an increased use of tobacco, alcohol and other drugs – all shown to increase the likelihood of health and developmental vulnerabilities in children (Weinstock, 2005; Esperat, Yan, & Owen, 2007).

Poverty is likely to increase a mother's exposure to psychological stressors such as domestic violence and homelessness, affecting the body's hormonal regulation during pregnancy and increasing the likelihood of foetal growth delay and preterm birth (Weinstock, 2005).

Birth to 4 years

Low income adversely impacts a mother's ability to keep their immediate environment healthy and secure, feed and clothe their children, and look after their health needs (Harris & Wells, 2016). Parental psychological distress is the primary connecting factor between economic hardship and less responsive and/or hostile parenting behaviours (Solantaus, Leinonen, & Punamäki, 2004; Gershoff, Aber, Raver & Lennon, 2007). When infants and young children interact with a disengaged or irritable caregiver, the anxiety that is created in them can cause their body to increase production of potentially harmful stress hormones (Dawson & Ashman, 2000). If this bodily reaction occurs often and over a sustained period of time, it can affect the child's brain development and interfere with their ability to learn and increase the likelihood of mental ill-health in later life (National Scientific Council on the Developing Child, 2005; Weissman et al., 2006).

The quality of care that children receive, the number and quality of learning opportunities they have, and the level and duration of stress that they experience, are all significantly influenced by the experience and duration of poverty (Moore et al., 2017).

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, and spend more time in front of a television (Bradley & Corwyn, 2002; Evans, 2004).

The quality of early childhood education and care programs tends to be lower in low socioeconomic areas (Cloney, Cleveland, Hattie, & Tayler, 2016). Children living in poverty are more likely to lack access to natural environments and be exposed to environmental hazards (Chakraborty & Armstrong, 2001; Derezinski, Lacy & Stretesky, 2003; Lester, Allen, & Hill, 2001).

Housing

Access to stable and adequate housing[10] is a basic human need (Maslow, 1948). It has a significant impact on the health and wellbeing of children as it provides families with a safe environment, autonomy and the security needed for full participation in social, educational, economic, and community life (Wise, 2003; Victorian Department of Human Services, 2006).

Housing factors of significance to families include affordability, housing characteristics (e.g. safety of the building) and overcrowding (i.e. sufficient room for privacy and play).

While historically Tasmanians have had relatively high rates of home ownership, this has changed in recent years, with rates of home ownership beginning to decline. As Tasmania has the nation's highest proportion of low income households, the demand for low cost housing is high. Almost one quarter of low income households are reported to be experiencing housing stress or crisis (DHHS, 2015). While Tasmania continues to experience the lowest rate of homelessness in the nation (31.8 per 10,000 population), the number of people experiencing homelessness in Australia has increased by 4.6 per cent over the last five years (Census of Population and Housing, ABS 2016).

Pregnancy

Housing instability can cause pregnant women stress and is associated with adverse outcomes for the mother and potentially long-term risks to the child (Nelson, 2010).

Housing instability is a significant predictor of lower birth weight and preterm birth (Carrion et al., 2015). Housing instability increases the likelihood of intimate partner violence for women, including during pregnancy (Pavao, Alvarez, Baumrind, Induni, & Kimerling, 2007). Housing instability also reduces the likelihood of prenatal care (Bloom et al., 2005).

Birth to 4 years

High housing costs can affect child wellbeing by contributing to family financial or material hardship (Harkness & Newman, 2005). Families who allocate a disproportionate amount of their income to housing have to cut back on other basic needs such as food, clothing and heating (Lippman, 2005).

A lack of affordable housing can affect parenting capacity and mental health. Housing affordability can contribute to family stress in circumstances where housing costs are the main source of economic hardship and/or family conflict (Leventhal & Newman, 2010).

Parents facing financial hardship face an increased risk of chronic stress, depression and partner conflict, which, in turn, correlates with more inconsistent, unsupportive, and punitive parenting styles (Leventhal & Newman, 2010).

[10] Housing refers to a dwelling that is safe, secure, affordable, and appropriate. It also encompasses issues relating to housing mobility, homelessness, neighbourhood characteristics, and overcrowding.

Young children are particularly vulnerable to inadequate housing as they are physiologically more susceptible to environmental hazards. For example, as they spend more time in the home, young children experience greater exposure to environmental hazards (e.g. mould), are more susceptible to physical features of a home that can cause injury, and have limited communication abilities and control over their environment (AIHW, 2014).

Homeless infants and toddlers are particularly vulnerable and more likely to experience delays in physical and mental development (Cooper, 2001; Horn & Jordan, 2007; Hicks-Coolick, Burnside-Eaton, & Ardith, 2003). They are twice as likely to be hospitalised (Weinreb, Goldberg, & Perloff, 1998) and experience a higher incidence of: asthma and other respiratory problems; infectious diseases; chronic diarrhoea; visual and neurological deficits; delayed immunisations; tooth decay; ear and skin infections; and mental ill-health and behavioural disorders (Cooper, 2001; Karim, Tischler, Gregory, & Vostanis, 2006; Weinreb, et al., 1998; Yu, 2008).

Built environments

The built environment can have a significant impact on children and families. The way that built environments are designed can have a range of personal and social benefits (Goldhagen, 2017), such as promoting healthier lifestyles and contributing to reducing the risk of non-communicable disease (Sallis, Floyd, Rodríguez, & Saelens, 2012; Villanueva et al., 2016).

Qualities of the built environment that promote healthier lifestyles include: easy access to green spaces (i.e. open spaces and parks); facilities; services and social infrastructure; parks and recreational facilities; and stores selling fresh produce (Ulmer, Chapman, Kershaw, & Campbell, 2014; Villanueva et al., 2016). A poorly designed built environment has less connected street networks, limited access to shops and services, and an oversupply of fast food restaurants (Ulmer et al., 2014; Villanueva et al., 2016).

Pregnancy

Built environments are not only related to birth outcomes but are also associated with maternal health behaviours that are on the pathway to birth outcomes (Vinikoor-Imler, Messer, Evenson, & Laraiad, 2011). For example, neighbourhood crime may contribute to adverse pregnancy outcomes by increasing chronic stress (Mayne, Pool, Grobman, & Kershaw, 2017), and neighbourhood income and deprivation are related to low birth weight and perinatal death (Agyemang et al., 2009).

Birth to 4 years

Access to green spaces and parks can affect a parent's caregiving capacity by playing a significant role in coping with and recovering from stress and mental fatigue (Berto, 2014). Green spaces have also been shown to increase social interactions between families and children, promoting social trust and community perceptions of safety (Goldfeld et al., 2017; Coley, Sullivan, & Kuo, 1997; Kuo, Bacaicoa, & Sullivan, 1998).

Perceived presence of/access to public transport and walkability to facilities is also considered important to families for easy access to services (Goldfeld et al., 2017).

Built environments that provide access to nature and green space can have a significant impact on children's lifelong development (Strife & Downey, 2009). Such access provides children with various cognitive, emotional, and physical benefits, including (but not limited to): better educational attainment; reduced stress and aggression; and lower risk of obesity (Kellert, 2002; Louv, 2007).

In communities where children's services are lacking or unavailable, detrimental early childhood developmental (ECD) outcomes are common (Goldfeld et al., 2017). Even where services may be available, access may be a significant barrier to their use if families cannot physically attend due to distance, limited availability of public or private transport, traffic, poor walkability, weather conditions or geographical location (Goldfeld et al., 2017).

Personal and community social support

The single most important factor shaping health and wellbeing is the quality of our relationships, both our personal support networks and the community environments in which we live. We are 'wired to be social' (Lieberman, 2013), and social connectedness is vital for our health and wellbeing (Hawkley & Cacioppo, 2013). The nature and quality of the social interactions within a community can have a significant impact on people's health and wellbeing (Barnes, Katz, Korbin, & O'Brien, 2006; Pebley & Sastry, 2004; Pinker, 2015; Popkin, Acs, & Smith, 2010). Our immediate social networks – those people we mix with on a regular basis – have a significant influence on our ideas, emotions, health, relationships, behaviour, and even our politics (Christakis & Fowler, 2009; US Department of Health and Human Services, 2011). Even 'consequential strangers' – people outside our circle of family and close friends, such as casual acquaintances – are important for personal and community wellbeing (Blau & Fingerman, 2009).

The quality of parents' personal social support networks has a major impact on their personal wellbeing as well as their parenting. Social support takes three forms: practical (e.g. having someone who can offer a lift or help look after your child); emotional (having someone who will listen and provide emotional comfort and reassurance, particularly during a stressful situation); and advice and information (e.g. having someone to contact who can help and/or provide advice) (McArthur & Winkworth, 2017). Parents' strong preference and practice is to seek all of these forms of support (even advice and information) from their personal support networks, only turning to services for help when these are inadequate. Parents who do not have good social support networks or positive relationships with health and other services are disadvantaged when it comes to meeting the needs of their children, their families and themselves.

Social support has a particularly significant role during periods of stress or major life transition – such as pregnancy and infancy.

Pregnancy

The perception and experience of insufficient support has a visibly detrimental effect on not only maternal psychological wellbeing, but also adverse health and wellbeing outcomes for the child (Dibaba, Fantahun, & Hindin, 2013; Dunkel, Schetter, & Lobel, 2011; WHO, 2009).

Experiencing social support during pregnancy reduces the likelihood of maternal stress, depression and risk-taking behaviours during and after pregnancy (Kawachi & Berkman, 2001; Rini et al., 2006; Robles & Kiecolt-Glaser, 2003).

The level of social support during pregnancy can affect a woman's protective behaviours during this period (e.g. increase or decrease the risk of smoking during pregnancy based on the perceived level of social support) (Elsenbruch et al., 2007).

Birth to 4 years

Parental social support can facilitate a child's contact with other caring adults, help build positive attachment relationships, and play a significant role in modelling relational skills for children (US Department of Health and Human Services, 2011).

Social support also greatly affects parental caregiving capacity by promoting mental health and resilience during challenging periods (Green, Furrer, & McAllistar, 2007; Munsell, Kilmer, Cook, & Reeve, 2012).

Social isolation is a key feature of the lives of families with parental substance abuse. Typically, women with substance misuse problems feel unable to attend a range of community activities that are often the building blocks of community connectedness and support (Moore et al., 2017).

Positive social support reduces the likelihood of child maltreatment (Bishop & Leadbeater, 1999): the risk of child maltreatment increases when parents (particularly those who are experiencing concurrent vulnerabilities) have limited social supports (MacLeod & Nelson, 2000).

Social support helps families to access family and/or early intervention services (Kang, 2012). This is in part due to the notion that without adequate social networks, the opportunity to be 'introduced' to services may be limited (Winkworth, McArthur, Layton, & Thompson, 2010; Winkworth et al., 2010).

The effect of stress on parenting has been found to be reliant on social support (Goldstein, Diener, & Mangelsdorf, 1996). Specifically, both stress and social support are found to significantly predict maternal attitudes and interactive behaviour.

Early education and care

Growing evidence suggests that engagement with quality early childhood education and care (ECEC) programs such as preschool can improve children's early development (Goldfeld et al., 2016). By providing cognitively stimulating and rich learning environments, ECEC provides a significant opportunity to promote children's healthy development (Magnuson et al., 2004), and therefore support successful transitions to the school environment (Sylva, Melhuish, Siraj-Blatchford, & Taggart, 2010).

The ECEC experiences of Australian children tend to differ across jurisdictions and at-risk subpopulations (Goldfeld et al., 2016). Children from non-English speaking backgrounds, Aboriginal and Torres Strait Islander children, and children from socioeconomically disadvantaged families are among the least likely to attend preschool or day care prior to entering school. In Tasmania, over half of all children aged under four participate in formal childcare. The average number of hours is 12 hours per week; and the main reason that parents use this important service is to enable them to participate in the workforce. However, children from disadvantaged areas do not attend ECEC in the same numbers as children from other areas (Commissioner for Children and Young People, 2017).

This is reflected in the AEDC results which show particular vulnerabilities arising in areas of socio-economic disadvantage. However, compared to national percentages, Tasmania has a lower percentage of at-risk children in the domains of physical health, social competence and communication skills, but a higher percentage of at-risk children in emotional maturity and language and cognitive skills (AEDC, 2015).

Tasmania's ECEC services are delivered by a mix of for-profit, not-for-profit and local government providers, however the sector is dominated by not-for-profit providers in metropolitan areas where there is a wealthier population (KPMG, 2017).

Taking into account that Tasmanian preschool children on average are experiencing a greater level of disadvantage than their interstate peers, the Tasmanian Government has recently proposed a voluntary earlier school starting age in the *Education Act 2016.* By providing voluntary earlier access to early learning for all Tasmanian children (through the universal platform of government schools), the aim is to address the disadvantage faced by Tasmanians and support better outcomes for individuals (Tasmanian Government, 2017).

Social determinants and Aboriginal and Torres Strait Islander health and wellbeing

According to the Australian Bureau of Statistics (ABS, 2016), approximately 8 per cent of Tasmania's children aged between 0 and 19 identify as Aboriginal or Torres Strait Islander, with the overall population identifying as Aboriginal or Torres Strait Islander in Tasmania at around 5 per cent (ABS, 2016). In the most recent round of the AEDC, 9.1 per cent (583) were from an Aboriginal and Torres Strait Islander background (AEDC, 2015). Results of the AEDC show that Aboriginal and Torres Strait Islander children's developmental vulnerability in Tasmania has decreased from 36.3 per cent in 2012 to 29.7 per cent in 2015. While this is still notably greater than developmental vulnerabilities among non-Indigenous Tasmanian children, it is notably less than the Australian average (Figure 4).

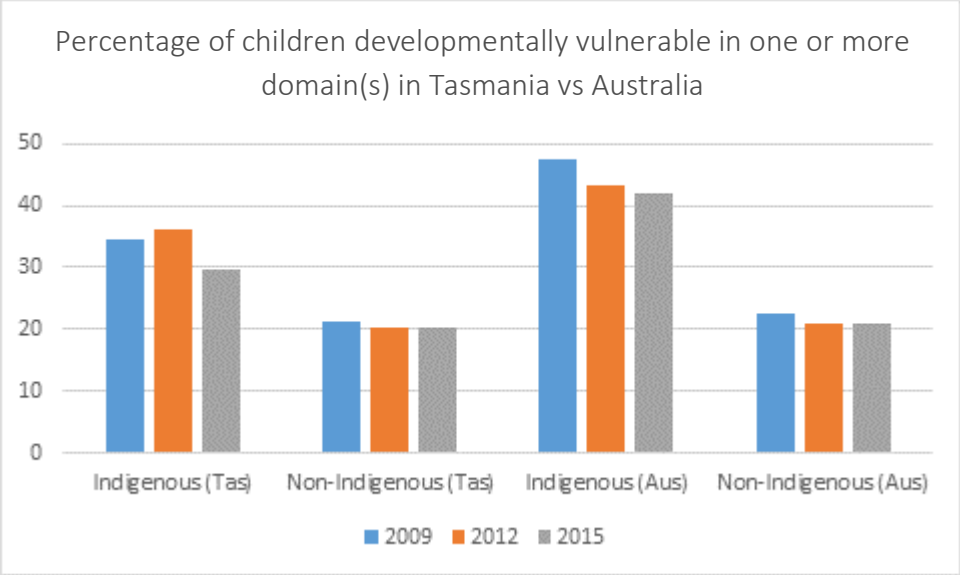

Figure 4: Percentage of children developmentally vulnerable in one or more domain(s) in Tasmania Vs Australia. Source: Australian Early Development Census, 2015.

When the necessary social conditions are in place, Aboriginal and Torres Strait Islander peoples' culture is a protective force for children, families and communities (Moore et al., 2017). Aboriginal and Torres Strait Islander parents have robust cultural practices in family life and child rearing, and know how to keep their children safe and to raise them to be active contributors to family and community life (Lohar, Butera, & Kennedy, 2014). However, factors such as intergenerational trauma, cultural disconnection, and family disruption among many Aboriginal and Torres Strait Islander communities, are increasingly being recognised as factors which can have significant adverse outcomes for some Aboriginal and Torres Strait Islander children (Council of Australian Governments, 2009).

Faced with all the evidence regarding the challenges confronting Aboriginal and Torres Strait Islander populations and the poor health and other outcomes they experience, it is easy to lose sight of the strengths of their cultures and the resilience of many communities and peoples. This may partly reflect a tendency to focus unduly on the negatives (Moore et al., 2017). As Nguyen and Cairney (2013) note, existing government frameworks that collect data about Aboriginal and Torres Strait Islander peoples often focus on deficits, disadvantage and dysfunction. However, a growing body of evidence highlights a significant relationship between a robust affinity with traditional cultures and improved health and wellbeing outcomes amongst Aboriginal and Torres Strait Islander peoples (Colquhoun & Dockery, 2012; Wexler, 2009; Fleming & Ledogar, 2008; Dockery 2009, 2010).

The association between 'traditional' social determinants (e.g. education, housing, income etc.) and health are likely to be more complex for Aboriginal and Torres Strait Islander children for a number of reasons (Moore et al., 2017). One is that marginalisation and discrimination are often deeply embedded in the lives of Aboriginal and Torres Strait Islander peoples, limiting the likelihood of health benefits that are typically associated with improved income, education, etc. (Gracey & King, 2009). Another reason is that the generational

marginalisation of Aboriginal and Torres Strait Islander peoples can affect optimal development in a number of ways, placing some Aboriginal and Torres Strait Islander children at a greater disadvantage from the beginning of life and limiting the acquisition of skills that can be drawn upon for the benefits of health at all levels of the gradient (Shepherd, Li, & Zubrick, 2012). Finally, kinship, spirituality, connection to traditional lands and cultural continuity play a central role in the health and wellbeing of Aboriginal and Torres Strait Islander peoples (Poroch et al., 2009). However, these factors are not captured in our 'traditional' understanding of the social determinants of health (Boulton, 2016; Shepherd et al., 2012).

The social determinants of health, particularly relating to poverty and the systematic discrimination of Aboriginal and Torres Strait Islander peoples, help us to understand the foundations upon which disparities in health and wellbeing outcomes of Aboriginal and Torres Strait Islander children and other Australian children are formed. While there is limited evidence which directly relates to the social determinants of Aboriginal and Torres Strait Islander children's health (particularly in the early years), the fact that they are significantly more likely to be born with low birthweight, amplifies the early start and consequences of socioeconomic disadvantage (Moore et al., 2017).

Parental/caregiving factors

A child's interaction with their caregiver is perhaps the most powerful postnatal determinant of their future health and wellbeing. Regardless of the diversity of family structures, what is most important is the quality of care that the child receives (Moore et al., 2017; Benoit, 2004). A consistently responsive and nurturing relationship between a child and their caregiver encourages secure attachment and facilitates the development of future relationships throughout the child's life, while providing a safe foundation for learning (Moore et al., 2017; Music, 2011; Siegel, 2012).

To learn effectively, children need to feel calm, safe and protected (US Department of Health and Human Services, 2001). When this attachment process is interrupted, a child's brain places an emphasis on developing neuronal pathways that are associated with survival, before those that are essential to future learning and growth (US Department of Health and Human Services, 2001).

All caregivers play an important role in the lives of very young children. While mothers and fathers are biologically primed to interact with and care for their infants, the infant will develop an attachment with caregivers who respond to them consistently. Bonding and the development of attachments are not instantaneous processes but unfold over the first year of life (Dykas & Cassidy, 2013). Having multiple caregivers is the norm in most societies (Hrdy, 2009; Lancy, 2008), and grandparents often play a major role as caregivers in Australian society (Hamilton & Jenkins, 2015; Ochiltree, 2006).

While research on parenting often focuses primarily on the role of mothers or families in general, growing evidence also supports the critical and unique role of fathers/male caregivers (Moore et al., 2017). Specifically, greater father involvement has been linked to: greater levels of cognitive and social competence; increased capacity for empathy; positive self-control and self-esteem; better interactions with siblings; and better academic progress (Wilson & Prior, 2011).

Evidence supports that fathers play a more prominent role in facilitating play exploration which fosters emotional and behavioural self-regulation, whilst mothers are more likely to provide comfort in times of distress (Lamb, 2002). Moreover, research indicates that fathers play a distinct (as in different to mothers) role in children's socialisation. Specifically, fathers who model positive behaviours such as accessibility, engagement and responsibility contribute to: better psychosocial adjustment; better social competence and maturity; and more positive child/adolescent-father relationships (Wilson & Prior, 2011; Moore et al., 2017).

Conversely, poor father-child relationships and fathering behaviours can have a lasting effect on a child's social adjustment and relationships. They are associated with inferior adult social functioning, a significantly reduced likelihood of secure adjustment, and a significantly greater risk of avoidant or dependent attachment styles (Goodwin & Styron, 2012). Poor quality early father-child relationships have also been associated with an increased likelihood of mental health disorders such as depression, bipolar and anxiety disorders, and phobias in later life – regardless of socio-economic status and perceived quality of the childhood maternal relationship (Goodwin & Styron, 2012; Moore et al., 2017).

Adverse interpersonal relationships and sustained trauma

Infants are born with a range of attachment behaviours that seek proximity to and safety in supportive others. Proximity and safety seeking is a way for the child to maintain or increase its positive feelings and minimise or regulate its stress feelings and defensive states (Bowlby, 1988).

Over the last decade evidence has established a strong dose-response relationship (response that varies based on levels of exposure) between exposure to adverse early experiences such as neglect, and an increased likelihood of: cognitive and language difficulties; lower educational attainment; unemployment, poverty; homelessness; becoming victims or perpetrators of violence in later life; early mortality; heart disease; diabetes; liver disease; cancer; depression; anxiety; eating disorders; obesity; and suicide (Liu et al., 2013; Sethi et al., 2013; Fortin et al., 2014; Moore et al., 2017).

There are three key linking mechanisms through which sustained exposure to neglect and/or abuse in the early years increases the likelihood of ill (physical and mental) health and early mortality (Moore et al., 2017):

1. By disrupting the progression of critical developmental processes (namely the stress response and brain development).
2. By affecting the way children relate to and interpret the world around them.
3. Through increased engagement in adverse health risk behaviours for physiological or psychological benefit (e.g. substance abuse as a coping mechanism).

Adverse family experiences that can increase the likelihood of sustained early years trauma include (but are not limited to): exposure to family and domestic violence; and parental/caregiver substance abuse.

Exposure to family and domestic violence

Children do not need to be the recipient of physical or verbal violence to be affected by it (Moore et al., 2017). There is strong evidence linking children's exposure to family and domestic violence and the increased likelihood of adverse lifelong outcomes (Campo, 2015; Sety, 2011). In addition, one of children's fundamental rights, as recognised in the United Nations Convention on the Rights of the Child (United Nations, 1990) is the right to safety and protection, including safety from domestic violence, and the witnessing of violence in the home and/or the larger communities.

Pregnancy

Pregnancy is recognised as a period of high risk for the onset or worsening of domestic violence (Taft, Watson & Lee, 2004; WHO 2000). Women who experience domestic violence during pregnancy are likely to be hit in the abdomen (WHO, 2011) and likely to be hit more frequently (Martin et al., 2004), posing significant risk of harm to the mother and unborn child. High levels of maternal stress can result in an increase in the mother's cortisol production, which can enter the foetus' brain via the placenta or the umbilical veins (Sandman et al., 1999) adversely affecting the growing brain. Maternal anxiety during the earlier part of the prenatal period is associated with lower birth weight, shorter gestational age and smaller infant head circumference at birth, suggesting a decrease in brain growth (Lou et al., 1994).

Research also suggests a strong correlation between domestic violence during pregnancy and: poor emotional regulation and academic outcomes in school (Durand, Schrailber, Franca-Junior & Barros, 2011); behavioural problems during infancy (Flach et al., 2011); poor maternal attachment (Quinlavin & Evans, 2005); an increase in internalising problems from as early as 24 months (McFarlane et al., 2014); and aggressive behaviours at school (Durand et al., 2011).

Birth to 4 years

Abuse during pregnancy strongly predicts abuse immediately following birth (Huth-Bocks, Levendosky & Bogat, 2002). Threats to a caregiver is one of the most psychologically destructive traumas for children (Scheeringa & Zeanah, 1995; Moore et al., 2017). Infants and toddlers who hear or witness anger and/or violence can show symptoms of post-traumatic stress disorder, including eating problems, sleep disturbances, a lack of typical responses to adults, and loss of previously acquired developmental skills (Huth-Bocks et al., 2002; De Bellis & Thomas, 2003; Schore, 2001). They are also more likely to demonstrate greater child adjustment difficulties and increased externalising behaviours in later life including lower levels of social competence, emotional regulation, difficulties with peer relationships, aggressiveness, and disruptive behaviour (Levendosky et al., 2006; Perry, 2005).

Parental/caregiver substance abuse

Pregnancy

Exposure to alcohol in the uterus is the leading cause of cognitive impairment and neurodevelopmental disorders (Centers for Disease Control and Prevention, 2002; Eustace, Kang, & Coombs, 2003), and the most

common preventable cause of birth defects. The adverse effects of substance abuse can also be considerable and include premature birth, foetal distress, physical and/or mental retardation, birth defects and withdrawal symptoms upon birth (Russell, 1995). Treatment resulting in separation could also have implications for infant-maternal attachment (Love & Tsantefski, 2006).

In the longer term, the effects of in utero exposure to drugs and alcohol include (but are not limited to) increased risk of sudden infant death syndrome (SIDS), impulsivity, learning disabilities, antisocial behaviour and neurological deficits (Dore, Doris & Wright 1995; Moore et al., 2017).

Birth to 4 years

It is well established that children who are raised in families with parental substance misuse often have poor developmental outcomes (Dawe, Harnett, & Frye, 2008). However, parental substance abuse often co-exists with other risk factors (such as domestic violence, low income, and transience) and it is the sum of these various influences that determines the child's lifelong outcomes (Dawe et al., 2008; Moore et al., 2017). When a parent is intoxicated, their ability to provide adequate care and protection to an infant is significantly compromised (Dawe et al., 2008). Child death reviews conducted by the Victorian Child Death Review Committee (Victorian Child Death Review Committee, 2012) have consistently noted the high prevalence of parental substance misuse among deaths of infants known to the Victorian Child Protection Service. This can result, for example, from substance-affected parents sleeping with infants (Moore et al., 2017). Besides compromising parental care in various ways, alcohol or drug misuse can also increase the likelihood of child maltreatment by increasing the risk of violent tendencies (Moore et al., 2017; Flanzer, 1993).

Exposure to tobacco smoke

Pregnancy

Smoking during pregnancy is known to affect the normal development of the brain systems that regulate oxygen uptake and heart function, increasing the risk of stillbirth, neonatal death and SIDS (British Medical Association, 2004). Smoking during pregnancy has also been linked to the development of childhood obesity (Oken, Levitan, & Gillman, 2008) and learning disabilities (Godding et al., 2004).

Exposure to environmental tobacco smoke (ETS) or passive smoking during pregnancy is also associated with a wide range of complications such as: a high risk for preterm, low birth weight, small for gestational age infants, and SIDS (Simón et al., 2017).

Birth to 4 years

Passive smoking during infancy and childhood has been associated with slower rates of growth in lung function and increased risk of asthma, middle ear disease and respiratory disease (British Medical Association, 2004). Some studies have found that compared to children of non-smokers, the children of smokers have inferior performance at school, and greater likelihood of behavioural problems, including hyperactivity and shorter attention spans (British Medical Association, 2004).

Exposure to passive smoking may also influence breastfeeding, with non-smoking women who are exposed to ETS stopping breastfeeding sooner than those who are not exposed (British Medical Association, 2004). Nicotine distributes rapidly to and from breast milk. Mothers who smoke are less likely to start breastfeeding their babies than non-smoking mothers, and tend to breastfeed for a shorter time. Breast milk production is also lower in smokers than in non-smokers. In breastfeeding mothers who smoke, milk output is reduced by more than 250 mL/day compared with non-smoking mothers (Dempsey & Benowitz, 2001; Moore et al., 2017).

Nutrition

Pregnancy

The foetus uses nutritional input from its mother to anticipate the kind of nutritional world it will be born into, and adjusts its phenotype accordingly (Moore et al., 2014a). As such, maternal nutrition can affect the offspring's epigenetic state and have lifelong effects on: the child's mental health (Sarris et al., 2015); food/flavour preferences (Gugusheff, Ong, & Muhlhausler, 2013; Vucetic, Kimmel, Totoki, Hollenbeck, & Reyes, 2010); satiety, muscle mass and insulin resistance (Low et al., 2012; Vaiserman, 2014).

Environmental influences that promote obesity in later life are considerably shaped by maternal nutritional status at conception, during pregnancy, and during weaning (Low et al., 2012). Women who are overweight or obese before pregnancy are at greater risk of disorders such as pre-eclampsia during pregnancy, and giving birth to larger infants who are at increased risk of developing obesity in later life (World Health Organization, 2010).

Weight gain during pregnancy can also affect the immediate and future health of infants: while excessive gestational weight gain can increase birth weight and postpartum weight retention, inadequate gestational weight gain can increase the likelihood of poor foetal development (Siega-Riz et al., 2009; ACOG Committee opinion, 2013).

Paternal obesity has also been suggested to impair sex hormones, basic sperm function and molecular composition, which results in disturbed embryo development and health, and an increased offspring disease burden (Ng et al., 2010; Sermondade et al., 2013).

Birth to 4 years

The infant and toddler are entirely dependent on others to meet its nutrient needs (Robinson, 2015). Inadequate nutrition during this period can result in permanent stunting (Scientific Advisory Committee on Nutrition, 2011) in addition to increasing the potential for lifelong deficits in neurological functioning (Innis, 2014). Excessive and rapid weight gain in infancy, however, is also a concern and has been linked to obesity in later life, as well as a number of risk factors for cardiovascular disease (Brands, Demmelmair, & Koletzko, 2014; Weng et al., 2012).

The initiation and duration of breastfeeding influences the likelihood of later obesity (Young et al., 2012; Stettler, Zemel, Kumanyika, & Stallings, 2002): a longer duration of breastfeeding has been associated with a

decreased likelihood of obesity in later life (Harder, Bergmann, Kallischnigg, & Plagemann, 2005). Breast milk has also been found to decrease the likelihood of developing allergies in later life as it contains many immune factors (Prescott, 2011).

The timely introduction of appropriate complementary foods is critical in ensuring optimal growth and wellbeing (UNICEF Innocenti Research Centre, 2005). If complementary foods or drinks are introduced too early or are not given safely in the correct quantity at the optimum time, growth rates can falter dramatically and lead to growth restriction and even stunting – associated with an under-developed brain (Michaelsen, Weaver, Branca, & Robertson, 2010).

Maternal mental health (including stress, anxiety and depression)

Pregnancy

During the prenatal period, the foetus is highly sensitive to changes in the mother's nutrition, stress levels, and health status. These changes can 'reprogram' the development of organs, tissues and the genome itself, long-lasting or even permanent effects (Moore et al., 2017). One primary risk factor for health outcomes resulting from foetal programming is prenatal exposure to maternal stress (the term 'stress' is used in this report to include the experience of depression and/or anxiety and other mental health conditions) (Davis & Sandman, 2010).

There are multiple behaviours associated with stress during pregnancy that are relevant to children's outcomes: accessing prenatal care early and regularly, healthy eating (weight gain) and sleeping, and avoiding drugs, alcohol and cigarettes. Both the symptoms of depression, such as anhedonia (lack of pleasure in everyday experiences) and low energy, and the often correlated stress may contribute to pregnant women overlooking their physical health and engaging in behaviours that might provide immediate relief from distress, such as smoking, drinking or unhealthy eating (Sim, 2011).

Moreover, persistent and significant maternal stress can affect the foetal nervous system and reduce foetal growth and the length of gestation. High levels of maternal anxiety are significantly associated with an increased risk of intrauterine growth restriction (Ding et al., 2014; Grote et al., 2010) – a major risk factor for future health problems such as heart disease, hypertension and low birth weight (Moore et al., 2017; Shankaran, Das, & Bauer, 2006).

Stress during pregnancy can also negatively affect a range of health and developmental outcomes including cognitive, language, behavioural, emotional, and physical development (Sandman et al., 2012; Tegethoff et al., 2011; Greene, Olsen, Schaffner, & Meinlschmidt, 2011).

Birth to 4 years

Parenting practices that do not meet infants' or children's needs to sustain healthy development are one of the primary mechanisms through which parental depression/anxiety exerts its effects on children (Belsky & Jaffee, 2006; Sim, 2011 Goodman & Gotlib, 1999). Parental anxiety/depression has been associated with negative

parenting qualities such as rejection, harshness, intrusiveness and greater risk of child maltreatment (DuMont, Widom, & Czaja, 2007; Springer et al., 2007; Whitfield et al., 2003).

Significant and persistent parenting stress has also been associated with inferior mental health functioning in children (Roberts et al., 2013) and is an important predictor of both internalising and externalising problems in children.

Implications for action

This section examines the implications of the evidence for action and identifies three complementary strategies for improving outcomes during the early years (Moore et al., 2017): educate and empower, change the environment, and improve services and service systems.

- The *educate and empower* strategy is essentially a public health approach. Developing better ways of educating and empowering the general public about the evidence identified in this paper should be a priority. Many parents still think that children only begin to learn when they commence preschool or school, and are not aware of the important forms of learning that occur prenatally and in infancy. Since many professionals are not aware of all the evidence about the early years, training/retraining them should also be a priority.

- The change the environment strategy involves efforts to improve the conditions under which families are raising young children, as well as strategies to address the social determinants of health and wellbeing, and to reduce the social inequities that create social gradients in health and development (Carey & Crammond, 2015; Marmot, 2016; Tarazi et al., 2016). This can only be done through a coordinated policy approach which addresses the needs of children from conception, thus laying the foundation for their future health and wellbeing (The Marmot Review, 2010).

- The *improve services and service systems* strategy seeks to provide service-based interventions to promote effective parenting or to address specific problems, and to improve service coordination to ensure more comprehensive support for families. This has been the default approach adopted by governments and service providers, and will continue to play an important role in ensuring the health and wellbeing of children and families. However, relying solely on targeted health and other services has not been sufficient to make a significant difference to the complex health problems that are prevalent today, and by ignoring the holistic nature of childhood development this approach risks jeopardising children's optimal development (UNICEF, 2013). This approach needs to be complemented by the two strategies above. A reduction in health and developmental problems is more likely to result from the combined effect of a range of social, health and economic policies that are based on equity and the even distribution of resources (Willcox, 2014).

More specifically there are actions that parents/caregivers, communities, services and employers/businesses can take to support optimal health and wellbeing outcomes in children's early years.

What parents/caregivers and families can do

Starting from conception, the foetus uses cues provided by the mother's physical and mental state to prepare its bodily structures for the kind of world it 'predicts' it will be born into. As such, ensuring that both the antenatal and postnatal environments are optimal is of utmost significance.

Ways in which parents can enable this during pregnancy include:

- **eating the right quantity of nutritious foods** that are good for both mother and the foetus
- **reducing stress** by avoiding stressful situations and circumstances
- **avoiding cigarette smoke** (including second-hand smoke)
- **avoiding alcohol** and illicit drugs
- **asking for support** and staying socially connected to friends, family, services and community
- **ensuring timely prenatal (health) assessments** to ensure the foetus is growing as expected.

These actions should also continue to take place once the baby is born.

Additionally, we know that children's relationships shape the way they see the world and affect all areas of their development. Ways in which parents/families can foster positive relationships from birth to 4 years include:

- **providing comfort** so that children learn that the world is a safe place to explore
- **cuddling and smiling** lets baby know they're loved and helps their brain to develop
- **talking, singing and reading** with children builds their early and future literacy skills
- **making eye contact** helps baby learn the connection between words and feelings
- **maintaining a regular routine** helps baby feel comfortable and safe
- **having safe and loving relationships with others.** It's not just the relationship between carer and baby that shapes their development, it's also the carer's relationships with others. Watching how their carer(s) interact with others gives baby a model of how to behave with others and how others will behave in return.

What parents/caregivers need to be able to provide these experiences

Support

To be able to provide loving, responsive and consistent care to their children, parents/caregivers need lots of opportunities to be able to ask for and receive support from families, from their community and from services. Support can take place in the form of practical assistance (having someone who can offer a lift), emotional support (having someone to listen and provide emotional comfort), or providing welcome advice and information.

Parents must be provided with the opportunity to build and establish positive social support networks, as this promotes parental wellbeing, and better mental health. Importantly, positive social support reduces the likelihood of child maltreatment (Bishop & Leadbeater, 1999): the risk of child maltreatment increases when parents (particularly those who are experiencing concurrent vulnerabilities such as poverty, depression, unemployment) have limited social support (MacLeod & Nelson, 2000).

Access

Parents/caregivers need to be able to easily access services, support systems, places/facilities where they can meet other families. This includes green spaces such as parks, parent groups, playgroups, and early childhood education and care. Access can be facilitated by the availability of reliable and affordable public transportation, and safe built environments where families are able to easily walk to and from these places.

Being able to effectively access supports and appropriate services also requires that such provisions are culturally appropriate/safe, affordable and responsive to the immediate and self-identified needs of families.

Optimal conditions

The conditions under which families raise their children is central to the provision of loving and consistent caregiving. Trying to address only the superficial 'causes' of non-communicable diseases (such as bad nutrition, smoking and inactivity) without addressing the wider 'causes of the causes' (the social, cultural and economic determinants of health) will be certain to fail.

This means that families need alleviation from poverty; appropriate (affordable, secure and safe) housing in which to raise their children; and communities that are welcoming and open to families from all cultures and backgrounds.

What communities can do

Community has a major impact on the healthy development of children, particularly on the resources that are available to families to promote good development (Leventhal & Brooks-Gunn, 2000). Research shows that in disadvantaged communities, a lack of resources and opportunities can result in inferior child development outcomes that can persist from one generation to the next. However, there are also many community factors that can promote healthy child development – even in lower income communities (Goldfeld et al., 2017). These include:

- **Providing multiple places where families can meet other families**: To help ensure that parents develop social support networks with other parents, they need multiple opportunities to meet each other. These opportunities occur when there are dedicated child and family-friendly places for parents to meet, which can also serve as the place where various early childhood and family support services can be delivered. Where these places are best located depends upon what is available locally and what the parents themselves want and find acceptable. They could be in child and family centres, community centres, or attached to preschools or schools.

- **Providing easily available and diverse facilities:** Having a range of places and destinations available locally can influence the use of facilities, and help to provide a sense of community (Goldfeld et al., 2017). Designing neighbourhoods that encourage children's health and wellbeing includes enabling access to local destinations, including local infrastructure and services (Villanueva et al., 2013; Goldfeld et al., 2017). While destinations such as schools, recreation venues, and child and health care services all have inherent functional roles, they can also serve as physical places for social interaction and the development networks of support (Komro, Flay, & Biglan, 2011). These places may influence children's development by providing opportunities to learn, explore, recreate, socialise, and interact (Bejleri et

al., 2009). Close proximity to local destinations is an important component of destination accessibility (Goldfeld et al., 2017).

In communities where children's services are lacking or are not available, adverse early childhood development outcomes are more common (Goldfeld et al., 2010). However, while services may be available, a significant barrier to their use is if families do not have the ability to physically access services due to distance, reliance on public or private transport, traffic, poor walkability, weather conditions or geographical location (Goldfeld et al., 2017).

- Providing public open/green spaces: Access to quality public open spaces (e.g. parks) can support family relationships and provide children with safe green environments to play (Chiesura, 2004). This can increase their participation in different types of physical activity, improving motor skills and social development (Ward et al., 2016; Goldfeld et al., 2018). Exposure to green spaces and physical activity has also been shown to improve emotional wellbeing in children (Christian et al., 2015).

- Minimising traffic exposure: Being away from traffic within the suburb is an important factor for neighbourhood and child safety (Villanueva et al., 2016; Goldfeld et al., 2017). Parents perceive increased traffic, and poor availability and design of crossings as great risks to child safety. This affects their decision to allow their children to use parks and play in their surrounding environments (Villanueva et al., 2016; Giles-Cort et al., 2009). Evidence also indicates that there is a greater incidence of injury in children when exposed to increased traffic with limited traffic calming measures, such as sidewalks and street crossings (Rothman et al., 2014; Goldfeld et al., 2017).

- Promoting neighbourhood safety: Neighbourhoods characterised by perceived safety concerns, high crime rates, garbage/litter in the streets, and vandalism have been associated with a number of adverse child health behaviours and outcomes (Borrell, Graham, & Joseph, 2016; Singh & Ghandour, 2012).

  In Tasmania, 24 per cent of all victims of robbery were children and young people aged 0-19 years in 2016: this is consistent with the national percentage (ABS, 2016). Moreover, almost 50 per cent of all victims of sexual assault in Tasmania were children and young people aged between 0 and 19 – marginally below the national percentage of 56 per cent (ABS, 2016).

  Neighbourhood safety concerns are among the highest cited barriers to children's access to the outdoor environment (Carver, Timperio & Crawford, 2017). This means parents limit children's play opportunities because they perceived it as 'unsafe' to play outdoors; and they also have limited trust in their neighbours, reducing social capital (Goldfeld et al., 2017).

While developing high levels of social capital is complex, having local programs such as Neighbourhood Watch, or ongoing events and programs that facilitate social interaction between local residents, can increase social capital (Goldfeld et al., 2017).

- **Facilitating place-based approaches**: A place-based approach targets an entire community and aims to address issues that exist at the neighbourhood level (Centre for Community Child Health, 2011). Local decision making that produces tailored initiatives or solutions that are specific and sensitive to the local context take into account the local people, resources and environment (Goldfeld et al., 2017). Key characteristics of effective place-based initiatives include: communities participate, lead and own the intervention; effective partnerships between key community stakeholders; investing adequate time and funding; strong leadership and support from government; established processes to rigorously measure and evaluate outcomes at all stages of the initiative (Centre for Community Child Health, 2011).

- **Adopting a community-led approach**: In the UK, a Community Led Support approach is being successfully trialled with adult care services (Brown et al., 2017), and can act as a model for early childhood services. It involves local authorities working collaboratively with their communities and partners and with staff, to design a health and social care service that works for everyone.

- **Providing many opportunities for play**: Play is vital to child development as it contributes to the physical, cognitive, social, and emotional well-being of children. Play also provides the ideal opportunity for parents to engage fully with their children. When parents observe their children in play, or join them in child-driven play, they have a unique opportunity to see the world from their child's view point, as the child navigates a world perfectly created just to fit their needs. The interactions that occur through play tell children that parents are fully paying attention to them and help to build enduring relationships (Ginsburg, 2007; Tsao, 2002).

What services can do

Actions within the scope of the service system that can help to optimise the health and development of children include:

- **Providing pre- and inter-conception care:** The health and wellbeing of parents prior to conception can affect the foetus from the moment of conception (Barker, 2015). Therefore, there is a need for specific strategies relating to both preconception and inter-conception care.

  Preconception care is defined as a set of interventions that aim to identify and modify biomedical, behavioural, and social risks to a woman's health or pregnancy outcomes through prevention and management. This involves a two-pronged approach: (i) securing nutritional and physiological sufficiency – ensuring mothers have what they and the developing foetus require for optimal health,

and (ii) avoiding or minimising toxic exposures that predispose to adverse outcomes (Genuis & Genuis, 2017).

Inter-conception care is provided to women beginning with childbirth until the birth of a subsequent child. It is a subset of preconception care that addresses the continuity of risk from one pregnancy to the next (Ratcliffe et al., 2017).

- **Expanding antenatal care:** In the light of our growing knowledge about the potentially life-shaping adaptations that can take place in the womb, the nature and extent of antenatal care needs to be reviewed. Apart from taking steps to ensure that all pregnant mothers and their partners have ready access to comprehensive antenatal care, particular attention should be paid to screening for factors known to compromise the development of the foetus, especially the circumstances that create stress for the mother (e.g. partner violence, food insecurity and exposure to environmental toxins).

  In Tasmania the percentage of pregnant women attending antenatal visits before 14 weeks has risen to 88 per cent – the highest in Australia. The percentage of parents attending the eight-week Child Health Assessment has remained stable over the past five years (Commissioner for Children and Young People Tasmania, 2017).

- **Ensuring easy access to facilities and services:**
  - *Physical accessibility* is important for service provision and use, particularly for young families who need access to essential services (Goldfeld et al., 2017). Access to public transport, walkability to services and facilities, co-location of services to shopping centres, and childcare services including bus pickup and drop-off are all features of communities that foster optimal early childhood development. Services co-located with or near other facilities that are part of routine activities can support children's wellbeing (Sampson et al., 2002). For example, the presence of services within walking distance to shops and public transport can affect how families use services whilst attending to other daily errands with their children (Goldfeld et al., 2017).
  - *Cultural accessibility* is achieved when a service system is responsive and safe for Aboriginal and Torres Strait Islander peoples, and cultural values, strengths and differences are respected. The Cultural Respect Framework 2004-2009 defined cultural respect as: "Recognition, protection and continued advancement of the inherent rights, cultures and traditions of Aboriginal and Torres Strait Islander people." (Australian Health Ministers' Advisory Council's National Aboriginal and Torres Strait Islander Health Standing Committee, 2016). The Australian Health Ministers' Advisory Council's National Aboriginal and Torres Strait Islander Health Standing Committee (2016) has identified six domains and related focus areas as underpinning culturally accessible, responsive and safe service delivery.

- **Ensuring accessible and quality ECEC services**: Attending high quality ECEC continues to be positively associated with improved child learning, socioemotional, and other ECD outcomes (Barnett &

Ackerman, 2006). A recent Australian study found that there were fewer ECEC services in disadvantaged areas, and that these services provided a lower average quality of care compared with more advantaged areas (Cloney et al., 2016). Goldfeld and colleagues (2017) found that perceived availability of local ECEC was a factor that consistently pointed to why some local communities had better ECD outcomes than others. Cost, location and transport access are closely related to factors of perceived ECEC availability (Goldfeld et al., 2017).

- Adopting a family-centred practice approach: The essential assumption of a family-centred approach is that young children cannot be viewed apart from their families, nor can services be provided without a consideration of the family context (Bailey et al., 2012). Implementing family-centred practices has a positive effect in a diverse array of child and family domains, such as more efficient use of services, decreased health care costs, strengthened child and family capabilities and parenting practices, and improved health or developmental outcomes for children (Moore et al., 2016; American Academy of Pediatrics, 2012; Bailey et al., 2007). This approach is also consistent with the Family Partnership Model (Davis & Day, 2010; Day, 2013).

  Core principles of a family-centred approach include focusing on family strengths, respecting family diversity and values, encouraging family decision making and empowerment, communicating with families in an open and collaborative fashion, adopting a flexible approach to service provision, and recognising the value of informal support systems. The help-giving practices needed to implement family-centred practice and the Family Partnership Model are well understood and trainable (Braun et al., Dunst et al., 2007).

- Building a service system based on progressive universalism: Interventions targeting the most disadvantaged may look appealing, but have several disadvantages including stigmatising the targeted populations and neglecting families who experience disadvantage but don't live in targeted areas (Solar & Irwin, 2010; Newman et al., 2015). Reducing inequalities in outcomes ultimately requires a social gradient approach (Moore et al., 2016), which is what a service system based on a strong universal platform and progressive universalism is designed to do: provide a strong universal service base that progressively adds levels of support for those with additional needs.

- Facilitating integrated service delivery: An integrated service system can improve family functioning and children's wellbeing by improving access to services and enabling early identification of problems (Moore & Skinner, 2010). Integrated service delivery means that families have access to a broad range of interventions that address a broad range of risk factors, provided in a range of formats to suit the different needs and preferences of diverse groups.

- Promoting multiple use of resources: Enabling and encouraging community groups and services to make use of resources such as schools and early childhood centres.

- **Providing resources for parents:** Developing a common set of information resources regarding key parenting issues for use by all services working with families of young children.

- **Modelling parenting practices**: Using service provision opportunities to model appropriate ways of meeting children's care and behavioural needs that promote their social, emotional and cognitive development.

- **Providing parenting programs**: Providing a range of evidence-based parenting programs to promote the development of parenting knowledge and skills. These should be provided in response to parental concerns (rather than prescribed by professionals), and even engage parents as co-facilitators – as in the *Empowering Parents, Empowering Communities* (EPEC) parenting program (Day et al., 2012).

- **Adopting a co-design approach**: Co-design is about designing a service (its purpose and procedures) in collaboration with the consumers of the service. It involves working alongside families who experience vulnerabilities, in creating interventions, services and programs which will work in the context of their lives and will reflect their own values and goals. This involves letting go of professional assumptions about a group's perspectives and experiences, and actively learning from what people say and do. Expertise, professional knowledge and research is then considered in relation to group input, to add colour to the possibilities of approaching social problems with specific groups (Clarkson, 2015).

What employers/organisations can do

Employers and organisations can take action to support the pivotal role of parents/carers. This includes:

- **Ensuring family-friendly work conditions**: Businesses/employers can make a critical contribution to children's wellbeing by creating family-friendly workplaces where employees are supported to meet both their work and family commitments. The United Nations Children's Fund (UNICEF) provides the following as a best practice guideline for employers:
    - providing an adequate wage and ensure the provision of fair working hours and conditions
    - having workplace policies that prevent discrimination against pregnant women and mothers
    - providing appropriate childcare facilities for working parents as an investment in your workforce
    - offering fair and flexible working hours that takes into account family/parenting responsibilities
    - protecting employees' reproductive health, giving particular consideration to pregnant women and women of childbearing age
    - offering provisions for pregnant and breastfeeding women
    - offering appropriate parental leave

- **Adopting child-focused corporate social responsibility (CSR)**: Child-focused CSR is the responsibility of an organisation for the impacts of its decisions and activities on local communities and the environment. Businesses can make an important contribution towards improving child outcomes not

only through its own practices and policies, but also by using its influence to change attitudes, policies and practices (UNICEF, 2011).

Child-focused CSR takes into account the expectations of children and their family as stakeholders. Businesses can strengthen their existing corporate responsibility initiatives while ensuring benefits for their business when they integrate respect and support for children's rights into their strategies and operations. Some ways to achieve this include:

- contributing to the development of strong, well-educated communities that are vital to a stable, inclusive and sustainable business environment
- innovating and creating new markets by considering how products and services can better meet children's needs
- maintaining a motivated workforce of employees who feel their roles as parents and caregivers are acknowledged.

- **Considering the impact of business activities:** Employers must reflect on the impact of business decisions on their surroundings, safeguarding the environment for future generations, and making sure business operations do not contribute to adverse outcomes for families and communities.

- **Reviewing and updating practice and policies**: Businesses can support better outcomes for children by regularly reviewing and updating existing family-friendly provisions. This can include addressing the following key questions:

  - Are the family-friendly provisions documented in writing and easily accessible to all employees?
  - Are employees aware of what family-friendly entitlements exist in the workplace and how to utilise the provisions?
  - Is it acknowledged that employees have important roles and responsibilities outside the workplace?
  - Is the concept of work and family balance and its benefits positively received and understood by managers and employees? (Fair Work Ombudsman, 2018).

How collaboration can support optimal outcomes for children

There are various actions that parents/caregivers, communities, services and employers/businesses can take to support children's health and wellbeing, however, they likelihood of success is optimised if they act jointly. This can be best achieved through place-based early years partnerships.

A place-based approach seeks to engage all stakeholders in collaboration to address issues experienced within a geographic space (Bellefontaine & Wisener, 2011). Place-based approaches show promise as an alternative to traditional stand-alone sector-driven approaches for tackling complex problems.

Place-based principles

A place-based principle is based on the belief that existing approaches to addressing complex social challenges are ineffective and that a new approach is needed when addressing complexity. The current approach, where a single service addresses a specific issue, is termed "isolated impact" (Kania & Kramer, 2011) and differs greatly with place-based initiatives, where stakeholders collaborate across sectors to address multiple and concurrent complex social issues in local communities, with local resources (Kania & Kramer, 2011).

An example of a simplified program logic for a place-based initiative is demonstrated in Figure 5.

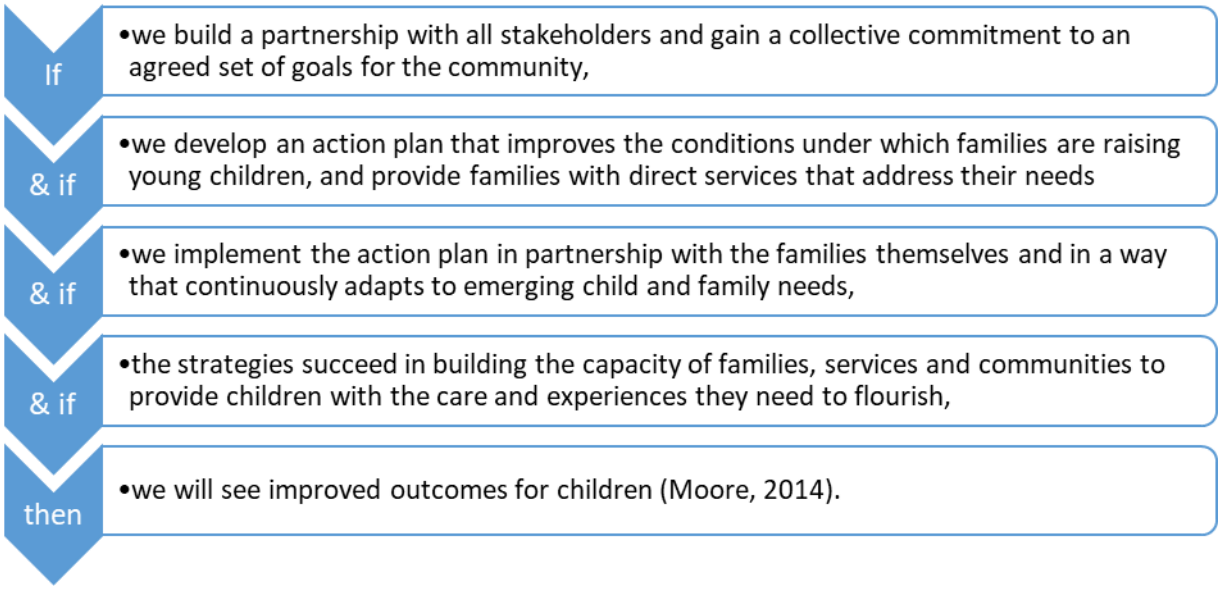

Figure 5: Simplified place-based program logic

Evident from this program logic is that building a place-based collaboration is only the first step in the partnership-building process. Strategies, an action plan and the ongoing monitoring and improvement of interventions must be determined separately.

Building successful community partnerships

The research evidence identifies the following enablers and barriers of effective place-based partnerships (Hanleybrown et al., 2012; Jolin et al., 2012; Moore et al., 2014):

Enablers

- A shared sense of urgency for change (Hanleybrown et al., 2012; Wise, 2013).
- A shared agenda and coherent long-term vision (Hanleybrown et al., 2012; Jolin et al., 2012; Statham, 2011).
- Influential champions and strong leadership (Hanleybrown et al., 2012; Jolin et al., 2012; Statham, 2011).

- Sufficient time for strong personal relationships and trust to develop between partners (Statham, 2011).
- Alignment of interventions and resources toward common goals (Hanleybrown et al., 2012; Jolin et al., 2012; Wise, 2013).
- Clear governance structure and division of responsibilities (Goldfeld et al., 2013).

Barriers

- A lack of senior management commitment.
- A climate of constant organisational change.
- Differences between agencies in priorities, systems, culture and professional beliefs.
- Difficulties with information sharing (Moore et al., 2014).

Effective place-based action planning and intervention

It is important to evaluate the efficacy of the partnership and the efficacy of the action planning and strategies used by the partnership. Some enablers of effective action planning have been identified (Stith et al., 2006; Wise, 2013), including:

- developing a strategic action framework (Wise, 2013)
- selecting appropriate programs to meet the identified needs of the community (Wise, 2013)
- delivering programs or interventions as they were designed to be delivered (Moore et al., 2014)
- taking account of the realities of the local service delivery environment (Wise, 2013)
- building on community strengths and abilities (Wise, 2013).

Effective ongoing improvement/monitoring

Given that we cannot be sure if our intervention(s) will have the desired effect, it is critical to establish cycles of continuous improvement (Green, 2006), monitoring the outcomes closely and being ready to change course if they are not effectively meeting the needs of families. This means that solutions are emergent rather than predetermined (Moore et al., 2014).

Evidence relating to enablers of effective ongoing monitoring and improvement include:

- continuous communication (Hanleybrown et al., 2012)
- shared measurement systems (Hanleybrown et al., 2012)
- developmental evaluation (Patton, 2011)
- realist evaluation (Pawson & Tilley, 1997; Pawson, 2006, 2013)
- building local competencies to allow communities to develop their own solutions (Katz, 2007; Vinson, 2009).

Key strategies for effective place-based initiatives

Strategies for effective place-based initiatives include:

- **Using multilevel approaches and interventions** that aim to simultaneously address the conditions under which families are raising young children and provide direct services and supports to meet their emerging needs. The engagement of a wide range of stakeholders in a place-based partnership provides a strong basis for delivering multilevel interventions.

- **Integrating service systems based on progressive universalism**. A strong and inclusive universal set of services has well-developed 'horizontal' linkages between the various forms of services that directly or indirectly support families of young children, and well developed 'vertical' linkages with secondary and tertiary services that enable varying levels of additional support to be provided to those with particular needs (Moore et al., 2014).

- **Improving the communication between communities and services.** By developing ways in which service providers/systems can be more attuned to the emerging concerns of parents, services can be more responsive to the emerging needs of communities.

- **Engaging service users in co-production and co-design of services**. This requires collaboration between service providers (including government staff) and consumers in the design of services (Boyle et al., 2010). This approach is based on the understanding that people's needs are better met when they are involved in an equal and reciprocal relationship with public service professionals and others (Boyle et al., 2010).

- **Building on local strengths** and seeking to make communities stronger. This means tackling social problems by engaging community members so that they can devise their own solutions (Katz, 2007).

- **Adapting interventions to local circumstances and needs** to fashion the most relevant local response to the needs of these children and families.

- **Using an evidence-informed decision-making framework** to ensure an effective blend of relationship-based and evidence-based practices (Moore, 2016; Moore et al., 2016)

- **Allowing time** for place-based initiatives to become established. It is not realistic to expect early evidence of a measurable impact on outcomes for children and their families (Statham, 2011).

Conclusion

Evidence continues to grow on the critical significance of the period from conception until 4 years of age. There is a scientific, economic and moral imperative to provide every child with the best possible opportunity to learn, grow and thrive. By optimising the health, development and wellbeing of children and families, we are also helping to ensure the wellbeing and prosperity of our communities.

By working in partnership with families, and collaborating with those who support and care for children and families, we can improve our capacity to address the needs of children and families – particularly those most vulnerable – to ensure that all children get the best possible start to life.

References

ACOG Committee opinion no. 549 (2013). Obesity in pregnancy. *Obstetrics and Gynaecology*, 121(1):213-7.

Adler, N. E. & Stewart, J. (2010). Health disparities across the lifespan: meaning, methods, and mechanisms. *Annals of the New York Academy of Sciences, 1186*: 5-23. Doi: 10.1111/j.1749-6632.2009.05337.x.

Agyemang, C., Vrijkotte, T.G., Droomers, M., van der Wal, M.F., Bonsel, G. J. & Stronks, K. (2009). The effect of neighbourhood income and deprivation on pregnancy outcomes in Amsterdam, The Netherlands. *Journal of Epidemiology and Community Health, 63* (9):755-60. Doi:10.1136/jech.2008.080408.

American Academy of Pediatrics' Committee on Hospital Care and the Institute for Patient- and Family-Centered Care (2012). Patient- and family-centered care and the pediatrician's role. *Pediatrics, 129* (2). Doi: 10.1542/peds.2011-3084

Arabena, K., Ritte, R. & Panozzo, S. (2016). *The Australian Model of the First 1000 Days.* Melbourne, Victoria: Australian Institute of Family Studies. https://www2.aifs.gov.au/cfca/knowledgecircle/discussions/children-and-young-people/australian-model-first-1000-days

Arabena, K., Howell-Muers, S., Ritte, R. & Munro-Harrison, E. (2015). *Making the World of Difference: The First 1000 Days Scientific Symposium Report*. Parkville, Victoria: Onemda VicHealth Group, The University of Melbourne. http://www.onemda.unimelb.edu.au/sites/default/files/docs/First%201000%20Days%20Scientific%20Symposium%20Report.pdf

Australian Bureau of Statistics 2016, Census of Population and Housing, ABS, Canberra.

Australian Bureau of Statistics. (2011). *Aboriginal and Torres Strait Islander Wellbeing: a focus on children and youth.* Canberra, ACT: Australian Bureau of Statistics. Retrieved from http://www.abs.gov. au/ausstats/abs@.nsf/Lookup/4725.0main+features1Apr%202011.

Australian Council of Social Service (2016). *Poverty in Australia 2016*. http://www.acoss.org.au/wp-content/uploads/2016/10/Poverty-in-Australia-2016.pdf

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

Australian Institute of Health and Welfare (2014). *Specialist homelessness services: 2013-2014*, cat. No. HOU 276. Canberra, ACT: AIHW. http://www.aihw.gov.au/WorkArea/DownloadAsset. aspx?id=60129549998

Australian Institute of Health and Welfare (2015a). *Chronic diseases and comorbidities in Australia.* Canberra, ACT: Australian Institute of Health and Welfare. Retrieved from: http://www.aihw.gov.au/chronic-diseases/comorbidity/

Australian Research Alliance for Children and Youth (2014). *The Nest Action Agenda (2nd Edition).* Canberra, ACT: Australian Research Alliance for Children and Youth http://www.aracy.org.au/documents/item/182

Bailey, D. B., Raspa, M. & Fox, L. C. (2012). What is the future of family outcomes and family-centered services? *Topics in Early Childhood Special Education, 31* (4), 216-223.

Bals, M., Turi, A. L., Skre, I. & Kvernmo, S. (2011). The relationship between internalizing and externalizing symptoms and cultural resilience factors in Indigenous Sami youth from Arctic Norway. *International Journal of Circumpolar Health, 70* (1), 37–45

Barker, D. J. P. (2012). Developmental origins of chronic disease. *Public Health, 126* (3), 185-189. DOI: http://dx.doi.org/10.1016/j. puhe.2011.11.014

Barker, M. (2015). Developmental origins, behaviour change and the new public health. *Journal of Developmental Origins of Health and Disease, 6* (5), 428-433. DOI: http://dx.doi.org/10.1017/ S2040174415001312

Barnes, J., Katz, I. B., Korbin, J. E. & O'Brien, M. (2006). *Children and Families in Communities: Theory, Research, Policy and Practice.* Chichester, East Sussex: John Wiley and Sons

Barnett, W. S. & Ackerman, D. J. (2006). Costs, benefits, and long-term effects of early care and education programs: Recommendations and cautions for community developers. *Community Development*. 37 (2): 86-100.

Barouki, R., Gluckman, P. D., Grandjean, P., Hanson, M., & Heindel, J. J. (2012). Developmental origins of non-communicable disease: Implications for research and public health. *Environmental Health*, 11, 42. Doi:10.1186/1476-069X-11-42

Bateson, P., & Gluckman, P. D. (2010). Plasticity and robustness in development and evolution. *International Journal of Epidemiology, 41* (1), 219-223. Doi:doi: 10.1093/ije/dyr240

Bejleri, I., Steiner R.L., Provost, R. E., Fischman, A. & Arafat A.A. (2009). Understanding and Mapping Elements of Urban Form That Affect Children's Ability to Walk and Bicycle to School. *Transportation Research Record: Journal of the Transportation Research Board, 2137* (1):148-58.

Bellefontaine, T. & Wisener, R. (2011). *The Evaluation of Place-Based Approaches: Questions for Further Research.* Ottawa, Canada: Policy Horizons Canada. www.horizons.gc.ca/sites/ default/files/Publication-alt-format/2011_0074_ evaluationpb_e.pdf

Belsky, J. & Jaffee, S.R. (2006). The multiple determinants of parenting. In D. Cicchetti, editor; and D.J. Cohen, editor. (Eds.), *Developmental Psychopathology: Risk, Disorder, and Adaptation* (pp. 38–85). New York: Wiley.

Berto, R. (2014). The Role of Nature in Coping with PsychoPhysiological Stress: A Literature Review on Restorativeness. *Behavioral Sciences, 4* (4): 394–409.

Benoit, D. (2004). Infant-parent attachment: Definition, types, antecedents, measurement and outcome. *Paediatr Child Health. 9*(8): 541–545.

Bishop, S. J. & Leadbeater, B. J. (1999). Maternal social support patterns and child maltreatment: comparison of maltreating and nonmaltreating mothers. *American Journal of Orthopsychiatry, 69* (2):172-81.

Blackburn, E. H. & Epel, E. S. (2012). Too toxic to ignore. *Nature, 490* (7419), 169-171. Doi: 10.1038/490169a

Blackburn, E. H. & Epel, E. (2017). *The Telomere Effect: A Revolutionary Approach to Living Younger, Healthier, Longer.* London, UK: Orion Spring.

Blackburn, E. H., Epel, E. S. & Lin, J. (2015). Human telomere biology: A contributory and interactive factor in aging, disease risks, and protection. *Science, 350* (6265), 1193-1198. DOI: 10.1126/ science.aab3389: 1193-1198

Blair, C. & Raver, C. C. (2012). Child development in the context of adversity: Experiential canalization of brain and behaviour. *American Psychologist, 67* (4), 309-318. Doi: 10.1037/a0027493

Blau, M. & Fingerman, K. (2009). *Consequential Strangers: The Power of People Who Don't Seem to Matter … But Really Do.* New York: W.W. Norton.

Bloom, K., Bednarzyk, M., Devitt, D., Renault, R., Teaman, V., & Van Loock, D.M. (2005). Barriers to Prenatal Care for Homeless Pregnant Women. *Journal of Obstetric, Gynecologic & Neonatal Nursing, 33*(4) 428-35.

Borrell, L. N, Graham, L., Joseph, S. P. (2016). Associations of neighborhood safety and neighborhood support with overweight and obesity in US Children and Adolescents. *Ethnicity & Disease, 26* (4): 469.

Boulton, J. (Ed.) (2016). *Aboriginal Children, History and Health: Beyond Social Determinants*. Oxford and New York: Routledge.

Bowlby, J. (1988). *A secure base: Clinical applications of attachment theory*. London: Routledge.

Boyle, D., Coote, A., Sherwood, C. & Slay, J. (2010). *Right Here, Right Now: Taking co-production into the mainstream*. London, UK: nef foundation.B.3cdn.net/nefoundation/8678a9d67320a294b4_38m6ivak1.pdf

Bradley, R. H. & Corwyn, R. F. (2002) Socioeconomic Status and Child Development. *Annual Review of Psychology, 53,* 371-399. http://dx.doi.org/10.1146/annurev.psych.53.100901.135233

Brands, B., Demmelmair, H. & Koletzko, B. (2014). How growth due to infant nutrition influences obesity and later disease risk. *Acta Paediatrica, 103* (6):578-85.

Braun, D., Davis, H. & Mansfield, P. (2006). *How Helping Works: towards a shared model of process.* London, UK: Parentline Plus. http://www.parentlineplus.org.uk/index.php?id=81&backPID=80&policyreports=95

Brinkman, S. A., Gialamas, A., Rahman, A., Mittinty, M.N., Gregory, T. A., Silburn, S., Goldfeld, S., Zubrick, S., Carr, V., Janus, M., Hertzman, C. & Lynch, J.W. (2012). Jurisdictional, socioeconomic and gender inequalities in child health and development: analysis of a national census of 5-year-olds in Australia. *BMJ Open, 2* (5), e001075. Doi:10.1136/bmjopen-2012-001075

Brinkman, S., Gregory, T., Harris, J., Hart, B., Blackmore, S. & Janus, M. (2013). Associations between the Early Development Instrument at age 5, and reading and numeracy skills at ages 8, 10 and 12: a prospective linked data study. *Child Indicators Research, 6* (4), 695-708. DOI: 10.1007/s12187-013-9189-3

British Medical Association (2004). *Smoking and reproductive life: the impact of smoking on sexual, reproductive and child health.* London, Edinburgh.

Brown, H., Carrier, J., Hayden, C. & Jennings, Y. (2017). *What works in Community Led Support? Findings and lessons from local approaches and solutions for transforming adult social care (and health) services in England, Wales and Scotland.* Bath, UK: National Development for Inclusion. https://www.ndti.org.uk/uploads/files/What_Works_in_Community_Led_Support_First_Evaluation_Report_Dec_17.pdf

Campo, M. (2015). *Children's exposure to domestic and family violence: key issues and responses.* Child Family Community Australia (CFCA) Paper no. 36. Melbourne, Victoria: Australian Institute of Family Studies. https://aifs.gov.au/cfca/publications/childrens-exposure-domestic-and-family-violence

Carey, G. & Crammond, B. (2015). Systems change for the social determinants of health. *BMC Public Health, 15*: 662. Doi:10.1186/s12889-015-1979-8. http://www.biomedcentral.com/1471-2458/15/662

Carey, N. (2011). *The Epigenetics Revolution: How Modern Biology is Rewriting Our Understanding of Genetics, Disease and Inheritance*. London, UK: Icon Books

Carrion, B. V., Earnshaw, V. A., Kershaw, T., Lewis, J. B., Stasko, E. C., Tobin, J. N. & Ickovics, J. R. (2015). Housing Instability and Birth Weight among Young Urban Mothers. *Journal of Urban Health, 92* (1): 1–9.

Carver, A., Timperio, A., Crawford, D. (2008). Playing it safe: The influence of neighbourhood safety on children's physical activity—A review. *Health & Place, 14* (2):217-27.

Center on the Developing Child at Harvard University (2016). *Applying the Science of Child Development in Child Welfare Systems.* Cambridge, Massachusetts: Centre on the Developing Child. http://developingchild.harvard.edu/resources/child-welfare-systems/

Center on the Developing Child at Harvard University (2010). *The Foundations of Lifelong Health Are Built in Early Childhood*. Cambridge, Massachusetts: Centre on the Developing Child, Harvard University. http://developingchild.harvard.edu/index.php/resources/reports_and_working_papers/foundations-of-lifelonghealth/

Centers for Disease Control and Prevention. (2002). Alcohol use among women of childbearing age—US, 1991 to 1999. *The Journal of the American Medical Association, 287* (16), 2069-2071.

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

Champagne, F. A., Francis, D. D., Mar, A. & Meaney, M. J. (2003). Naturally-occurring variations in maternal care in the rat as a mediating influence for the effects of environment on the development of individual differences in stress reactivity. *Physiology & Behavior, 79*, 359–371.

Chakraborty, J. & Armstrong, M.P. (2001). Assessing the impact of airborne toxic releases on populations with special needs. *Professional Geographer, 53* (1):119–131.

Chiesura, A. (2004). The role of urban parks for the sustainable city. *Landscape and Urban Planning, 68:* 129-38.

Christakis, N. A. & Fowler, J. H. (2009). *Connected: The Surprising Power of Our Social Networks and How They Shape Our Lives.* New York: Little, Brown & Co.

Christian, H. E, Klinker, C. D, Villanueva, K., Knuiman M. W., Foster, S. A., Zubrick, S. R., et al. (2015). The Effect of the Social and Physical Environment on Children's Independent Mobility to Neighborhood Destinations. *Journal of Physical Activity and Health, 12* (6 Suppl 1):S84-93

Clarkson, M. (2015). *Walk Alongside: Co-designing Social Innovation with People Experiencing Vulnerabilities*. Melbourne, Victoria: Victorian Council of Social Services.

Cloney, D., Cleveland, G., Hattie, J. & Tayler, C. (2016). Variations in the availability and quality of early childhood education and care by socioeconomic status of neighbourhoods. Early *Education and Development, 27* (3), 384-401. Doi: 10.1080/10409289.2015.1076674

Coe, C. L. & Lubach, G. R. (2008). Fetal programming: Prenatal origins of health and illness. *Current Directions in Psychological Science, 17* (1), 36-41.

Coley, R. L., Sullivan, W. C., & Kuo, F. E. (1997). Where does community grow? The social context created by nature in urban public housing. *Environment and Behavior, 29* (4):468–494.

Colquhoun, S. & Dockery, A.M. (2012). *The link between Indigenous culture and wellbeing: Qualitative evidence for Australian Aboriginal peoples*. Perth, Western Australia: Centre for Labour Market Research and School of Economics and Finance, Curtin University.

Commissioner for Children and Young People Tasmania. (2017). *Health and Wellbeing of Tasmania's Children, Young People and their Families Report*. Retrieved from: http://www.childcomm.tas.gov.au/wp-content/uploads/2017/03/Health-and-Wellbeing-of-Tasmanias-Children-Young-People-and-their-Families-Report.pdf

Commonwealth of Australia. (2016). *Australian Early Development Census National Report 2015*. Canberra, ACT. https://www.aedc.gov.au/resources/2015-aedc-results

Cooper, M. (2001). *Housing affordability: a children's issue.* CPRN discussion paper. Ottawa: Canadian Policy Research Networks.

Council of Australian Governments. (2009). *Protecting children is everyone's business: National Framework for Protecting Australia's Children 2009-2020*. Canberra: COAG.

Davis, E. P. & Sandman, C. A. (2010). The timing of prenatal exposure to maternal cortisol and psychosocial stress is associated with human infant cognitive development. *Child Development,* 81 (1), 131-148. doi:10.1111/j.1467-8624.2009.01385.x

Davies, J. A. (2014). *Life Unfolding: How the human body creates itself.* Oxford, UK: Oxford University Press.

Davis, H. & Day, C. (2010). *Working In Partnership: The Family Partnership Model.* London, UK: Pearson.

Dawe, S., Harnett, P, & Frye, S. (2008*). Improving outcomes for children living in families with parental substance misuse: What do we know and what should we do.* NCPC Issues No. 29. Melbourne, Victoria: Child Family Community Australia, Australian Institute of Family Studies.

Dawson, G. & Ashman, D.B. (2000). *On the origins of a vulnerability to depression: The influence of the early social environment on the development of psychobiological systems related to risk of effective disorder.* In C.A. Nelson (Ed.), The effects of early adversity on neurobehavioral development. Minnesota Symposia on Child Psychology, Vol. 31 (pp. 245-279). Mahwah, N. J.: Erlbaum.

Day, C. (2013). Family Partnership Model: Connecting and working in partnership with families. *Australian Journal of Child and Family Health Nursing, 10* (1), 4-10.

Day, C., Michelson, D., Thomson, S., Penney, C. & Draper, L. (2012). Empowering Parents, Empowering Communities: A pilot evaluation of a peer-led parenting programme. *Child and Adolescent Mental Health, 17* (1), 52–57. Doi: 10.1111/j.1475-3588.2011.00619.x

De Bellis, M. D. & Thomas, L. A. (2003). Biologic findings of posttraumatic stress disorder and child maltreatment. *Current Psychiatry Reports, 5* (2):108-17.

Dempsey, D. A., & Benowitz, N. L. (2001). Risks and benefits of nicotine to aid smoking cessation in pregnancy. *Drug Safety, 24* (4):277–322.

Department of Education and Early Childhood Development. (2011). *Refugee Status Report A report on how refugee children and young people in Victoria are faring*. Retrieved from https://www.eduweb.vic.gov.au/edulibrary/public/govrel/Policy/children/refugee-status-report.pdf

Department of Education and Training. (2016). *The State of Victoria's Children Report.* Retrieved from http://www.education.vic.gov.au/Documents/about/research/state_of_victorias_children_2015.pdf.

Department of Health and Human Services, Housing Tasmania (2015). *Tasmania's Affordable Housing. Strategy 2015-2025.*

Derezinski, D. D., Lacy, M. G., & Stretesky, P. B. (2003). Chemical accidents in the United States, 1990–1996. *Social Science Quarterly. 84*:122–143

Dibaba, Y., Fantahun, M. & Hindin, M. J. (2013). The association of unwanted pregnancy and social support with depressive symptoms in pregnancy: Evidence from rural Southwestern Ethiopia. *BMC Pregnancy Childbirth, 13*.

Ding, X. X., Wu, Y. L., Xu, S. J., Zhu, R. P., Jia, X. M., Zhang, S. F., Huang, K., Zhu, P., Hao, J.H. & Tao, F. B. (2014). Maternal anxiety during pregnancy and adverse birth outcomes: a systematic review and meta-analysis of prospective cohort studies. *Journal of Affective Disorders,* 159, 103–110.

Dockery, A. M. (2009). *Cultural dimensions of Indigenous participation in education and training, NCVER Monograph Series 02/2009*. Adelaide, South Australia: National Centre for Vocational Education Research.

Dockery, A. M. (2010). *Culture and wellbeing: the case of indigenous Australians. Social Indicators Research: an international and interdisciplinary journal for quality-of-life measurement*. 99 (2), 315-332.

Dore, M., Doris, J. M. & Wright, P. (1995). Identifying substance abuse in maltreating families: a child welfare challenge. *Child Abuse and Neglect,19* (5): 531 – 543

DuMont, K. A., Widom, C. S. & Czaja, S. J. (2007). Predictors of resilience in abused and neglected children grown-up: the role of individual and neighborhood characteristics. *Child Abuse & Neglect, 31*, 255-274.

Duncan, E. J., Gluckman, P. D., & Dearden, P. K. (2014). Epigenetics, plasticity and evolution: How do we link epigenetic change to phenotype? *Journal of Experimental Biology, 322*(4), 208-220.

Dunkel Schetter, C., & Lobel, M. (2011). Pregnancy and birth: a multilevel analysis of stress and birth weight. In: Revenson T, Baum A, Singer J, editors. *Handbook of health psychology*. Lawrence Erlbaum; Mahwah, N.J.: 2011. Pp. 427–453.

Dunst, C. J., Trivette, C. M. & Hamby, D. W. (2007). Meta-analysis of family-centered helpgiving practices research. *Mental Retardation and Developmental Disabilities Research Reviews, 13*(4), 370-378. Doi:10.1002/mrdd.20176

Durand, J. G., Schrailber, l. B., Franca-Junior, I. & Barros, C. (2011). Impact of exposure to intimate partner violence on children's behavior. *Rev. Saude Publica, 45*(2), 1-8.

Dykas, M. J. & Cassidy, J. (2013). The first bonding experience: The basics of infant-caregiver attachment, Ch. 1 in C. Hazan, C. and M.I. Campa (Eds*). Human Bonding: The Science of Affectional Ties.* New York: The Guilford Press.

Elsenbruch, S., Benson, S., Rücke, M., Rose, M., Dudenhausen, J., Pincus-Knackstedt, M. K., Klapp, B. F. & Arck, P. C. (2007). Social support during pregnancy: effects on maternal depressive symptoms, smoking and pregnancy outcome. *Human Reproduction, 22*(3): 869-77.

Esperat, C., Du, F. Yan, Z. & Owen, D. (2007). Health behaviors of low-income pregnant minority women. *Western Journal of Nursing Research, 29*: 284–300.

Eustace, L. W., Kang, D. H., & Coombs, D. (2003). Fetal alcohol syndrome: A growing concern for health care professionals. *Journal of Obstetric, Gyencologic and Neonatal Nursing, 32*(2), 215-221.

Evans, G. W. (2004) The environment of childhood poverty. *Am Psychol. 59*(2):77–92

Evans, G. W. & Schamberg, M. A. (2009). Childhood poverty, chronic stress, and adult working memory. *Proceedings of the National Academy of Sciences, 106* (16), 6545-6549. Doi:10.1073/ pnas.0811910106

Fair work ombudsman (2018). *Australian Government, templates and guidelines*: https://www.fairwork.gov.au/how-we-will-help/templates-and-guides/best-practice-guides/work-and-family

Feinstein, L. (2003). Inequality in the early cognitive development of British children in the 1970 cohort. *Economica, 70* (Issue 297), 73-97.

Flach, C., Leese, M., Heron, J., Evans, J., Feder, G., Sharp, D. & Howard, L.M. (2011). Antenatal domestic violence, maternal mental health and subsequent child behaviour: a cohort study. British *Journal of Obstetrics and Gynaecology, 118*.(11): 1383-91.

Flanzer, J. P. (1993) Alcohol and other drugs are key causal agents of violence, in R. J. Gelles and D. R. Loseke (eds), *Current Controversies on Family Violence*, Sage Publications, Newbury Park, California.

Fleming, J. & Ledogar, R. J. (2008). Resilience and indigenous spirituality: A literature review. Pimatisiwin: *A Journal of Aboriginal and Indigenous Community Health, 6*(2), 47-64.

Fox, S. E., Levitt, P. & Nelson, C. A. (2010). How the timing and quality of early experiences influence the development of brain architecture. *Child Development, 81*(1), 28-40.

Fortin, M., Haggerty, J., Almirall, J., Bouhali, T., Sasseville, M. & Lemieux, M. (2014). Lifestyle factors and multimorbidity: a cross sectional study. *BMC Public Health*, *14*:686.

Francis, R. C. (2011). *Epigenetics: The Ultimate Mystery of Inheritance.* New York W.W. Norton.

Gershoff, E. T., Aber, J. L., Raver, C. C. & Lennon, M. C. (2007). Income is not enough: Incorporating material hardship into models of income associations with parenting and child development. *Child Development. 78*:70–95. Doi: 10.1111/j.1467-8624.2007.00986.x

Genuis, R. A. & Genuis, S. J. (2017). Preconception care: the next frontier for improving maternal-child health care. *Public Health, 149*, 57– 9. DOI: http://dx.doi.org/10.1016/j.puhe.2017.03.012

Giles-Corti, B., Kelty, S., Zubrick, S. & Villanueva, K. (2009). Encouraging walking for transport and physical activity in children and adolescents: how important is the built environment? *Sports Medicine, 39* (12): 995-1009

Ginsburg, K. (2007). The Importance of Play in Promoting Healthy Child Development and Maintaining Strong Parent-Child Bonds. *Paediatrics. 119*(182) 2006-2697.

Gluckman, P. D. & Hanson, M. A. (2004). Maternal constraint of fetal growth and its consequences. *Seminars in Fetal and Neonatal Medicine, 9* (5): 419–25. DOI: 10.1016/j.siny.2004.03.001

Gluckman, P. D., Hanson, M. A., Bateson, P., Beedle, A. S., Law, C. M., Bhutta, Z. A., Anokhin, K. V., Bougnères, P., Chandak, G. R., Dasgupta, P., Smith, G. D., Ellison, P. A., Forrester, T. E., Gilbert, S. F., Jablonka, E., Kaplan, H., Prentice, A. M., Simpson, S. J., Uauy, R. & West-Eberhard, M. J. (2009). Towards a new developmental synthesis: adaptive developmental plasticity and human disease. *The Lancet, 373* (9675), 1654–1657. DOI: 10.1016/S0140-6736(09)60234-8

Godding, V., Bonnier, C., Fiasse, L., Michel, M., Longueville, E., Lebecque, P., Robert A. & Galanti, L. (2004). Does in utero exposure to heavy maternal smoking induce nicotine withdrawal symptoms in neonates? *Pediatric Research, 55* (4), 645-651.

Godfrey, K. M., Gluckman, P. D. & Hanson, M. A. (2010). Developmental origins of metabolic disease: life course and intergenerational perspectives. *Trends in Endocrinology and Metabolism, 21* (4), 199–205. DOI: 10.1016/j.tem.2009.12.008

Goldfeld, S., Henderson, K., & Leuenberger, M. (2013). *Blue Sky Research Project – Shifting Children's Developmental Trajectories Final Report – Phase One*. Melbourne, Victoria: Department of Education and Early Childhood Development.

Goldfeld, S., Mathers, M., Mathews, T., Katz, I., Kershaw, P., Brinkman, S., et al. (2010). *Understanding the community level factors that influence children's developmental outcomes: A literature review undertaken for the Kids in Communities Study (KICS) collaboration.* 2010.

Goldfeld, S., O'Connor, M., Mithen, J., Sayers, M., & Brinkman, S. (2013). Early development of emerging and English-proficient bilingual children at school entry in an Australian population cohort. *International journal of Behavioral Development, 38* (1).

Goldfeld, S., O'Connor, E., O'Connor, M., Sayers, M., Moore, T., Kvalsvig, A. & Brinkman, S. (2016). The role of preschool in promoting children's healthy development: Evidence from an Australian population cohort. *Early Childhood Research Quarterly. 35*: 40-48

Goldfeld, S., Villanueva, K., Lee, J. L., Robinson, R., Moriarty, A., Peel, D., Tanton, R., Giles-Corti, B., Woolcock, G., Brinkman, S. & Katz, I. (2017). *Foundational Community Factors (FCFs) for Early Childhood Development: A report on the Kids in Communities Study*.

Goldfeld, S. & West, S. (2014). *Inequalities in early childhood outcomes: What lies beneath*. Insight Issue 9. Melbourne, Victoria: Victorian Council of Social Services (VCOSS). http://apo.org.au/ resource/inequalities-early-childhood-outcomes-what-lies-beneath

Goldhagen, S. W. (2017). *Welcome to Your World: How the Built Environment Shapes Our Lives*. New York: HarperCollins.

Goldstein, L. H., Diener, M. L. & Mangelsdorf, S.C. (1996). Maternal characteristics and social support across the transition to mother hood: Associations with maternal behavior. *Journal of Family Psychology*, *10*, 60–71.

Golombok, S. (2015). *Modern families: parents and children in new family forms*. Cambridge, UK: Cambridge University Press.

Goodman, S. H. & Gotlib, I. H. (1999). Risk for psychopathology in the children of depressed mothers: A developmental model for understanding mechanisms of transmission. *Psychological Review*, *106*, 458–490.

Goodwin, R. D., & Styron, T. H. (2012). Perceived quality of early paternal relationships and mental health in adulthood. *Journal of Nervous and Mental Disease, 200* (9), 791–795.

Gracey, M. &King, M. (2009). Indigenous health part 1: determinants and disease patterns. Lancet. 374(9683):65–75.

Green, L.W. (2006). Public health asks of systems science: to advance our evidence-based practice, can you help us get more practice-based evidence? *American Journal of Public Health, 96* (3), 406–409. Doi: 10.2105/ AJPH.2005.066035

Green, B. L., Furrer, C. & McAllister, C. (2007). How do relationships support parenting? Effects of attachment style and social support on parenting behavior in an at-risk population. *American Journal of Community Psychology, 40* (1-2): 96-108.

Grint, K. (2010). The cuckoo clock syndrome: addicted to command, allergic to leadership. *European Management Journal, 28* (4), 306–313. http://dx.doi.org/10.1016/j.emj.2010.05.002

Grote, N. K., Bridge, J. A., Gavin, A. R., Melville, J. L., Iyengar, S. & Katon, W. J. (2010). A meta-analysis of depression during pregnancy and the risk of preterm birth, low birth weight, and intrauterine growth restriction. *Archives of General Psychiatry, 67*, 1012–1024

Gugusheff, J. R., Ong, Z. Y. & Muhlhausler, B. S. (2013). A maternal "junk-food" diet reduces sensitivity to the opioid antagonist naloxone in offspring postweaning. *The FASEB Journal, 27* (2), 1275-1284.

Hamilton, M., & Jenkins, B. (2015). *Grandparent childcare and labour market participation in Australia*. SPRC Report 14/2015. Melbourne, Victoria: National Seniors Australia.

http://www.nationalseniors.com.au/system/files/09151356PAC_GrandparentsChildcareLabourForceParticipation_Report_FINAL_Web_0.pdf

Hanleybrown, F., Kania, J. & Kramer, M. (2012). Channeling change: Making collective impact work. *Stanford Social Innovation Review*, Blog, 26th January 2012, 1-8. www.ssireview.org/blog/entry/channeling_change_making_collective_impact_work

Harder, T., Bergmann, R., Kallischnigg, G., & Plagemann, A. (2005). Duration of breastfeeding and risk of overweight: a meta-analysis. *American Journal of Epidemiology, 162* (5), 397-403.

Harkness, J. M. & Newman, S. J. (2005). Housing affordability and children's wellbeing: evidence from the national survey of America's families. *Housing Policy Debate, 16*(2):223–55.

Harris, J. & Wells, M. (2016). *State of Australia's Mothers. Save the Children*. http://apo.org.au/system/files/63692/apo-nid63692-90046.pdf

Hawkley, L. C. & Cacioppo, J. T. (2013). Social connectedness and health. Ch. 12 in C. Hazan and M.I. Campa (Eds). *Human Bonding: The Science of Affectional Ties.* New York: The Guilford Press.

Hayes, A., Weston, R., Qu, L. & Gray, M. (2010). *Families then and now: 1980-2010. AIFS Facts Sheet.* Melbourne, Victoria: Australian Institute of Family Studies. http://www.aifs.gov.au/institute/pubs/factsheet/fs2010conf/fs2010conf.html

Hertzman, C. (2010). Framework for the social determinants of early child development. In R.E. Tremblay, M. Boivin & R.DeV. Peters (Eds.), *Encyclopedia on Early Childhood Development.* Montreal, Quebec: Centre of Excellence for Early Childhood Development. http://www.child-encyclopedia.com/Pages/PDF/HertzmanANGxp.pdf

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, c468. Published 10 February 2010, doi:10.1136/bmj.c468

Hicks-Coolick, A., Burnside-Eaton, P., & Ardith, P. (2003). Homeless children: needs and services. *Child and Youth Care Forum 32*(4):197–210.

Hochberg, Z., Feil, R., Constancia, M., Fraga, M., Junien, C., Carel, J. C., Boileau, P., Le Bouc, Y., Deal, C. L., Lillycrop, K., Scharfmann, R., Sheppard, A., Skinner, M., Szyf, M., Waterland, R. A., Waxman, D. J., Whitelaw, E., Ong, K. & Albertsson-Wikland, K. (2011). Child health, developmental plasticity, and epigenetic programming. *Endocrine Reviews, 32* (2), 159–224. Doi:10.1210/er.2009-0039

Holland, C. (2015). *Close the Gap Progress and Priorities Report 2015*. The Close the Gap Campaign Steering Committee.

Horn, M. & Jordan, L. (2007). *Putting children first: Improving responses to family homelessness.* Melbourne: Melbourne City Mission.

Hrdy, S. B. (2009). Allomothers across species, across cultures, and through time. Prologue in G. Bentley and R. Mace (Eds.) (2009). *Substitute Parents: Biological and Social Perspectives on Alloparenting in Human Societies.* New York: Berghahn Books.

Humphrey, M. D., Bonello, M. R., Chughtai A, Macaldowie, A., Harris, K. & Chambers, G. M. (2015). *Maternal deaths in Australia 2008–2012*.

Maternal deaths series no. 5. Cat. No. PER 70. Canberra: AIHW.

Huth-Bocks, A., Levendosky, A. & Bogat, A. (2002). The Effects of Domestic Violence *During Pregnancy on Maternal and Infant Health. Violence and Victims, 17*(2):169-85.

Innis S.M. (2014). Impact of maternal diet on human milk composition and neurological development of infants. *The American Journal of Clinical Nutrition, 99*(3):734S-41S.

Ismail, F. Y., Fatemi, A. & Johnston, M. V. (2017). Cerebral plasticity: windows of opportunity in the developing brain. *European Journal of Paediatric Neurology, 21* (1), 23-48. http://dx.doi. Org/10.1016/j.ejpn.2016.07.007

Jolin, M., Schmitz, P. & Seldon, W. (2012). *Needle Moving Community Collaboratives: A Promising Approach to Addressing America's Biggest Challenges*. Boston, Massachusetts: The Bridgespan Group. www.bridgespan. Org/getattachment/efdc40ca-aa41-4fb5-8960-34eb504eaf9a/Needle-Moving-Community-Collaborative –s-A-Promisin.aspx

Kang, J. (2012). Pathways from social support to service use among caregivers at risk of child maltreatment. *Children and Youth Services Review, 34* (5): 933-939.

Kania, J. & Kramer, M. (2011). Collective impact. *Stanford Innovation Review*, Winter, 36-41. www.ssireview.org/articles/entry/collective_impact /?zbrandid=2039&zidType=CH&zid=1634595&zsub scriberId=500518267&zbdom =aracy.informz.net

Karim, K., Tischler, V., Gregory, P. & Vostanis, P. (2006). Homeless children and parents: short-term mental health outcomes. *The International Journal of Social Psychiatry, 52*(5):447

Katz, I. (2007). Community interventions for vulnerable children and families: Participation and power. *Communities, Children and Families Australia, 3* (1), 19-32.

Kawachi, I. & Berkman, L.F. (2001). Social ties and mental health. *Journal of Urban Health, 78*(3): 458–467

Keating, D. P. (2016). Transformative role of epigenetics in child development research: Commentary on the Special Section. *Child Development, 87* (1), 135–142. Doi: 10.1111/cdev.12488

Kellert, S. R. (2002). Experiencing nature: Affective, cognitive, and evaluative development. In: Kahn P, Kellert S, editors. *Children and nature: Psychological, sociocultural, and evolutionary investigations.* Cambridge: MIT Press. Pp. 117–152.

Komro, K., Flay, B. & Biglan, A. (2011). Creating Nurturing Environments: A Science-Based Framework for Promoting Child Health and Development Within High-Poverty Neighborhoods. *Clinical Child and Family Psychology Review, 14* (2):111-34.

KPMG. (2017). *Change to school starting age*. Retrieved from: https://documentcentre.education.tas.gov.au/Documents/The-Impact-on-the-ECEC-Sector-of-Change-to-School-Starting-Age-KPMG-Report.pdf

Kundakovic, M., & Champagne, F. A. (2015). Early-life experience, epigenetics, and the developing brain. *Neuropsychopharmacology, 40* (1), 141–153. Doi:10.1038/npp.2014.140

Kuo, F. E., Bacaicoa, M., & Sullivan, W. C. (1998). Transforming inner-city landscapes: Trees, sense of safety, and preference. *Environment and Behavior*, *30*(1), 28-59. DOI: 10.1177/0013916598301002

Kruk, K. E. (2013), Parental income and the dynamics of health inequality in early childhood—evidence from the UK. *Health Economics, 22* (10), 1199–1214. DOI: 10.1002/hec.2876

Lamb, M. E. (2002). Infant-father attachments and their impact on child development. In C. S. Tamis-LeMonda & N. Cabrera (Eds.), *Handbook of father involvement: Multidisciplinary perspectives* (pp. 93-117). Mahwah, NJ: Erlbaum.

Lancy, D. F. (2008). *The Anthropology of Childhood: Cherubs, Chattel, Changelings.* New York: Cambridge University Press.

Lane, M., Robker, R.L. & Robertson, S.A. (2014). Parenting from before conception. *Science, 345* (6198): 756-760. DOI: 10.1126/ science.1254400

Leadsom, A., Field, F., Burstow, P. & Lucas, C. (2013). *The 1001 Critical Days: The Importance of the Conception to Age Two Period*. A Cross-Party Manifesto prepared by four Members of the UK Parliament. http://www.andrealeadsom.com/downloads/1001cdmanifesto.pdf

Lester, J. P, Allen, D. W, & Hill, K. M. (2001). *Environmental Injustice in the United States: Myths and Realities.* Boulder, CO: Westview Press.

Lester, B. M., Conradt, E. & Marsit, C. (2016). Introduction to the Special Section on Epigenetics. *Child Development, 87* (1), 29–37. Doi: 10.1111/cdev.12489

Levendosky, A. A., Leahy, K. L., Bogat, G. A., Davidson, W. S. & von Eye, A. (2006). Domestic violence, maternal parenting, maternal mental health, and infant externalizing behavior. *Journal of Family Psychology, 20* (4): 544-552.

Leventhal, T. & Brooks-Gunn, J. (2000). The neighborhoods they live in: the effects of neighborhood residence on child and adolescent outcomes. *Psychological bulletin, 126* (2):309.

Leventhal, T., & Newman, S. (2010). Housing and child development. *Children and Youth Services Review, 32*(9), 1165-1174.

Lieberman, D. (2013a). *The Story of the Human Body: Evolution, Health and Disease*. London, UK: Allen Lane.

Lieberman, M. D. (2013). *Social: Why Our Brains are Wired to Connect.* Oxford, UK: Oxford University Press.

Lippman, B. (2005). *Something's gotta give: working families and the cost of housing*. Vol. 5. Washington: Center for Housing Policy

Lohar, S., Butera, N. & Kennedy, E. (2014). *Strengths of Australian Aboriginal cultural practices in family life and child rearing*. CFCA Paper No. 25. Melbourne, Victoria: Child Family Community Australia, Australian Institute of Family Studies. https://aifs.gov.au/cfca/publications/strengths-australian-aboriginalcultural-practices-fam/introduction

Loke, Y. J., Hannan, A. J. & Craig, J.M. (2015). The role of epigenetic change in autism spectrum disorders. *Frontiers in Neurology*, published online 26 May 2015. https://doi.org/10.3389/fneur.2015.00107

Lou, H. C., Hansen, D., Nordentoft, M., Pryds, O., Jensen, F., Nim, J. & Hemmingsen, R. (1994). Prenatal stressors of human life affect fetal brain development. *Developmental Medicine and Child Neurology 36* (9): 826–832.

Louv, R. (2007). Leave no child inside. *Orion Magazine*. https://orionmagazine.org/article/leave-no-child-inside/

Love, V., & Tsantefski, M. (2006). *Psychosocial issues for substancedependent pregnant women and parents of neonates. Background Papers to the National clinical guidelines for the management of drug use during pregnancy, birth and the early development years of the newborn (*pp. 14-22). North Sydney: NSW Department of Health.

Low, F. M., Gluckman, P. D., & Hanson, M. A. (2012). Developmental plasticity, epigenetics and human health. *Evolutionary Biology, 39* (4), 650-665. Doi:10.1007/s11692-011-9157-0

Liu, Y., Croft, J.B., Chapman, D.P., Perry, G.S, Greenlund, K.J., Zhao, G. & Edwards, V.J. (2013). Relationship between adverse childhood experiences and unemployment among adults from five U.S. states. *Social Psychiatry and Psychiatric Epidemiology, 48* (3):357-69.

MacLeod, J., & Nelson, G. (2000). Programs for the promotion of family wellness and the prevention of child maltreatment: A meta-analytic review. Child *Abuse & Neglect, 24*(9), 1127-1149.

McArthur, M., & Winkworth, G. (2017). What do we know about the social networks of single parents who do not use supportive services? *Child and Family Social Work, 22* (2), 638-647.

McNeill, J. R. & Engelke, P. (2015). The Great Acceleration: *An Environmental History of the Anthropocene since 1945*. Cambridge, Massachusetts: Belknap Press / Harvard University Press

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

Martin, R. P. & Dombrowski, S. C. (2008). *Prenatal exposures: Psychological and educational consequences for children.* New York: Springer.

Martin, S. L., Harris-Britt, A., Li, Y., Moracco, K. E., Kupper, L. L. & Campbell, J. C. (2004). Changes in intimate partner violence during pregnancy. *Journal of Family Violence. 19*(4):201–210.

Maslow, A. H. (1948). “Higher” and “Lower” Needs. *The Journal of Psychology: Interdisciplinary and Applied, 25*:2, 433-436

Mayne, S. L., Pool, L. R., Grobman, W.A., and Kershaw, K.N. (2018). Associations of neighbourhood crime with adverse pregnancy outcomes among women in Chicago: analysis of electronic health records from 2009 to 2013. *Epidemiology and Community Health*, Epub ahead of print 5 January 2018. Doi:10.1136/jech-2017-209801

McDade, T. W. (2012). Early environments and the ecology of inflammation. Proceedings of the *National Academy of Sciences USA, 109* (Supplement 2), 17281-17288; doi:10.1073/pnas.1202244109

McDonald, M., Turner, C., & Gray, J. (2014). *Evidence into action: Playgroups for diverse communities.* Melbourne: Victorian Cooperative on Children's Services for Ethnic Groups.

McFarlane, J., Maddoux, J., Cesario, S., Koci, A., Liu, F., Gilroy, H. & Bianchi, A.L. (2014). Effect of abuse during pregnancy on maternal and child safety and functioning for 24 months after delivery. *Obstetrics & Gynecology*, 123(4), 839-847

Michaelsen, K. F., Weaver, L., Branca, F., & Robertson, A. (2010). *Feeding and nutrition of infants and young children: Guidelines for the WHO European Region, with emphasis on the former Soviet countries.* Copenhagen, Denmark: WHO Regional Office for Europe. http://www.euro.who.int/__data/assets/pdf_file/0004/98302/ WS_115_2000FE.pdf

Miller, G. E. & Chen, E. (2013). The biological residue of childhood poverty. *Child Development Perspectives, 7* (2), 67–73. Doi: 10.1111/cdep.12021

Millward, K. (2013). *Meeting the needs of our children: Effective community controlled strategies that prevent and respond to family violence* (Fact Sheet No. 1). Melbourne: Secretariat of the National Aboriginal and Islander Child Care.

Moore, D.S. (2015). *The Developing Genome: An Introduction to Behavioral Epigenetics*. New York: Oxford University Press.

Moore, T.G. (2014). Understanding the nature and significance of early childhood: New evidence and its implications. Presentation at Centre for Community Child Health seminar on Investing in Early Childhood – the future of early childhood education and care in Australia, The Royal Children's Hospital, Melbourne, 25th July. DOI: 10.4225/50/5578DA99168A5 http://www.rch.org.au/uploadedFiles/Main/Content/ccch/PCI_Tim-Moore_Understandingnature-significance-early-childhood.pdf

Moore, T.G. (2016). Towards a model of evidence-informed decision-making and service delivery. *CCCH Working paper No. 5.* Parkville, Victoria: Centre for Community Child Health, Murdoch Children's Research Institute. DOI: 10.13140/RG.2.1.3155.7367. http://www.rch.org.au/uploadedFiles/Main/Content/ccchdev/CCCH-Towards-a-model-of-evidence-informed-decisio-making-and-service-delivery-Tim-Moore-May2016.pdf

Moore, T.G., Beatson, R., Rushton, S., Powers, R., Deery, A., Arefadib, N. & 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 Children's Research Institute, The Royal Children's Hospital. http://strongfamiliessafechildren.vic.gov.au/news-feed/news_feed/using-evidence-to-improve-outcomes

Moore, T. G. & Fry, R. (2011). Place-based approaches to child and family services: A literature review. Parkville, Victoria: Murdoch Childrens Research Institute and The Royal Children's Hospital Centre for Community Child Health. DOI: 10.4225/50/5577CE906382B http://www.rch.org.au/uploadedFiles/Main/Content/ccch/Place_based_services_literature_review.pdf

Moore, T.G., & Skinner, Al. (2010). *An integrated approach to early childhood development.* Parkville, Victoria; Centre for Community Child Health, Murdoch Children's Research Institute

Moore, T.G., Arefadib, N., Deery, A., & West, S. (2017). *The First Thousand Days: An Evidence Paper.* Parkville, Victoria; Centre for Community Child Health, Murdoch Children's Research Institute.

Moore, T.G., McDonald, M., McHugh-Dillon, H. & West, S. (2016b). *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., McHugh-Dillon, H., Bull, K., Fry, R., Laidlaw, B., & West, S. (2014). *The evidence: what we know about place-based approaches to support children's wellbeing*. Parkville, Victoria: Murdoch Children's Research Institute and The Royal Children's Hospital Centre for Community Child Health.

Munsell, E. P., Kilmer, R. P., Cook, J. R. & Reeve, C.L. (2012). The Effects of Caregiver Social Connections on Caregiver, Child, and Family Well-Being. *American Journal of Orthopsychiatry,* 82(1): 137-145.

Music, G. (2011). *Nurturing Natures: Attachment and Children's Emotional, Sociocultural and Brain Development*. London, UK: Psychology Press.

National Academies of Sciences, Engineering, and Medicine (2017). *Communities in Action: Pathways to Health Equity.* Washington, DC: The National Academies Press. https://doi.org/10.17226/24624

National Research Council (US) and Institute of Medicine (US) Committee on Depression, Parenting Practices, and the Healthy Development of Children. (2009). England MJ, Sim LJ, editors. Washington (DC): National Academies Press (US.

National Scientific Council on the Developing Child (2005). *Excessive Stress Disrupts the Architecture of the Developing Brain*. NSCDC Working Paper No. 3. Waltham, Massachusetts: National Scientific Council on the Developing Child, Brandeis University. http://developingchild.harvard.edu/index.php/download_file/-/view/469/

Nelson, J. (2010). No room at the inn: pregnancy and overcrowding. *Journal of Family Health Care, 20* (4): 112-4.

Ng, S. F., Lin, R. C., Laybutt, D. R., Barres, R., Owens, J. A., & Morris, M. J. (2010). Chronic high-fat diet in fathers programs beta-cell dysfunction in female rat offspring. *Nature,* 467, 963–966.

Nguyen, O.K. & Cairney, S. (2013). *Literature review of the interplay between education, employment, health and wellbeing for Aboriginal and Torres Strait Islander people in remote areas: Working towards an Aboriginal and Torres Strait Islander wellbeing framework*. CRC-REP Working Paper CW013. Alice Springs, Northern Territory: Ninti One Limited.

Ochiltree, G. (2006). *The changing role of grandparents.* AFRC Briefing No. 2, 2006. Melbourne, Victoria: Australian Family Relationships Clearinghouse, Australian Institute of Family Studies. http://www.aifs.gov.au/afrc/pubs/briefing/briefing2.html

Oken, E., Levitan, E.B. and Gillman, M.W. (2008). Maternal smoking during pregnancy and child overweight: systematic review and meta-

analysis. *International Journal of Obesity, 32* (2): 201-10. DOI: 10.1038/sj.ijo.0803760

Padmanabhan, V., Cardoso, R.C. & Puttabyatappa, M. (2016). Developmental programming, a pathway to disease. *Endocrinology, 157* (4), 1328-1340. DOI: http://dx.doi.org/10.1210/ en.2016-1003

Paradies, Y., Forrest, J., Dunn, K., Pedersen, A. & Webster, K. (2009). More than tolerance: racism and the health of young Australians. In F. Mansouri (Ed.), *Youth identity and migration: culture, values and social connectedness* (pp. 207-226). Melbourne, Victoria: Common Ground Publishing.

Patton, M.Q. (2011). *Developmental Evaluation: Applying Complexity Concepts to Enhance Innovation and Use.* New York: Guilford Press.

Paul, A. M. (2010). *Origins: How the Nine Months Before Birth Shape the Rest of Our Lives*. New York: Free Press

Pavao, J., Alvarez, J., Baumrind, N., Induni, M., & Kimerling, R. (2007). Intimate partner violence and housing instability. *American Journal of Preventive Medicine, 32* (2): 143-6.

Pawson, R. (2006). *Evidence-Based Policy: A Realist Perspective.* London, UK: Sage Publications.

Pawson, R. (2013). *The Science of Evaluation: A Realist Manifesto.* London, UK: Sage Publications.

Pawson, R. & Tilley, N. (1997). *Realistic Evaluation.* London, UK: Sage Publications.

Pebley, A. R. & Sastry, N. (2004). Neighbourhoods, poverty, and children's well-being. In K. M. Neckerman (Ed.). *Social Inequality*. New York: Russell Sage Foundation.

Perry, B. D. (2005). Maltreatment and the developing child: how early childhood experience shapes child and culture. Paper presented to The Margaret McCain Lecture Series, London, Ontario, Canada.

Pinker, S. (2015). *The Village Effect: Why Face-to-Face Contact Matters*. London, UK: Atlantic Books.

Popkin, S. J., Acs, G. & Smith, R. (2010). Understanding how place matters for kids. *Community Investments, 22* (1), 23-26, 36-37. http://www.frbsf.org/publications/community/investments/1005/S_Popkins.pdf

Poroch, N., Arabena, K., Tongs, J., Larkin, S., Fisher, J. & Henderson, G. 2009, *Spirituality and Aboriginal People's Social and Emotional Wellbeing: A Review, Discussion Paper No. 11*, Cooperative Research Centre for Aboriginal Health, Darwin.

Prescott, S. (2015). *Origins: An early life solution to the modern health crisis.* Perth, Western Australia: The University of Western Australia Publishing

Prescott, S. (2011). *The Allergy Epidemic: A Mystery of Modern Life.* Perth, Western Australia: University of Western Australia Publishing.

Priest, N., Paradies, Y., Gunthorpe, W., Cairney, S. and Sayers, S. (2011). Racism as a determinant of social and emotional wellbeing for Aboriginal Australian youth. *Medical Journal of Australia, 194* (10): 546-50.

Priest, N., Paradies, Y., Stevens, M. & Bailie, R. (2012). Exploring relationships between racism, housing and child illness in remote indigenous communities. *Journal of Epidemiology and Community Health, 66*(5): 440-447

Productivity Commission. (2016). *Report on Government Services. Volume B: Child care, education and training*. Retrieved from http://www.pc.gov.au/research/ongoing/report-on-government-services/2016/childcare-education-andtraining/rogs-2016-volumeb-child-care-education-and-training.pdf

Productivity Commission (2016). *Overcoming Indigenous Disadvantage: Key Indicators 2016*. Canberra, ACT: Productivity Commission. http://www.pc.gov.au/research/ongoing/overcoming-indigenousdisadvantage/2016#thereport

Quinlavin, J. J & Evans, S. F. (2005). Impact of domestic violence and drug abuse in pregnancy on maternal attachment and infant temperament in teenage mothers in the setting of best clinical practice. *Archives of Women's Mental Health, 8*(3): 191-9.

Raposa, E. B., Bower, J. E., Hammen, C. L., Najman, J. M. & Brennan, P. A. (2014). A developmental pathway from early life stress to inflammation: The role of negative health behaviours. *Psychological Science, 25* (6), 1268-1274. Doi:10.1177/0956797614530570

Ratcliff, K.S. (2017). *The Social Determinants of Health: Looking Upstream.* Cambridge, UK: Polity.

Ratcliffe, S.D., Rosener, S.E. & Frayne, D. J. (2017). Preconception care. In P.M. Paulman, R.B. Taylor, A.A. Paulman, and L.S. Nasir (Eds.), *Family Medicine: Principles and Practice (7th. Ed.)* (pp. 127-139). Geneva, Switzerland: Springer International.

Richardson, S., & Prior, M. (2005). *No Time to Lose: The Wellbeing of Australia's Children.* Melbourne, Victoria: Melbourne University Press.

Rini, C., Dunkel Schetter, C., Hobel, C.J., Glynn, L.M. & Sandman, C.A. (2006). Effective social support: antecedents and consequences of partner support during pregnancy. *Personal Relationships, 13*(2): 207–229.

Roberts, Y. H., Campbell, C. A., Ferguson, M., & Crusto, C. A. (2013). The role of parenting stress in young children's mental health functioning after exposure to family violence. *Journal of Traumatic Stress, 26* (5), 605-612.

Robinson, M. (2013). How the first nine months shape the rest of our lives. *Australian Psychologist, 48* (4), 239–245. doi: 10.1111/ ap.12022

Robles, T. F. & Kiecolt-Glaser, J. K. (2003). The physiology of marriage: pathways to health. *Physiology and Behavior, 79*(3): 409–16.

Rothman, L., Buliung, R., Macarthur, C., To, T., Howard, A. (2014). Walking and child pedestrian injury: a systematic review of built environment correlates of safe walking. *Injury Prevention, 20* (1):41–9.

Russell, K. (1995). Inmates with alcohol and other drug problems: what about the next generation? *Current Issues in Criminal Justice, 7* (2), 245 - 257.

Sallis, J. F., Floyd, M. F., Rodríguez, D. A. & Saelens, B. E. (2012). Role of built environments in physical activity, obesity, and cardiovascular disease. *Circulation, 125* (5): 729-37. DOI: 10.1161/ CIRCULATIONAHA.110.969022

Sallis, J. F., Sullivan, M. F., Rodríguez, D. A. & Saelens, B.E. (2012). Role of built environments in physical activity, obesity, and cardiovascular disease. *Circulation, 125* (5): 729-37. DOI: 10.1161/ CIRCULATIONAHA.110.969022

Sampson, R., Morenoff, J., Gannon-Rowley T. (2002). Assessing "Neighbourhood Effects": Social

Processes and New Directions in Research. *Annual Review of Sociology, 28*: 443-78.

Sandman, C. A., Davis, E. P., Buss, C., & Glynn, L. M. (2012). Exposure to prenatal psychobiological stress exerts programming influences on the mother and her fetus. *Neuroendocrinology, 95* (1), 8–21. doi:10.1159/ 000327017

Sandman, C.A., Wadhwa, P.D., Chicz-DeMet, A., Porto, M. & Garite, T.J. (1999). Maternal corticotropin-releasing hormone and habituation in the human fetus. *Dev. Psychobiol. 34*, 163—173.

Sarris J., Logan A. C., Akbaraly, T. N., Amminger, G. P., Balanzá-Martínez V., Freeman M. P., . . . Jacka F. N. (2015). Nutritional medicine as mainstream in psychiatry. *Lancet Psychiatry, 2*(3): 271–274.

Save the Children (2012). *Nutrition in the First 1000 Days: State of the World's Mothers 2012.* Westport, Connecticut: Save the Children. https://www.savethechildren.nl/Uploaded_files/Publicaties/STATEOFTHEWORLDSMOTHERS50488b0e621b5.pdf

Schanen, N. C. (2006). Epigenetics of autism spectrum disorders. *Human Molecular Genetics, 15* (Spec No 2), R138-150. doi:10.1093/hmg/ddl213

Scheeringa, M. S., & Zeanah, C. H. (1995). Symptom expression and trauma variables in children under 48 months of age. *Infant Mental Health Journal, 16*(4): 259–270.

Schore, A. N. (2001). The effects of early relational trauma on right brain development, affect regulation, and infant mental health. *Infant Mental Health Journal, 22* (1-2), 201-269.

Scientific Advisory Committee on Nutrition (2011). *Dietary Reference Values for Energy*. London, UK. Retrieved from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/339317/SACN_Dietary_Reference_Values_for_Energy.pdf

Sermondade, N., Faure, C., Fezeu, L., Shayeb, A. G., Bonde, J. P., Jensen, T. K., . . . Czernichow, S. (2013). BMI in relation to sperm count: an updated systematic review and collaborative meta-analysis. *Human Reproduction Update, 19*, 221–231.

Sethi, D., Bellis, M.A., Hughes, K., Mitis, F., Gilbert, R. & Galea, G. (2013). *European report on preventing child maltreatment.* Copenhagen: World Health Organization Regional Office for Europe.

Sety, M. (2011). *The Impact of Domestic Violence on Children: A Literature Review.* Sydney, NSW: The Australian Domestic & Family Violence Clearinghouse, University of New South Wales. http://www.adfvc.unsw.edu.au/documents/ImpactofDVonChildren.pdf

Shankaran, S., Das, A., & Bauer, C. R. (2006). Fetal origin of childhood disease: Intrauterine growth restriction in term infants and risk for hypertension at 6 years of age. *Archives of Pediatrics & Adolescent Medicine, 160*, 977–981.

Shepherd, C. C., Li, J. & Zubrick, S. R. (2012). Social gradients in the health of Indigenous Australians. *American Journal of Public Health, 102* (1): 107-17. doi: 10.2105/AJPH.2011.300354.

Shonkoff, J. P. & Phillips, D. A. (Eds) (2000). From *Neurons to Neighborhoods: The Science of Early Childhood Development. Committee on Integrating the Science of Early Childhood Development*, National Research Council and Institute of Medicine. Washington, DC: National Academy Press

Siega-Riz, A. M., Viswanathan, M., Moos, M. K., Deierlein, A., Mumford, S., Knaack, J., Thieda, P., Lux, L. J. &. Lohr, K. N. (2009). A systematic review of outcomes of maternal weight gain according to the Institute of Medicine recommendations: birthweight, fetal growth, and postpartum weight retention. *American Journal of Obstetrics & Gynecology, 201* (339), e1–14. doi:10.1016/j.ajog.2009.07.002

Siegel, D.J. (2012). *The Developing Mind: How Relationships and the Brain Interact to Shape Who We Are (2nd Ed.).* New York: The Guilford Press.

Sims, M. (2011). *Early childhood and education services for Indigenous children prior to starting school.* Resource sheet no. 7 for the Closing the Gap Clearinghouse. Australian Institute of Health and Welfare. Retrieved from: http://www.aihw.gov.au/uploadedFiles/ClosingTheGap/Content/Publications/2011/ctgc-rs07.pdf

Simón, L., Pastor-Barriuso, R., Boldo, E., Fernández-Cuenca, R., Ortiz, C., Linares, C., Medrano, M.J. & Galan, I. (2017). Smoke-free legislation in Spain and prematurity. *Pediatrics, 139* (6); e20162068. DOI: 10.1542/peds.2016-2068

Singh, G. K., Ghandour, R. M. (2012). Impact of neighborhood social conditions and household socioeconomic status on behavioral problems among US children. *Maternal and child health journal, 16* (1):158-69

Springer, K.W., Sheridan, J., Kuo, D., & Carnes, M. (2007). Long-term physical and mental health consequences of childhood physical abuse: Results from a large population-based sample of men and women. *Child Abuse and Neglect*, *31*, 517–530.

Solantaus, T., Leinonen, J., Punamäki, R. L. (2004). Children's mental health in times of economic recession: Replication and extension of the family economic stress model in Finland. *Developmental Psychology, 40*: 412–429. http://dx.doi.org/10.1037/0012-1649.40.3.412

Solar, O. & Irwin, A. (2010). *A conceptual framework for action on the social determinants of health.* Social Determinants of Health Discussion Paper 2 (Policy and Practice). World Health Organization.

Solar, O. & Irwin, A. (2006). Social determinants, political contexts and civil society action: a historical perspective on the Commission on Social Determinants of Health. *Health Promotion Journal of Australia, 17*(3):180-5

Statham, J. (2011). *A review of international evidence on interagency working, to inform the development of Children's Services Committees in Ireland.* Dublin, Ireland: Department of Children and Youth Affairs. www.dcya.gov.ie/documents/publications/wtfchildren.pdf

Steering Committee for the Review of Government Service Provision. (2011). Overcoming Indigenous disadvantage: Key indicators 2011. Canberra: Productivity Commission.

Stettler, N., Zemel, B. S., Kumanyika, S. & Stallings, V. A. (2002). Infant weight gain and childhood overweight status in a multicenter, cohort study. *Pediatrics, 109*, 194–199.

Strife, S. & Downey, L. (2009). Childhood Development and Access to Nature: A New Direction for Environmental Inequality Research. *Organization and Environment, 22*(1): 99–122.

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.

Tarazi, C., Skeer, M., Fiscella, K., Dean, S. & Dammann, O. (2016). Everything is connected: social determinants of pediatric health and disease. *Pediatric Research, 79* (1-2), 125–126. doi:10.1038/pr.2015.220

Tasmanian Government. (2017). *Social and economic impacts of implementing the voluntary earlier school starting age*. Report from the secretary of the Department of education. Retrieved from: https://documentcentre.education.tas.gov.au/Documents/Social-and-Economic-Impacts-of-Implementing-the-Voluntary-Earlier-School-Starting-Age-Report-from-Secretary.pdf

Tegethoff, M., Greene, N., Olsen, J., Schaffner, E. & Meinlschmidt, G. (2011). Stress during pregnancy and offpsring pediatric disease: A national cohort study. *Environmental Health Perspectives, 119*, 1647–1652. doi:10.1289/ehp.1003253

Thompson, R. A. (2014). Stress and child development. *The Future of Children, 24*(1).

Thornburg, K. L. (2015). The programming of cardiovascular disease. *Journal of Developmental Origins of Health and Disease, 6* (5), 366-376. DOI: http://dx.doi.org/10.1017/S2040174415001300

Thousand Days (2016). *The First 1,000 Days: Nourishing America's Future*. Washington, DC: Thousand Days. http://thousanddays.org/resource/nourishing-americas-future/

Tsao L. (2002). How much do we know about the importance of play in child development? *Child Educ*. 78:230 –233

Ulmer, J.M., Chapman, J.E., Kershaw, S.E. & Campbell, M. (2014). Application of an evidence-based tool to evaluate health impacts of changes to the built environment. *Canadian Journal of Public Health, 106* (1) (Suppl. 1): eS26-eS32.

UNICEF Innocenti Research Centre (2005). *1990 - 2005 Celebrating the Innocenti Declaration of the protection, promotion and support of breastfeeding: Past Achievements, Present Challenges and the Way Forward for Infant and Young Child Feeding.* Florence, Italy: UNICEF Innocenti Research Centre http://www.unicef.org/nutrition/files/Innocenti_plus15_BreastfeedingReport.pdf

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 (2006). *UN Convention on the Rights of the Child: A Guide to General Comment 7: 'Implementing Child Rights in Early Childhood'*. The Hague, The Netherlands: Bernard van Leer Foundation. http://www.bernardvanleer.org/publication_store/publication_store_publications/a_guide_to_general_comment_7_implementing_child_rights_in_early_childhood/file

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 (part. 24)*. Geneva, Switzerland: Office of the High Commissioner, United Nations.
US Department of Health and Human Services. (2011). *Strengthening families and communities: 2011 resource guide*. Retrieved from https://www.childwelfare.gov/preventing/preventionmonth/ guide2011/

Vaiserman, A. M. (2014). Early-life nutritional programming of longevity. *Journal of Developmental Origins of Health and Disease, 5* (5), 325-338. doi:doi:10.1017/S2040174414000294

Victorian Child Death Review Committee (2012). *Victorian Child Death Review Committee annual report 2012: information for practitioners*. Office of the Child Safety Commissioner, Melbourne, Victoria.

Villanueva, K., Badland, H., Kvalsvig, A., O'Connor, M., Christian, H., Woolcock, G., Giles-Corti, B. & Goldfeld, S. (2016). Can the neighborhood built environment make a difference to children's development? Building the research agenda to create evidence for place-based children's policy. *Academic Pediatrics, 16* (1), 10-19. DOI:10.1016/j.acap.2015.09.006

Villanueva, K., Giles-Corti, B., Bulsara, M., Timperio, A., McCormack, G., Beesley, B., et al. (2013). Where do Children Travel to and What Local Opportunities Are Available? The Relationship Between Neighborhood Destinations and Children's Independent Mobility. *Environment and Behavior. 45*(6):679-705
Vinikoor-Imler, L. C., Messer, L. C., Evenson, K. R., & Laraiad,B. A. (2011). Neighborhood conditions are associated with maternal health behaviors and pregnancy outcomes. *Social Science Medicine, 73* (9): 1302–1311.

Vinson, T. (2009). *Markedly socially disadvantaged localities in Australia.* Canberra, ACT: Department of Education, Employment and Workplace Relations.

Vucetic, Z., Kimmel, J., Totoki, K., Hollenbeck, E. & Reyes, T. M. (2010). Maternal high-fat diet alters methylation and gene expression of dopamine and opioid-related genes. *Endocrinology, 151*, 4756–4764.

Ward, J., Duncan, J., Jarden, A., Stewart, T. (2016). The impact of children's exposure to greenspace on physical activity, cognitive development, emotional wellbeing, and ability to appraise risk. *Health & Place, 40*: 44-50

WAVE Trust (2013). *Conception to Age 2 – the Age of Opportunity.* Croydon, Surrey: WAVE Trust. http://www.wavetrust.org/sites/ default/files/reports/conception-to-age-2-full-report_0.pdf

WAVE Trust (2015). *Building Great Britons: Report on First 1001 Days All Party Parliamentary Group's Perinatal Inquiry* – Evidence Sessions on First 1001 Days: Recommendations for the promotion of optimal development in the first 1001 days to give every baby the best possible start in life. Croydon, Surrey, UK: WAVE Trust. http://www.wavetrust.org/sites/default/files/reports/Building_Great_Britons_Report-APPG_Conception_to_Age_2-Wednesday_25th_February_2015.pdf

Webb, S. J., Monk, C. S., & Nelson, C. A. (2001). Mechanisms of postnatal neurobiological development: Implications for human development. *Developmental Neuropsychology, 19*

(2), 147–171. DOI: 10.1207/S15326942DN1902_2

Weber, E. P. & Khademian, A. M. (2008). Wicked problems, knowledge challenges, and collaborative capacity builders in network settings. *Public Administration Review, 68* (2), 334-349.

Weinstock, M. (2005). The potential influence of maternal stress hormones on development and mental health of the offspring. *Brain, behavior and immunity, 19*(4):296-308.

Weinreb, L., Goldberg, R., & Perloff, J. (1998). Health characteristics and medical service use patterns of sheltered homeless and low-income housed mothers. *Journal of General Internal Medicine, 13(*6). 389–397.

Weissman, M. M., Wickramaratne, P., Nomura, Y., Warner, V., Pilowsky, D. & Verdeli, W. (2006). Offspring of Depressed Parents: 20 Years Later. The *American journal of psychiatry, 163*(6): 1001-1008.

Weng, S. F., Redsell, S. A., Swift, J. A., Yang, M. & Glazebrook, C. P. (2012). Systematic review and meta-analyses of risk factors for childhood overweight identifiable during infancy. *Archives of disease in childhood, 97*(12):1019-26

Wexler, L. (2009). The importance of identity, history, and culture in the wellbeing of indigenous youth. *Journal of the History of Childhood and Youth, 2* (2), 267-276.

Whitfield, C. L., Anda, R. F., Dube, S. R. & Felitti, V.J. (2003). Violent childhood experiences and the risk of intimate partner violence in adults: Assessment in a large health maintenance organization. *Journal of Interpersonal Violence*, *18*, 166–185.

Wilkinson, R. G. & Pickett, K. E. (2009). *The Spirit Level: Why More Equal Societies Almost Always Do Better.* London, UK: Allen Lane.

Wilkinson, R. & Pickett, K. (2018). *The Inner Level: How More Equal Societies Reduce Stress, Restore Sanity and Improve Everyone's Wellbeing.* London, UK: Allen Lane.

Willcox, S. (2014). *Chronic diseases in Australia: the case for changing course. Background and policy paper.* Policy paper No. 2014-02. Melbourne, Victoria: Australian Health Policy Collaboration. https://www.vu.edu.au/sites/default/files/AHPC/pdfs/Chronic-diseases-in-Australia-the-case-for-changing-course-sharon-willcox.pdf

Wilson, K. R. & Prior, M. R. (2011). Father involvement and child well-being. *Journal of Paediatrics and Child Health, 47*. 405–407

Winkworth, G., McArthur, M., Layton, M., Thomson, L. & Wilson, F. (2010). Opportunities Lost - Why Some Parents of Young Children Are Not Well-Connected to the Service Systems Designed to Assist Them. *Australian Social Work*, *63*(4).

Winkworth, G., McArthur, M., Layton, M. & Thomson, L. (2010). Someone to check in one me: Social capital, social support and vulnerable parents with very young children in the Australian Capital Territory. *Child & Family Social Work, 15*, 206-215.

Wise, S. (2013). *Improving the early life outcomes of Indigenous children: implementing early childhood development at the local level.* Issues paper no. 6. Melbourne, Victoria: Closing the Gap Clearinghouse, Australian Institute of Family Studies. www.aihw.gov.au/ uploadedFiles/ClosingTheGap/Content/Publications / 2013/ctgc-ip06.pdf

Wise, S. (2003). *Family structure, child outcome and environmental mediators: an overview of the Development in Diverse Families Study.* Research paper no. 30. Melbourne: Australian Institute of Family Studies

Woolfenden, S., Goldfeld, S., Raman, S., Eapen, V., Kemp, L. & Williams, K. (2013). Inequity in child health: The importance of early childhood development. *Journal of Paediatrics and Child Health, 49* (9), E365–E369. doi: 10.1111/jpc.12171

World Health Organization. (2011). *Adverse Childhood Experiences International Questionnaire* Pilot study review and finalization meeting, 4-5 May 2011, WHO Headquarters, Geneva Meeting Report.

World Health Organization. (2009). *Prevalence and determinants of common perinatal mental disorders in women in low- and lower-middle-income countries: a systematic review.* http://www.who.int/bulletin/volumes/90/2/11-091850/en/

World Health Organization. (2000). *Women's mental health: an evidence based review*. Geneva: World Health Organization

Young, B. E., Johnson, S. L. & Krebs, N. F. (2012). Biological Determinants Linking Infant Weight Gain and Child Obesity: Current Knowledge and Future Directions. *Advances in Nutrition: An International Review Journal, 3*, 675-686.

Yu, P. (2008). *Mortality of children and parental disadvantage.* Australian Social Policy Research Conference, Sydney: Social Policy Research Centre, University of New South Wales.

Zhu, M. (2014). *Era of benign neglect of house price booms is over.* International Monetary Fund blog, 11th June. http://blog-imfdirect.imf.org/2014/06/11/era-of-benign-neglect-of-house-price-booms-isover/

Melbourne Children's

A world leader in child and adolescent health

Centre for Community Child Health
The Royal Children's Hospital Melbourne
50 Flemington Road Parkville Victoria 3052 Australia
www.rch.org.au/ccch

The Centre for Community Child Health is a department of The Royal Children's Hospital and a research group of Murdoch Children's Research Institute.