



How is learning enhanced through improved health and nutrition?

Are there key health issues impacting differently on the learning of children from culturally and linguistically diverse (CALD) and Indigenous backgrounds?



everyone's family

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By Dr Irene Williams

The Smith Family
(02) 9085 7222
Level 9, 117 Clarence St
Sydney NSW 2000
GPO Box 10500
Sydney NSW 2001

Further information may also be found at:
thesmithfamily.com.au

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Executive Summary

This literature review addresses the question ‘How is learning enhanced through improved health and nutrition?’ Are there key health issues impacting differently on the learning of children from culturally and linguistically diverse (CALD) and Indigenous backgrounds?

What does the research tell us?

Health literacy

- An individual's level of health literacy is shaped by their education level and proficiency in English (Australian Bureau of Statistics, 2009b).
- Health literacy helps determine the health of individuals, particularly through the decisions they make about diet, exercise and lifestyle on a daily basis.
- Lower levels of health literacy contribute to poorer health for disadvantaged children and young people, potentially contributing to decreased life expectancy, higher levels of disease causing factors and reduced use of preventive health services.
- Parents model food consumption and food attitudes to their children (Pettigrew, 2009; Vereecken, Keukelier and Maes, 2004). Parents also model decisions about food to their children through choices made at the supermarket. To do this effectively, parents need to be able to comprehend the nutritional information on food labels (Barreiro-Hurle, Gracia and de-Magistris, 2010).

The link between poor health, disadvantage and education

- Parental modelling of positive food choices is shaped by socio-economic factors including the mother's level of education (Vereecken, Keukelier and Maes, 2004).
- Disadvantaged children are burdened with significantly higher rates of obesity (Australian Bureau of Statistics, 2009d). They are also more likely to suffer from poor nutrition.
- Research highlights the link between ethnicity, low socio-economic status (SES) and obesity (O'Dea, 2008).
- In CALD populations, obesity may be up to four times more prevalent among young people from Middle Eastern and Pacific backgrounds, compared to those with Anglo/Caucasian backgrounds (O'Dea, 2008).
- Research highlights positive associations between parent employment, higher levels of parent education and better health outcomes for children (Spurrier, Sawyer, Clark and Baghurst, 2003).

Key health and nutrition issues

- The key health and nutrition issues affecting children and young people's learning are overweight and obesity; food insecurity and access to affordable, healthy food; dental health and eye and ear problems.
- Early childhood is a focal point of some initiatives in recognition of the importance of developing a life-long, healthy approach to food and exercise from an early age (Sorhaindo and Feinstein, 2006).
- The health of Indigenous children and young people is “significantly worse than that of other Australians”. “Poor health outcomes linked to poverty and reduced life chances generally commence at birth and continue throughout the life cycle” (Australian Medical Association, 2006, p.1).

- Among Indigenous children, the occurrence of “ear/hearing problems” and middle ear infections is three times higher than it is among non-Indigenous children (Australian Bureau of Statistics, 2006, p.6).

Enhancing learning through improved health and nutrition

- Research has reported varying degrees of improvement in academic performance as a result of physical activity interventions, ranging from benefits associated with increased activity to benefits associated with reduced screen time (Salmon et al., 2005).
- There are important but immeasurable benefits associated with school meal provision that may contribute to a more positive experience of school, including improved concentration and reduced illness (Kristjansson et al., 2009).
- Although research exploring the links between food and learning has limitations, “the evidence for promotion of physical activity and a diet low in fat, salt and sugar but high in fruits, vegetables and complex carbohydrates remains unequivocal in terms of health outcomes for all schoolchildren” (Ellis et al., 2008, p.933).
- The relationship between breakfast and learning is complex. There is widespread acceptance that skipping breakfast has a “transient detrimental effect on cognition in the late morning” (Grantham-McGregor, 2005, p.155) and that eating breakfast is beneficial.
- Positive associations between breakfast consumption and learning include improved attendance and punctuality where a breakfast program exists (Fernald and Grantham-McGregor, as cited in Taras, 2005).
- The nutritional quality of the food consumed for breakfast is important; it is not enough to simply eat breakfast (O’Sullivan et al., 2008).
- There is evidence of a link between disadvantage and the consumption of poor quality breakfast (O’Sullivan et al., 2008).

Current health promotion strategies

- Reducing the levels of overweight and obesity among Australian children and young people is a major focus of health promotion initiatives in both government and non-government sectors (Preventative Health Taskforce, 2009a; 2009b).
- Health initiatives targeting nutrition and physical activity are another major focus (Preventative Health Taskforce, 2009a; 2009b).

Recommendations: What are the implications of the research for policy and practice?

The following recommendations have been derived from the research and could be incorporated into future policy or practice initiatives seeking to effectively address the health and nutrition needs of children and young people, including children from CALD and Indigenous backgrounds.

Skills

- Equip parents with skills to help them become better models of healthy eating (Vereecken, Keukelier and Maes, 2004).
- Develop parents’ interest in eating healthy food; this has the greatest potential to contribute to more prevalent use of nutrition information on food labels (Grunert, Wills and Fernandez-Celemin, 2010).
- Assist Australians to develop adequate levels of health literacy which is associated with employment, English proficiency and higher levels of formal education (Australian Bureau of Statistics, 2009b).

Capacities

- Develop young people's capacity to make positive decisions and adopt healthy behaviours over a lifetime.
- Assist children, young people and their families to live a healthy life by promoting the consumption of a healthy diet and regular physical activity.

Relationships & Attributes

Family/home

- Create initiatives that educate parents and target specific behaviours related to nutrition and physical activity. For example, time spent engaged in sedentary activities.
- Acknowledge the important influence of parental behaviours and attitudes on children's healthy eating, physical activity and obesity prevention.
- Provide family-centred, lifestyle initiatives that target physical activity and healthy eating to increase physical activity outside of school hours (Luttikhuis, Baur, Jansen, Shrewsbury, O'Malley, Stolk and Summerbell, 2009).

School and community

- Develop students' proficiency in literacy and numeracy.
- Address the link between lower levels of health literacy and poorer health for disadvantaged children and young people (which potentially contributes to decreased life expectancy and higher levels of disease causing factors).
- Consider collaborative approaches that involve the family, school and local community to address and promote key health priorities, including increasing physical activity levels and improving children and young people's dietary intake.
- Implement collaborative approaches that incorporate education and support to improve the nutrition and physical activity levels of all children.
- Promote preventive health approaches through public education campaigns.
- Assist children, young people and their families to understand the impact of physical inactivity on health.
- Ensure that health initiatives targeting nutrition and physical activity are culturally and contextually appropriate.
- Improve the support available for families with vulnerable children, including some Indigenous and CALD children and those living in jobless households (Council of Australian Governments, 2009).
- Address the high rates of dental disease among Indigenous children through preventive dental health strategies.
- Understand that education and preventive measures could make a significant contribution to reducing the risk of eye and ear problems and preserving vision and hearing.
- Recognise the value of interventions from early childhood for the development of positive, healthy attitudes and behaviours over a lifetime.
- Incorporate family centred, lifestyle and behavioural approaches when addressing overweight and obesity among children and young people (Ambrosini et al., 2009).
- Address the social factors associated with food insecurity, including inadequate transport, parents' skill level and knowledge as well as the cost of food (Temple, 2008; Nolan, Rikard-Bell, Mohsin and Williams, 2006).

Introduction

The Smith Family focuses on developing the essential key literacies that are vital to enable all Australians to participate fully in society. There are seven key literacies that underpin The Smith Family's work with disadvantaged children, young people and their families. The seven key literacies are: emergent literacy and numeracy; digital literacy; financial literacy; health literacy; emotional literacy; community literacy and intercultural literacy. Health literacy involves the ability to access and comprehend information in order to improve or maintain good health. The Smith Family's approach to health literacy is shaped by the understanding that good health, in part, depends on an individual's ability to make decisions and adopt positive behaviours over a lifetime.

This paper outlines the link between health literacy and health. It then describes the evidence base linking poor health with disadvantage and the impact of this on education. In particular, it identifies the key health and nutrition issues affecting disadvantaged Australian children and young people today, including those from CALD or Indigenous backgrounds. The paper also reviews research that examines how improved health and nutrition can enhance learning. The paper then provides an overview of existing health promotion strategies and programs targeting children and young people. The summary of key findings includes recommendations that could be incorporated into future policy or practice initiatives seeking to effectively address the health and nutrition needs of children and young people, including children from CALD and Indigenous backgrounds.

Part One: Health literacy

Definitions and perspectives

The *Adult Literacy and Life Skills Survey*, Australia defines health literacy as “the knowledge and skills required to understand and use information relating to health issues such as drugs and alcohol, disease prevention...first aid, emergencies, and staying healthy” (Australian Bureau of Statistics, 2008a, p.2). Health literacy can be broadly understood as “the ability to access, understand, evaluate and communicate information as a way to promote, maintain and improve health in a variety of settings across the life course” (The Smith Family, n.d, p.6).

Health literacy and staying healthy requires effectively using “health related knowledge” (Australian Bureau of Statistics, 2008b, p.23). Importantly, it also involves making “informed decisions” within the official health system and “in the home, workplace and community” (Australian Bureau of Statistics, 2009b, p.8). However, health literacy is more than simply making decisions: it also relates to the adoption of positive behaviours associated with good health. Health literacy helps to determine health; that is, it plays an important role in the prevention of ill-health; there is a “causal pathway” between health literacy and health (Keleher and Hagger, 2007, p.25).

An individual’s literacy helps determine their level of health literacy. That is, health literacy is context specific, involving “reading and writing in specific health care contexts” (Papen, 2009, p.28). Like literacy generally, health literacy can be understood as an individual’s skills and their ability to apply these skills (Australian Bureau of Statistics, 2008a, p.2). Health literacy is also a “shared resource frequently achieved collectively by groups of people, for example families” (Papen, 2009, pp.19; 28), it is “both the process and outcome of people’s interactions with the culture and society in which they live” (Keleher and Hagger, 2007, p.25).

Thinking more broadly about health literacy – why is it important?

The Adult Literacy and Life Skills Survey (ALLS) is used to assess “literacy, numeracy and problem solving”. In 2006, health literacy components were added to ALLS for the first time. Five health-related activities were assessed: “health promotion: the ability to enhance and maintain health”; “health protection: the ability to safeguard individual or community health”; “disease prevention: the ability to take preventive measures and engage in early detection”; “health care maintenance: the ability to seek and form a partnership with health care providers” and “systems navigation: the ability to understand and to access needed health services” (Australian Bureau of Statistics, 2008a, p.4).

Proficiency in health literacy, like all aspects of literacy in the 2006 Adult Literacy and Life Skills Survey, was measured on a scale from 0 to 500. Scores were then categorised into five levels. Level 1 (0–225 points) was the lowest level and level 5 (376–500 points) was the highest level. “Skill Level 3” was deemed to be the minimum requirement needed to “meet the complex demands of everyday life” (Australian Bureau of Statistics, 2008a, p.5). In 2006, 41% of adults had “adequate or better health literacy skills”, scoring Level 3 or higher. Alarming, 19% of adults scored Level 1 and 40% of adults had Level 2 health literacy skills: “these people had difficulty with tasks such as locating information on a bottle of medicine” about dosage (Australian Bureau of Statistics, 2009b, pp.8–11). The effects of poor health literacy may include ignorance about “medical care and conditions, [and] decreased use of preventative services” (Johnston, Lea and Carapetis, 2009, p.694).

Results from the Adult Literacy and Life Skills Survey indicate that numerous factors help determine an individual's level of health literacy. Higher levels of health literacy were associated with higher income and education levels. Specifically, higher health literacy levels tend to be associated with higher household incomes, with a difference of over \$34,000 in "equivalised household incomes" between people who scored Level 1 and those who scored Level 3 in the Adult Literacy and Life Skills Survey (Australian Bureau of Statistics, 2008a, p.9).

Higher rates of health literacy in the Adult Literacy and Life Skills Survey were also associated with employment, proficiency in English and higher levels of formal education; 69% of people with 16 or more years of formal education achieved Level 3 or higher (p.13). Completion of Year 12 was also linked to higher health literacy scores; 50% of people who completed Year 12 achieved a health literacy of Level 3 or above. In addition, a "significantly greater proportion of employed people" (47%) achieved Level 3 or above in the Adult Literacy and Life Skills Survey (Australian Bureau of Statistics, 2009b, p.10).

Given the link between health literacy and health, it is problematic that the rates of "adequate or better health literacy" among people aged 15–74 years (41%) in the Adult Literacy and Life Skills Survey were lower than other types of literacy, namely: "prose (54%), document (53%) and numeracy (47%)". Clearly, there is a need to help Australians develop adequate levels of health literacy. In addition to the benefits to an individual's health, there are advantages associated with increasing the health literacy of all Australians. An increase in the proportion of individuals with "adequate levels" of health literacy may also have a positive impact on the Australian health system, by preventing "illness and chronic disease" and reducing the "rates of accident and death" (Australian Bureau of Statistics, 2009b, p.8).

Part Two: Linking health and education

The link between poor health, disadvantage and education

Health literacy has a significant impact upon the health of all people and affects decisions made by individuals about diet, exercise and lifestyle on a daily basis. There is a strong relationship between socio-economic status, education and low levels of health literacy that directly contributes to poorer health outcomes for disadvantaged children and young people. Poorer health and nutrition in turn impacts upon the learning of disadvantaged children and young people, limiting their educational opportunities. There is much at stake: enhancing learning can contribute to improved literacy and more specifically, improved health literacy, leading to better health and education outcomes. It is crucial to explore the relationship between health and learning and the way that the learning of disadvantaged young people might be enhanced through improved health and nutrition.

Research exploring the associations between health and education can be traced back at least thirty years when studies began to consider the links between infant death rates and the education levels of women. More contemporary research characterises education as retention, attainment and literacy (Australian Institute of Health and Welfare, 2010) and suggests a reciprocal relationship. That is, “education promotes health and good health leads to improved education prospects” (Johnston, Lea and Carapetis, 2009, p.693). In short, experiences early in life “have far reaching consequences” for health and wellbeing. Further, “educational attainment” has a positive impact upon health through numerous pathways, including greater employment opportunities as well as better health-related choices and health literacy. In the family context, higher education attainment is associated with better home environments; “better-educated parents positively influence both the education and health trajectories of their children, through early exposure to cognitive stimulating activities and improved health care practices” (Johnston, Lea and Carapetis, 2009, p.694).

An individual’s health is shaped by numerous factors, including “societal, environmental, socioeconomic, biological and lifestyle factors” (Australian Institute of Health and Welfare, 2010, p.63). The socio-economic factors that have been identified as key determinants of health include: “education”, “employment status and occupation”, “income” and “family structure” (Australian Institute of Health and Welfare, 2008; 2010). The interactions between health and socio-economic factors are complex, as the “causal direction is often unclear”. In addition, the effects of education and employment on health can be indirect (Australian Institute of Health and Welfare, 2010, p.78). However, it is clear that “higher incomes give greater access to goods and services that provide health benefits” in relation to food, housing, healthcare and lifestyle (Australian Institute of Health and Welfare, 2010, p.79).

Compared to the socially and economically advantaged, disadvantaged Australians “are more likely to have shorter lives, higher levels of disease risk factors and lower use of preventative health services” (Australian Institute of Health and Welfare, 2008, pp.xiii; 126). Disadvantage tends to continue in subsequent generations, which in turn influences health: “family factors and personal experience of lower income, and fewer opportunities for education and employment can all affect a person’s health in many ways. This may mean less satisfactory early development before and after birth, less opportunity for health literacy, and a greater influence of family and friends towards unhealthy behaviours such as smoking, heavy alcohol use and a poor diet” (Australian Institute of Health and Welfare, 2010, p.252).

Language background can also impact negatively upon health and wellbeing, and consequently upon learning and development. People whose first language was not English achieved lower

health literacy rates in the *Adult Literacy and Life Skills Survey*. Only 26% of those born in a “mainly non-English speaking country” achieved Level 3 or above, deemed necessary for meeting the demands of daily life, whereas 44% of those born in Australia achieved Level 3 or above (Australian Bureau of Statistics, 2009b, pp.8; 10; 11). In addition, there are clear associations between ethnicity and obesity, with people from some ethnic backgrounds having a higher prevalence of obesity than those from Caucasian backgrounds. Economic disadvantage further compounds the link between obesity and ethnicity, creating a double disadvantage.

The link between literacy and health literacy is evident in parts of Australia’s Indigenous population. It is clear that “poor retention in school, illiteracy and severely reduced life expectancy are well recognised crises for many Aboriginal communities”, and education-related factors shape an individual’s level of “health literacy” (Keleher and Hagger, 2007, pp.25; 27). In addition, an individual’s health literacy impacts upon their health (Keleher and Hagger, 2007); “Indigenous people are generally less healthy than other Australians, die at much younger ages, have more disability and a lower quality of life” (Australian Institute of Health and Welfare, 2008, p.xiii). This is primarily due to the link between socioeconomic status and health and its impact on Indigenous Australians. “Indigenous people with low levels of educational attainment were more likely...to regularly smoke, consume alcohol at risky or high-risk levels and engage in low levels of exercise, and were also less likely to eat fruit or vegetables daily” (Australian Institute of Health and Welfare, 2010, p.245).

Indigenous communities are among the most disadvantaged in Australia, and the “health and wellbeing” of Indigenous children and young people is “significantly worse” than that of other Australians. This is partly because of the cumulative effects of poverty: “poor health outcomes linked to poverty and reduced life chances generally commence at birth and continue throughout the life cycle” (Australian Medical Association, 2006, p.1). However, the “impaired development and health” of Indigenous children must be viewed within “the history of dispossession and intergenerational poverty” as well as social risk factors related to unemployment, housing and income and family risk factors such as mental health problems and “substance abuse” (Australian Medical Association, 2010, p.3). Indigenous health problems are significant because of “the link between poor health and impaired educational opportunity” (Australian Medical Association, 2006, pp.1; 4). Put simply, healthy children are better placed to “attend” school (Australian Bureau of Statistics, 2008b, p.25) and “learn and participate in school activities” (MCEETYA, as cited in Australian Institute of Health and Welfare, 2005).

Currently, one in seven Australian children are living in disadvantage and do not have access to the same educational, health or life opportunities that many of us enjoy and often take for granted. To get the most from life, good health and wellbeing are fundamentally important, but the ability to make healthy decisions is a skill that has to be learned. The Smith Family understands the significance of health literacy and the need to help kids and families learn how to adopt positive behaviours related to health and nutrition.

Children’s health in the early years: Low levels of child development

Early childhood is identified as a period when “the foundations” for subsequent health and wellbeing are established (Australian Institute of Health and Welfare, 2008, p.274). Several factors have been identified for their positive influence on “health and development”, including “good dental health, infant breastfeeding, physical activity and sound nutrition” (Australian Institute of Health and Welfare, 2010, p.301). In particular, the first three years lay the “foundation” for all aspects of child development, which is why “strengthening early childhood education” is one of the priorities of the *Melbourne Declaration on Educational Goals for Young Australians* (Ministerial Council on Education, Employment, Training and Youth Affairs, 2008,

p.11). The importance of the early years is also reflected internationally. For example, the Marmot Review *Fair Society, Healthy Lives* (2010), which seeks to reduce health inequalities in England, emphasises giving “every child the best start in life” and reducing inequalities in all aspects of development in the early years (Marmot et al., 2010, p.16).

Numerous factors affecting children’s health have been highlighted in the *National Headline Indicators for Children’s Health, Development and Wellbeing Report* (Victorian Government, 2008) which developed a set of indicators for children’s health and development (0–12 years) that could potentially improve with “prevention or early intervention” strategies.¹ Similarly, The Smith Family’s focus is on those factors that can be feasibly addressed by prevention or early intervention strategies.²

The *National Headline Indicators for Children’s Health* includes dental health and the prevalence of overweight and obesity, reflecting concerns raised in recent research. It is also significant to note the inclusion of other headline indicators, such as “attending early childhood education programs”, “transition to primary school” and literacy and numeracy, as this makes clear the associations between education, literacy and health literacy, reinforcing the important reciprocal relationship between education, literacy and health emphasised in the research.³ Nationally, the provision of “universal access to early childhood education programs to all 4 year olds for 15 hours per week, for a minimum of 40 weeks per year by 2013” is a government priority (Australian Institute of Health and Welfare, 2009, p.2). Significantly, “family economic situation” is another priority area given that in Australia, in 2005–06 there were over 400,000 low income households with children 12 years and under and “children living in families without adequate income are at a greater risk of poor health and educational outcomes, both in the short and long term” (Australian Institute of Health and Welfare, 2009, p.86). So that’s why today, as a children’s education charity, The Smith Family’s work is about helping disadvantaged children get the most out of their education, so they can go on to make the best of their lives.

Perhaps the most compelling evidence for the significantly poorer health and development of some children comes from the Australian Early Development Index (AEDI). This index measures five domains of early childhood development, including “physical health and wellbeing”.⁴ The AEDI focuses on all children in the community, because doing so has the potential to “make a bigger difference in supporting efforts to create optimal early childhood development” (AEDI, 2009, p.2). The AEDI was completed nationally for the first time in 2009, when data was collected from 97.5% of the five-year-old population in Australia (over 260,000 children). The data highlights that “there are higher proportions of children living in the most socio-economically disadvantaged communities and in very remote areas of Australia who are developmentally vulnerable on each of the AEDI domains” (AEDI, 2009, p.iv).

In 2009, 13% of Australian children were “developmentally at risk” in the “physical health and wellbeing domain”. Measures for this domain encompass “physical readiness for school” and “physical independence”. This is comparable to the proportion of children residing in the most disadvantaged parts of Australia (14.6%) who were “developmentally at risk” in the “physical health and wellbeing domain”. Higher proportions of certain children were “developmentally at risk” in the “physical health and wellbeing domain”, including: those living in “very remote regions” of Australia (17%); those who are Indigenous (17.5%); and those who are “not proficient in English”, regardless of whether children have a Language Background Other Than English (LBOTE) (AEDI, 2009, pp.11; 15).

Similarly, higher proportions of certain children were “developmentally vulnerable” in the “physical health and wellbeing domain”. Children in this category “have at least sometimes experienced coming unprepared for school by being dressed inappropriately, coming to school hungry or tired” (AEDI, 2009, p.15). In particular, 21.9% of Indigenous children were “developmentally vulnerable”

in the “physical health and wellbeing domain” compared with 8.7% of non-Indigenous children. Further, 29% of children with a language background other than English (LBOTE) who were not proficient in English were “developmentally vulnerable” in the “physical health and wellbeing domain”. Alarming, almost 50% of children who only spoke English but were not proficient in English were “developmentally vulnerable” in the “physical health and wellbeing domain” (AEDI, 2009, pp.12; 14; 15; 24). Clearly, language proficiency can impact upon health and wellbeing, and consequently upon learning and development.

In general terms, 23.4% of Australian children were “developmentally vulnerable on one or more of the AEDI domain/s”. AEDI data also indicates that higher proportions of Indigenous children were developmentally vulnerable on each of the AEDI domains. Overall, the proportion of Indigenous children who were “developmentally vulnerable” on two or more domains (29.5%) was also significantly higher than non-Indigenous children (11%). These children are considered “high-risk developmentally” (AEDI, 2009, pp.11; 12; 14; 15; 24).

Strikingly, the proportion of Indigenous children who were “developmentally vulnerable” on one or more domains (47%) was more than double that of non-Indigenous children (22%). AEDI data (2009) highlights that 32% of children with a Language Background Other Than English (LBOTE) were “developmentally vulnerable” on one or more of the AEDI domains, compared with 21.7% of children categorised as speaking “English only” (AEDI, 2009, p.24). Without support, the disadvantage they experience today is likely to continue into adulthood and on to the next generation.

Part Three: Key health and nutrition issues – children and young people

The key health and nutrition issues impacting upon children and young people vary with age and are influenced by numerous socio-economic factors. One Australian study found that “children in families of higher income, whose parents had more years of schooling and were employed and children who lived in two-parent, original families had significantly higher health related quality of life across a range of domains” (Spurrier, Sawyer, Clark and Baghurst, 2003, p.27). Conversely, the study demonstrated that “children from lower socio-economic backgrounds in Australia have a more negative experience of health and wellness” (Spurrier, Sawyer, Clark and Baghurst, 2003, p.30).

Critical aspects of children’s health include “high rates of overweight and obesity, insufficient physical activity and poor eating habits”. In particular, research has established that insufficient consumption of fruit and vegetables was more pronounced among older Australian children, aged 12–15 and 16–17 years (Australian Institute of Health and Welfare, 2008, p.274; Australian Bureau of Statistics, 2009d). Note that dental health and eye and ear problems are also priorities for some children.⁵ These concerns align with the most recent national data, which also notes that “diabetes and dental decay are on the rise and too many children spend more than the recommended time in front of a video screen” (Australian Institute of Health and Welfare, 2010, p.297).

Mental health becomes a significant health issue for some children as they get older and journey through adolescence. For example, 1 in 10 Australians aged 15–19 reported a “mental or behavioural problem” in the 2004–05 National Health Survey (Australian Institute of Health and Welfare, 2008, p.31). The onset of many mental health disorders occurs during adolescence, a time of “major physical and psychological maturational changes as well as complex adjustments within the family and society” (McGorry, Parker and Purcell, 2006, p.10). These disorders include “mood, psychotic, personality, eating and substance use disorders” (McGorry, Purcell, Hickie and Jorm, 2007, p.S5), and there is evidence that these disorders are linked to stress.⁶

Depression is a national health priority that can also have negative impacts upon education, particularly student engagement, resulting in “poor schoolwork, reduced achievement, impairments on cognitive task[s], and acting out behaviours”. Additional problems associated with youth mental disorders include “impaired or unstable employment, and poor family and social functioning, leading to spirals of dysfunction and disadvantage that are difficult to reverse” (McGorry, Purcell, Hickie and Jorm, 2007, p.S5).

Overweight and obesity

Obesity and overweight are major, worldwide health issues with significant long-term health and economic implications. Nationally, the total estimated cost of obesity in 2008 “including health system costs, productivity and carers costs” was approximately \$58 billion (Access Economics, as cited in Australian Bureau of Statistics, 2009d, p.6). High body mass index has been identified as one of three “main risk factors contributing to the burden of disease and injury within Australia” (Australian Bureau of Statistics, 2009e, p.2).⁷ In Australia, the prevalence of children 5–17 years who are overweight or obese has increased from 21% in 1995 to 25%, or one quarter of all children in 2007–08⁸ (Australian Bureau of Statistics, 2009d, p.6).⁹ The Longitudinal Study of Australian Children 2008–09 recorded similar rates of overweight and obesity among children: 23% of 4–5 year olds and 24% of 8–9 year olds (Australian Institute of Family Studies, 2009). It is

predicted that the obesity rate will continue to grow and that by 2023 type 2 diabetes will become “the leading cause of disease burden for males”;¹⁰ if this happens the health costs for type 2 diabetes could reach \$8 billion dollars¹¹ (Preventative Health Taskforce, 2009b, p.8).

Some parts of the population have a higher incidence of obesity than others. For example, over time, the proportion of boys with obesity (5–17 years) doubled, from 5% in 1995 to 10% in 2007–08¹². In addition, disadvantaged Australians have higher rates of obesity, “children living in the areas of greatest relative disadvantage had higher rates of being overweight (20%) compared with children living in lower relative disadvantage areas (14%)”; they also had “more than double the rate of obesity (12%)” compared with children in areas of lowest disadvantage (5%) (Australian Bureau of Statistics, 2009d, p.7).

Despite the absence of rigorous, national data on overweight and obesity among Indigenous children (Australian Institute of Health and Welfare, 2009, p.147), it was estimated, based on data from the National Aboriginal and Torres Strait Islander Health Survey,¹³ that Indigenous Australians were 1.9 times as likely as non-Indigenous Australians to be obese and more than three times as likely to be morbidly obese (Preventative Health Taskforce, 2009a, p.6). Significantly, in 2004–05 over half (57%), of Indigenous people 15 years and over were overweight or obese (Australian Bureau of Statistics, 2008b, p.xxii).¹⁴ However, this figure includes the adult population and may reflect dietary changes over time to foods high in carbohydrates and saturated fats (Burns and Thompson, as cited in Australian Institute of Health and Welfare, 2009, p.76). A smaller national study of almost 8000 young people found that 8.6% of Indigenous children (6–11 years) were obese and 16% were overweight (O’Dea, 2006). This is comparable to the 2007 Australian National Children’s Nutrition and Activity Survey, which found that 6% of children were obese and 17% of children were overweight, although this survey does not distinguish between Indigenous and non-Indigenous children (Australian Government Department of Health and Ageing, 2008a, p.2). Similarly, the National Health Survey (2007–08) found that 8% of children were obese and 17% were overweight (Australian Bureau of Statistics, 2009c, p.8).

There are clear associations between ethnicity and obesity.¹⁵ A recent Australian study found that among young people from Middle Eastern and Pacific backgrounds, obesity may be up to four times more prevalent than among those with Anglo/Caucasian backgrounds. The study also reported the influence of socio-economic status (SES), with “those of lower SES having a consistently greater prevalence of obesity than their higher SES peers”. The impact of SES was also observed within ethnic groups: “boys of low SES had a generally greater BMI than boys of middle or high SES” (O’Dea, 2006, p.4). Similarly, a US review emphasised the complex interplay between socio-economic status, ethnicity and race on obesity and observed that obesity rates were higher for African American and Hispanic youth than “white peers” (Kumanyika and Grier, 2006, p.189). Higher rates of obesity in “minority and low-income communities are associated with...economic stresses, reduced access to affordable healthful foods and opportunities for physical activity, overexposure to targeted advertising and marketing of energy-dense foods” (Kumanyika and Grier, 2006, p.198).

It is, however, important to acknowledge the different cultural interpretations of being overweight, since “many cultures value fatness as a sign of family prosperity, fertility and success”. It is therefore necessary for health professionals and educators to avoid blame and marginalisation and to operate within the broader framework of the family and cultural context (O’Dea, 2008, p.7).

Overweight and obesity have serious health implications for children, including an increased risk of developing asthma and Type 2 diabetes. In addition, overweight and obese children may be susceptible to bullying and “victimisation”, leading to negative peer interactions and experiences

of school (Australian Institute of Health and Welfare, 2009, p.75), all of which can detrimentally affect mental health and learning.

Current concern about obesity as a national health issue is reflected in the development of Australia: The Healthiest Country by 2020 (Preventative Health Taskforce, 2009a; 2009b). The strategy aims to “halt and reverse the rise in overweight and obesity in Australia by 2020” through numerous targets that address physical activity and nutrition. It employs a collaborative approach involving schools, workplaces and governments, federal, local and state. The NSW Government Plan for Preventing Overweight and Obesity in Children, Young People and their Families 2009–2011 confirms that concerns about obesity are also shared at the state government level.

Australian physical activity guidelines recommend that children 5–18 years do at least 60 minutes of physical activity each day (Department of Health and Ageing, 2004). Promisingly, The Australian National Children’s Nutrition and Physical Activity Survey found that the majority of children in the study (9–16 years) met the physical activity guidelines. “On any given day, there was a 69% chance that any given child would get at least 60 minutes of moderate to vigorous physical activity” (Australian Government Department of Health and Ageing, 2008a, p.2).

The second part of the physical activity guidelines relate to non-educational screen time and recommend that children 5–18 years spend no longer than two hours per day on the computer, watching television or playing video games (Department of Health and Ageing, 2004). The Australian National Children’s Nutrition and Physical Activity Survey found that few children met these guidelines, “on any given day, there was only a 33% chance that any given child would not exceed 120 minutes of screen time” (Australian Government Department of Health and Ageing, 2008a, p.2).

Other research indicates that approximately 68% of males and 76% of females 15 years and over had a “sedentary or low exercise level”¹⁶ (Australian Bureau of Statistics, 2009a, p.1). An Australian study exploring the sedentary behaviours of Australian¹⁷ adolescents (11–15 years) observed that “boys spent more time engaged in sedentary behaviour than girls” and “time spent being sedentary increases with age” (Hardy et al., 2006, p.534). In addition, “urban students and students from Asian-speaking backgrounds” spent more time sedentary than adolescents from “rural areas or other cultural backgrounds” (Hardy et al., 2006, p.539). This is problematic and needs to be addressed because of the clear impact of inactivity on health: “children who spend significant amounts of time in sedentary states”, “increase their likelihood of poor fitness, raised cholesterol and being overweight in adulthood” (Department of Health and Ageing, as cited in Australian Bureau of Statistics, 2009d, p.8).

Recent research explains the reasons for variations in levels of sedentary activity. Children “see enjoyment and social interaction with peers as reasons to be physically active”, they also experience greater enjoyment when “not being forced to compete and win, but encouraged to experiment with different activities” (Allender, Cowburn and Foster, 2006, p.829). Significantly, “underweight and obese children tended to have a lower physical activity level than children of normal weight” (Australian Government Department of Health and Ageing, 2008a, p.2). Predictably, teenage girls were motivated by “concerns about maintaining a slim body shape” and faced “pressure to conform to social stereotypes”. Many teenage girls viewed “impressing boyfriends and other peers” as “more important than physical activity”. These image-driven concerns created an “increased interest in non-active leisure” (Allender, Cowburn and Foster, 2006, pp.826; 829; 831–832).

The Australian National Children’s Nutrition and Physical Activity Survey found that the highest level of non-observance of dietary guidelines was in the following categories “vegetables, saturated fat and sugar for all age groups as well as fruit and dairy intake for those 9 years and

over". Only 1–2% of older children "appeared to consume 3 serves of fruit if juice was not included" and "about one quarter of children in the younger age groups and 1–11% of the older age groups met the guideline for vegetable intake" (Australian Government Department of Health and Ageing, 2008a, pp.2; 24).

A recent Australian study exploring the dietary patterns of over 1600 adolescents (aged 14 years) identified two dietary patterns, "healthy" and "western", and found a positive association between the "healthy pattern" and "higher maternal education". The results indicate the potential for "family factors" and "parent behaviours" to positively influence diet; "the 'healthy' dietary pattern was positively associated with better family functioning, independent of family income and maternal education". "Parental health behaviours" such as smoking were another important negative influence on diet and "poorer dietary habits in adolescents" were associated with "more television viewing". This provides a sound justification for the inclusion of family centred approaches when tackling overweight and obesity among children and young people (Ambrosini et al., 2009, pp.1812; 1814).

For young children in particular, the family is one of the biggest influences on their "food preferences and intake patterns" (Vereecken, Keukelier and Maes, 2004, p.93). This influence is exerted in several ways. In particular, the decisions made by parents determine the food that is available for children. Parents play three important food roles: they are "role models" of consumption, "providers of food", and they control the eating environment (Pettigrew, 2009, p.149; Vereecken, Keukelier and Maes, 2004). Parents also model decisions about food to their children through choices made at the supermarket, including the extent to which they use food nutrition labels or purchase products out of habit.

Research from the United States exploring children's fruit, juice and vegetable consumption suggests that a number of factors are needed for parents to promote increased consumption. Parents must: believe that fruit, juice and vegetable consumption is positively linked to their child's development, and possess the "knowledge, skills and self-efficacy" to purchase, prepare and encourage their children to eat fruit, juice and vegetables (Cullen et al., 2000, p.347).

In relation to the purchase of food, one of the skills parents need is the ability to comprehend the nutritional information on food labels. This has two benefits: firstly, consumer use of food labels is associated with making healthy food choices (Barreiro-Hurle, Gracia and de-Magistris, 2010). Secondly, this models good practice to offspring and leads to healthier food intake. However, the use of food labels is also linked to an individual's nutrition knowledge and level of motivation (Soederberg Miller, Gibson and Applegate, 2010). In addition, research highlights that buying habits are also shaped by competing factors such as price, convenience, packaging and in-store marketing (Maubach, Hoek and McCreanor, 2009, p.301).

Parental modelling of positive food choices is also shaped by socio-economic factors, including the mother's level of education. A recent Flemish study comparing preschool children's dietary habits with their mother's level of education found an association between mothers with low and medium education levels and the "lower dietary adequacy" of their children.¹⁸ The same authors observed a link between children's frequent soft drink consumption and the lower education levels of their mothers (Vereecken, Keukelier and Maes, 2004, p.101).

Conversely, the study also observed that "frequent consumption of fruit and vegetables, restrictions, verbal praise, negotiation and restraint from negative modelling" were prevalent approaches among mothers with higher levels of education (Vereecken, Keukelier and Maes, 2004, p.101). Promisingly, the authors concluded that providing nutrition education and information to young mothers can lead to improvements in the food intake of their children (Vereecken and Maes, 2010, pp.44; 50). Given that a mother's food intake appears to exert a

strong influence on the development of her young children's healthy eating habits, it is vital to equip parents with the skills to help them become better models of healthy eating (Vereecken, Keukelier and Maes, 2004).

A recent Australian study analysed over 200 customers' shopping docket to compare the supermarket food purchases of people from low and high SES area supermarkets. The study found that "low SES area shoppers purchased significantly more non-core foods compared with high SES area shoppers". Items categorised as non-core foods include chips, soft drinks and cordials. Interestingly, this was not linked to the shelf space devoted to these items, which did not alter significantly between supermarkets in high and low SES areas. The reasons for this pattern are not explored; however, since participants in low SES areas reported shopping for significantly more people than those from higher SES areas, it is possible that household size influences food choices (Melchers, Gomez and Colagiuri, 2009, pp.244; 245). The higher purchase of non-core foods in low SES areas is particularly concerning given that the risk of being overweight and obese, for people residing in low SES areas, is compounded by other factors including neighbourhood safety and access to gym facilities (Vieweg et al., 2007 as cited in Melchers, Gomez and Colagiuri, 2009).

Despite consumer interest in nutrition information on food labels (Grunert and Wills, 2007), there are numerous obstacles to the use of nutritional labels, including lack of motivation as well as literacy barriers (Sullivan, 2003). A recent New Zealand study observed that although parents had the desire to select healthy food for their children, practicalities such as "price, marketing and pressure from children" got in the way, and parents reported that food labels had little influence on food choice. Instead, parents relied on alternative influences such as recommendations from friends, the media or existing knowledge. Parents also reported that food choices were shaped by the desire to avoid certain additives such as "artificial colours, flavours, or preservatives" (Maubach, Hoek and McCreanor, 2009, p.301).

Level of education, country of origin and other cultural factors may also play an important role in consumer use of food labels (Yin et al., 2009). Other barriers to the effective use of nutritional information to determine food purchases include: misunderstanding product weight, frustration stemming from incomplete understanding of label information, and disinterest due to package print and presentation (Sullivan, 2003).

It is crucial to distinguish between consumer use and comprehension of food labels. A recent study from the United Kingdom involving in-store supermarket observations and interviews found that 27% of participants referred to nutrition information on the package when making a selection. However, 70–90% of participants demonstrated the ability to use nutrition information on packaging to make health-related decisions about products. This gap between the ability to use nutrition information and the actual use of nutrition information at the supermarket is attributed to interest in eating healthy food, the only variable which was found to have a direct effect on the use of nutrition information in the supermarket (Grunert, Wills and Fernandez-Celemin, 2010). In contrast, another review suggested that participants' self-reported use of food labels was inflated, and that actual use of food labels was much lower. The authors suggest that this is because much of the reported use of labels was simply "accessing the information without actually using it to help make a food purchasing decision" (Mhurchu and Gorton, 2007, p.110).

It is clear that, to maximise their effectiveness, food labels need to be accessible and easy to understand, and parents need to be motivated to use them. Further, developing parents' interest in eating healthy food has the greatest potential to contribute to more prevalent use of nutrition information on food labels (Grunert, Wills and Fernandez-Celemin, 2010).

Food insecurity

Food insecurity is “the limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways” (Kendall, as cited in Nolan, Rikard-Bell, Mohsin and Williams, 2006, p.247). There are four categories of food insecurity “food secure”, “food insecure without hunger”, “food insecure with hunger” and “food insecure with severe hunger” (Temple, 2008, p.651).

“Food access”, or the “capacity to acquire and consume a healthy diet” is also thought to influence food insecurity (Nolan, Rikard-Bell, Mohsin and Williams, 2006, p.247). A recent Australian paper observed that, although higher income provided protection from food insecurity, “social and demographic factors act independently of income to determine the risk of food insecurity through factors influencing access to food, including: transport, skills and knowledge, storage facilities, preparation and cooking facilities, time and mobility and social support” (Temple, 2008, p.662–663). The link between access to food and food security was highlighted in an Australian study of three disadvantaged communities in south-western Sydney, which found that the “ability to access shops”, the cost of food and “having adequate time to shop, prepare and cook food independently predicted household food insecurity” (Nolan et al., 2006, p.252).

Further, the cost of food means that low-income families “may be forced to choose cheaper rather than healthier foods” (Nolan et al., 2006, p.252), this is one of the reasons why “food insecurity is associated with poor health” (Booth, as cited in Nolan et al., 2006, p.247). Food insecurity is a key health issue for young people. It is important to note that although young people may have the knowledge and willingness to make positive choices about their food intake, they generally lack agency and must rely on the decisions made by their parents or carers, which are shaped by financial constraints and numerous other factors such as the desire for convenience. Parents need “information and support” to help promote healthy child development (Giallo, Treyvaud, Kienhuis and Matthews, 2008, p.43).

Considering the potential health implications, it is essential to “address structural issues underpinning food insecurity, such as poverty and geographical isolation” (Nolan et al., 2006, p.252)¹⁹ as well as the central role of parental decisions. It is alarming that “households with no capacity to save money were five times more likely to be food insecure than households that could save” (Nolan et al., 2006, p.252), particularly considering the important interplay between “nutritional stability, young children, and learning” (Winicki and Jemison, 2003, p.8).

Access to low-cost, healthy food

The “availability and cost” of healthy food is an issue facing many Indigenous Australians (Crengle et al., 2009, p.73) that is clearly linked to undernutrition and other health conditions (Australian Bureau of Statistics, 2008b, p.xxii). For example, compared with their non-Aboriginal and Torres Strait Islander counterparts, Aboriginal and Torres Strait Islander children are “nearly 30 times more likely to suffer from nutritional anaemia and malnutrition up to 4 years of age” (Australian Medical Association, in Freemantle and McAullay, 2009, p.67). In 2004–05, only 24% of Indigenous children (12–14 years) in non-remote areas met the daily recommended fruit intake and 59% met the recommended daily vegetable intake. Among Indigenous teenagers (15–17 years), only 20% met the recommended daily fruit intake and 61% met the vegetable consumption guidelines (Australian Bureau of Statistics, 2008b, p.86). Given that “poor nutrition severely limits a child’s capacity to concentrate and learn at school” (Australian Institute of Health and Welfare, 2005, p.23), it is alarming to consider that “Australia is the only developed country with high rates of undernutrition in its Indigenous population” (Ruben, 2009, p.1290). Consequently, a key target of the Close the Gap Campaign is a “dramatic increase in the

availability of fresh and healthy food supplies in Aboriginal and Torres Strait Islander communities” (Close the Gap 2030 Community Guide).

A more recent study categorised children’s fruit and vegetable consumption into different age ranges but did not differentiate between non-Indigenous and Indigenous participants; the latter represented just 3% of children surveyed. Nevertheless, it provides a useful comparison, and 51% of children surveyed (9–13 years) met the recommendations for fruit consumption (Australian Government Department of Health and Ageing, 2008a, p.25), which is more than double the reported data on Indigenous children in both age brackets. As an indication of their importance, obesity and nutrition were identified as strategic areas for action in the Overcoming Indigenous Disadvantage Report (2009). Without support, the disadvantage children experience today is likely to continue into adulthood – and on to the next generation – which is why The Smith Family works in partnership with other caring Australians to help disadvantaged children.

Dental health

Dental decay is common among children and adolescents in Australia (Australian Institute of Health and Welfare, 2009). Indeed, it is the “most common chronic disease among children” (Parliament of NSW, 2009, p.123). The 2003–04 Child Dental Health Survey revealed that almost half of children aged six years had “a history of decay in the deciduous (‘baby’) teeth” with an average of two “decayed, missing and filled deciduous teeth per child”. In addition, “between 40% and 57% of 12–15 year old teenagers had some history of decay in their permanent teeth” (Armfield, Spencer and Brennan, 2009, p.vi).

The National Dental Telephone Interview Survey revealed that from 1994 to 2005, roughly 8% of 5–11-year-old children who visited the dentist in the previous 12 months had an “extraction” (Ellershaw and Spencer, 2009, p.37). In the same time period approximately 30% of 5–11-year-olds received a filling (Ellershaw and Spencer, 2009, p.41). Significantly, there was a decline in the number of children (5–11 years) who underwent preventive treatment, and “this decline was particularly evident among uninsured children, children living in rural and remote areas and non-cardholders” (Ellershaw and Spencer, 2009, pp.vi; 37; 41).

This decline in preventive treatment has financial and dental health consequences. From 1994 to 2005,²⁰ “children who usually visited for a problem reported a higher prevalence of cost preventing recommended dental treatment than those who usually visited for a check-up”. This is a troubling trend, with financially disadvantaged children suffering on two fronts: firstly through not accessing preventive treatments and then when presenting with a problem, the cost can make dental treatment prohibitive (Ellershaw and Spencer, 2009, p.54).

The impact of disadvantage on children’s dental health was also reflected in the 2001 Child Dental Health Survey, which documented a trend of lower tooth decay among “higher socioeconomic groups”. Conversely, “among 5–6-year-olds, the average dmft of children in the lowest socioeconomic group was approximately 70% higher than for those in the highest socioeconomic group” (Armfield, Slade and Spencer, 2006, p.26)²¹. In addition, the 2003–04 Child Dental Health Survey observed that “children with immediate treatment needs were found to have greater decay experience in comparison to children judged not in immediate need...approximately 1.7 to 3.0 times higher than the national averages” (Armfield, Spencer and Brennan, 2009, p.32). The higher prevalence of decay among children “requiring immediate treatment reflects both the accumulated amount of dental disease and the methods of targeting and delivering school dental services” (Armfield, Spencer and Brennan, 2009, p.32).

Alarming, in New South Wales alone, as of December 2008, there were 25,439 children on public dental waiting lists. Over 18,000 of these were waiting for assessment, and the remainder were waiting for treatment. These lengthy waiting lists mean “prevention services are neglected, with a concentration on problems at the crisis stage, which escalates oral health problems” (Parliament of NSW, 2009, p.124).

The poor dental health of Indigenous children is a recurring research theme (Hudson, 2009), and “many Aboriginal and Torres Strait Islander children experience extensive destruction of their deciduous teeth, a condition rarely seen in the rest of Australia” (Jamieson, Armfield and Roberts-Thomson, 2007a, p.74). A recent report observed that a greater proportion of Aboriginal and Torres Strait Islander children aged 4–15 years had higher rates of dental caries than other Australian children. This is substantiated by the higher rates of decayed, missing and filled teeth (dmft) of Indigenous children. For example, the mean dmft of 6-year-old Indigenous children was 2.4 times the mean dmft of non-Indigenous children (Jamieson, Armfield and Roberts-Thomson, 2007a, p.61). Even among children in the disadvantaged (4–6 years) category, disadvantaged Indigenous children fared worse, with a dmft score 2.5 times higher than their non-Indigenous peers. Further, Indigenous children under 5 years had a hospitalisation rate of almost one and a half times that of other Australian children for dental treatment (Jamieson, Armfield and Roberts-Thomson, 2007a, p.62).

Alarming, less than 5% of remote Indigenous preschool children regularly brush their teeth (Jamieson, Armfield and Roberts-Thomson, 2007a). Not only are there high rates of dental disease among Indigenous children, but other research has reported low rates of dental treatment: 9% of participants aged 15–24 had never visited a health professional about their teeth. Yet, in the same age bracket, 18% of participants had lost 1–4 of their teeth (National Aboriginal and Torres Strait Islander Health Survey 2006).

Apart from pain, there are broader implications of oral disease that can impact upon Indigenous people, including tooth loss, problems with speech and eating and decreased self-esteem (Low et al., as cited in Jamieson, Armfield and Roberts-Thomson, 2007a), all of which can negatively affect learning. In addition, it is predicted that the oral health problems of Indigenous Australians will increase due to a number of factors including “limited access to dental services, low fluoride content in many communities’ drinking water” and “limited culture-specific” oral health promotion initiatives (Jamieson, Armfield and Roberts-Thomson, 2007a, p.74). This justifies the inclusion of tooth decay as part of the strategic areas for action²² identified in the Overcoming Indigenous Disadvantage Report (Steering Committee for the Review of Government Service Provision, 2009).

In 2008, The Smith Family, a facilitating partner in the Australian Government’s Communities for Children (C4C) initiative, launched Food for Smiling (C4C Fairfield), an oral health promotion initiative that also emphasises the importance of healthy eating. The method of delivery is unique, incorporating oral health and healthy eating into an informal information package for parents. A recent evaluation of Food for Smiling revealed that the program “appears to have created significant behavioural changes in parents...seventy six percent of participants surveyed three to four months after attending a session reported changing their children’s dental routine and thirty three percent, their children’s diet as a direct result of attending the session” (Smeaton, n.d., p.8).

Eye and ear health

Eye and ear problems “impair participation in education and limit employment opportunities” (Hudson, 2009, p.5). Among Indigenous children, the occurrence of “ear/hearing problems, including total/partial hearing loss” and middle ear infections is three times higher than for non-

Indigenous children (Australian Bureau of Statistics, 2006, p.6). A recent study found a link between children's exposure to cigarette smoke in the home and "increased risk of otitis media", middle ear infection (Crengle et al., 2009, p.85). "Chronic suppurative otitis media (CSOM) or 'runny ears'" is a consequence of recurring episodes of otitis media. It typically involves a ruptured eardrum and discharge resulting in "fluctuating and sometimes permanent hearing loss" (National Aboriginal Community Controlled Health Organisation, as cited in Australian Institute of Health and Welfare, 2005, p.22). Despite the absence of reliable evidence examining the effects of CSOM on learning, it is clear that Indigenous children whose hearing is damaged are significantly disadvantaged in the classroom, particularly in the areas of "reading and language acquisition". In addition, evidence suggests that Indigenous children with CSOM have lower school attendance rates than other children (Australian Institute of Health and Welfare, 2005, p.23).

Trachoma is an eye disease of early childhood and the most common cause of infectious blindness. Australia is "the only developed country to still have blinding endemic trachoma". Research indicates that between 20% and 30% of Indigenous children in "rural and remote Australia" are afflicted with trachoma. Trachoma can be treated with antibiotics and prevented with good facial hygiene (Crengle et al., 2009, p.85). Education and preventive measures, if communicated effectively, could make a significant contribution to reducing the risk of eye and ear problems and enhance the learning of Indigenous students by preserving their vision and hearing. Significantly, research exploring the links between health and education among Indigenous people is limited (Johnston, Lea and Carapetis, 2009). However, a priority for The Smith Family is to provide ongoing opportunities for Indigenous Australians through education and community-based initiatives. This priority is reflected in The Smith Family's development of a Reconciliation Action Plan to assist Indigenous children and families to fully benefit from our education and learning support programs.²³

Eye and ear problems can have a serious impact upon children's speech and learning. The Smith Family acknowledges the importance of early language development through its work with C4C Fairfield. The Playing Listening and Talking (PLAT) with Kids project actively promotes language and early literacy skills. The project helps families develop the skills to share stories with their children as well as improve parental knowledge on the importance of language and play. The PLAT team includes speech and language therapists, occupational therapists and early years teachers.

Part Four: Enhancing learning through improved health and nutrition

Supporting children's education and learning is one of the most effective means of breaking the cycle of disadvantage and ensuring all children have the same opportunity to realise their potential. The research suggests that part of the way this can be achieved is through initiatives focused on the health and nutrition of Australian children and young people. There is a growing body of research that highlights positive links between nutrition, physical activity, learning and school performance.

Physical activity

Research has reported varying degrees of improvement in academic performance as a result of physical activity interventions, ranging from positive benefits associated with increased activity and reduced screen time,²⁴ to investigations into more direct links between physical activity and learning. Both physiological factors including "cerebral blood flow" and "neurohormonal balance" (Shephard, 1996, p.33), and psychological factors such as positive "self-esteem" associated with physical activity (Kwak et al., 2009, p.916) have been proposed as elements involved in the link between physical activity and academic achievement. A recent study exploring the link between physical activity and cognition found that "fit" children "responded faster and more accurately" to computer-based "attention and working memory" tests. The authors concluded that "aerobic fitness may have had a general, positive effect on brain function" (Hillman, Castelli and Buck, 2005 as cited in Castelli and Hillman, 2007, p.27).

When school grades are used as the criteria for measuring academic performance, research has observed a positive impact of physical activity, particularly when the activity is "vigorous" (Castelli and Hillman, 2007, p.28). However, the use of standardised assessments as a measure of academic performance has had mixed results. The Californian Department of Education observed links between physical fitness and higher achievement in standardised reading and maths tests in Years 5, 7 and 9 (California Department of Education, 2001 as cited in Castelli and Hillman, 2007, p.28). A recent study of over 200 Year 3 and Year 5 students observed positive links between "aerobic capacity" and "academic achievement" (Castelli, Hillman, Buck and Erwin as cited in Castelli and Hillman, 2007, p.28).

The degree of activity is an important consideration when exploring the link between physical activity and academic performance (Kwak et al., 2009), "in girls, there is an association between more time spent in physical activity and higher grades". This may account for "the absence of a relationship between physical activity and academic achievement observed in other studies" (Kwak et al., 2009, p.916). However, the authors acknowledged several limitations of their study, including its "cross sectional design" and warned that "no conclusion can be drawn from this study whether vigorous physical activity or fitness leads to improvements in academic achievement" (Kwak et al., 2009, pp.916–917).

A US evaluation of the Making the Grade with Diet and Exercise program, revealed a "67% decline in nurse visits", a reduction in the number of visits categorised by the nurse as motivated by boredom, and a 58% decrease in the "total number of discipline referrals in the first four years" (Sibley et al., 2008). The program, conducted in one school over a six-year period, involved scheduling 10–20 minutes of physical activity for students each morning. Significantly, "writing improved 19% the first year after the intervention and maintained the improvement in each subsequent year" and there were improvements in maths and reading tests, with more students

passing each year. However, the authors acknowledged that there were no control groups and that different cohorts of students were used to compare variables such as test results, making it difficult to substantiate the impact of the program on academic achievement (Sibley et al., 2008, pp.41–43).

In Australia, an evaluation of the School Health, Academic Performance and Exercise (SHAPE) study provides a rare example of a randomised trial. Although “the randomised trial data provide little direct support for the causal role of physical activity in increasing academic performance”, the authors argued that there was no decline in academic performance despite reduced class time, providing some support for a link between physical activity and academic performance (Dwyer, Blizzard and Dean, 1996, p.31).

Another study concluded that “the rate of academic learning per unit of class time is enhanced in physically active students”, making concerns about time constraints an invalid justification for avoiding physical activity initiatives in schools (Shephard, 1996, pp.33–35). Similarly, another study observed “a positive association between academic performance and physical activity and physical fitness” presumably because “physical fitness has a positive influence on concentration and memory and on classroom behaviour”. To be beneficial, physical activity must be promoted from early childhood and take a collaborative approach involving “the family unit, the paediatric community, day care centres, and preschools” (Strong et al., 2005, pp.735; 737).

Nutrition, food insecurity and school meals

Diet quality also impacts upon academic performance and “is related to development, cognitive and behavioural outcomes” (Sorhaindo and Feinstein, 2006, p.22). A Taiwanese study found a “substantial positive association between unfavourable overall performance and high intake of low-quality foods, such as sweets and fried foods and low intake of high-quality foods” such as fruit and vegetables. Although this study, like others exploring the links between food and learning, has its limitations,²⁵ “the evidence for promotion of physical activity and a diet low in fat, salt and sugar but high in fruits, vegetables and complex carbohydrates remains unequivocal in terms of health outcomes for all schoolchildren” (Ellis et al., 2008, p.933).

At the simplest level, “poor diet” may impact negatively on a child’s experiences at school and “nutritional deficiencies prior to school entry” can potentially affect “cognitive outcomes in school-aged and adolescent children”. Research suggests that, in the short term, nutrition can affect “behaviour” and “concentration”, which can potentially impact upon “school performance”, peer interactions and “self-esteem”. Poor nutrition could also negatively affect immunity, contributing to increased sickness and absence from school. Therefore the “early years” is an important focal point for the development of healthy eating habits, and collaborative approaches involving “schools, families, government departments and other agencies” are needed in order “to improve children’s nutritional intake inside and outside of school” (Sorhaindo and Feinstein, 2006, pp.21–23). This affirms the approach of The Smith Family, which supports not only children but also the families and communities who provide the crucial nurturing relationships and supportive learning environments a child needs.

A recent Canadian study exploring diet quality and academic performance identified “dietary adequacy and variety” as factors impacting upon academic performance. The study involved 5,200 students and consulted data from the standardised literacy test administered by the Nova Scotia Department of Education. Among the findings were that “students with an increased fruit and vegetable intake and lower caloric intake of fat were significantly less likely to fail the assessment” (Florence, Asbridge and Veugelers, 2008, p.212–214).

The study highlighted “enhanced learning as an additional benefit of a healthy diet in childhood” and concluded that “increased parental income and educational attainment were significantly associated with decreased odds of poor academic performance” (Florence, Asbridge and Veugelers, 2008, p.212–214). Whereas “children from socio-economically disadvantaged backgrounds are more likely to have poor diets and poor academic performance resulting in lower levels of educational attainment and poorer health outcomes”. The impact of socio-economic disadvantage on diet quality and academic performance, compounded over time, may lead to “future increases in socioeconomic disparities in health” (Florence, Asbridge and Veugelers, 2008, p.214) and generational disadvantage.

One recent Australian initiative was an Outreach School Garden Project involving two remote, Indigenous schools. Teachers used the garden to incorporate a nutrition focus into all of the Key Learning Areas of the curriculum, and as a result, student knowledge and skills in nutrition and gardening increased over the six-month period of the study. The project facilitated an emphasis on nutrition that extended “beyond the garden”, and the whole school became excited about the project and adopted “a nutrition focus”. Positive improvements in the physical and social environment at the school were also observed (Viola, 2006, p.238).²⁶

Food insecurity also impacts upon learning. A US study of kindergarten children found that “math scores decline with increasing levels of food insecurity” (Winicki and Jemison, 2003). Although “unobservable characteristics may affect both math scores and food insecurity”, “children from homes with any level of nutritional instability fare worse than those that are truly food secure”. Further, there are positive associations between food security and academic achievement in relation to “ability entering school and learning over the school year” (Winicki and Jemison, 2003, pp.3; 6; 8).

A commonly observed benefit of the provision of school meals is improved attendance. Predictably, this benefit is probably greatest “in areas of greatest poverty”. Increased attendance due to the provision of school meals could improve “academic performance” and allow more time for social interactions, resulting in more positive associations with school. It is also important to consider the immeasurable benefits associated with school meal provision that may contribute to a more positive experience of school, including improved concentration, reduced illness and “the worth and pleasure derived from having a full stomach and eating a good meal”²⁷ (Kristjansson et al., 2009, pp.26; 29).

Breakfast

The relationship between breakfast and learning is complex,²⁸ however, there is widespread acceptance that “missing breakfast has a transient detrimental effect on cognition in the late morning” (Grantham-McGregor, 2005, p.155) and that eating breakfast is beneficial.²⁹ General health benefits associated with breakfast consumption include the likelihood of “better overall diet quality” and “more healthful body weights in children and adolescents, despite possibly higher daily energy intakes in breakfast consumers”. Other health benefits associated with consumption of a quality breakfast include “increased levels of physical activity” (O’Sullivan et al., 2008, p.252).

A recent Australian study of over eight hundred youths aged 13 to 15, 11% of whom fell into the “clinical range for mental health morbidity” concluded that “a higher-quality breakfast, consisting of foods from multiple food groups, was significantly related to better mental health scores in adolescents”³⁰ (O’Sullivan et al., 2008, p.257), highlighting that diet quality can impact positively on mental health.

The associations between student learning and mental health, including attitude and motivation, are widely recognised (Kopela and Clarke, 2008). Mental health can detrimentally affect learning. This is significant given that the World Health Organization predicts that “depression will be the second greatest disease burden on the world by the year 2020” (Cahill and Freeman, 2006, p.82). Depression is already the most prevalent mental health problem among young Australians aged 12–25 years (Australian Institute of Health and Welfare, 2007), and depressed adolescents are “more likely to develop problems” with academic performance than their peers (ACER, 2003, p.34). In addition, anxiety disorders can contribute to “impaired peer relationships, school absenteeism and self-concept problems” (Campbell, 2008, pp.16; 17). In Australia, the development of initiatives such as MindMatters, KidsMatter and HeadSpace provides indirect evidence of the impact of mental health on young people.

There are a number of positive associations between breakfast consumption and learning, including improved attendance and punctuality where a breakfast program exists (Fernald and Grantham-McGregor, as cited in Taras, 2005). Breakfast has also been shown to have a positive impact on various cognitive skills in the short term. These skills include “memory”, “academic performance”, “psychosocial function” and “mood” (Cueto, as cited in Taras, 2005, p.213).

However, the nutritional quality of the food consumed for breakfast is important; it is not enough to simply eat breakfast. Recent research found that a quality breakfast composed of “three or more food groups” was “positively associated with overall diet quality” (O’Sullivan et al., 2008, pp.252; 255). Significantly, another study concluded that “adolescents who eat breakfast and other meals regularly are more likely to display other healthy behaviours, such as a good diet, lower alcohol consumption and abstinence from smoking” (Lien, as cited in O’Sullivan et al., 2008, p.254).

Conversely, “breakfast skippers may be less likely to engage in physical activity” which may lead to weight gain. Skipping breakfast is a behaviour commonly “observed in overweight or obese children”. There is also some evidence that among children and adolescents, breakfast skipping “increases with age, may be more common among certain minority ethnic or low socioeconomic groups, and seems to be associated with other lifestyle factors that may be detrimental to health” (Rampersaud et al., 2005, pp.754; 744).

Significantly, there is evidence of a link between disadvantage and the consumption of poor quality breakfast. Adolescents with “lower breakfast quality scores were significantly more likely to be female, have mothers with a younger maternal age and a lower level of maternal education, come from lower-income families, have higher screen use and be less physically active” (O’Sullivan et al., 2008, p.252). Without support, the disadvantage young people experience today is likely to continue into adulthood – and on to the next generation.

Part Five: Current health promotion strategies and guidelines

Numerous government and non-government initiatives have been developed to address the key health issues that children and young people face as outlined in this paper. Many of the initiatives, including the Federal Government's Preventative Health Taskforce (2009), have a preventive focus and can be categorised into: overweight and obesity, healthy eating and physical activity (Preventative Health Taskforce, 2009a; 2009b). *The National Preventative Health Strategy* focuses on all Australians and articulates the need to “act early and throughout life” (Preventative Health Taskforce, 2009b, p.6).

For young children, “the Government has committed \$4.5 million over five years from 2007–08 to 2011–12 to develop and distribute guidelines on healthy eating and physical activity in early childhood settings”, part of the *Plan for Early Childhood and Plan for Tackling Obesity* (Australian Government Department of Health and Ageing, n.d.). Another recent federal development in child health (0–8 years) is the 2009 *National Early Childhood Development Strategy: Investing in the Early Years*. The strategy, developed under the authority of COAG in collaboration with the state and federal governments, seeks to “ensure that by 2020 all children have the best start in life”. The strategy builds on current national commitments, including: the “National Nutrition and Physical Activity initiatives such as the National Breastfeeding Strategy and Healthy Eating and Physical Activity Guidelines for Early Childhood Settings”; “The National Partnership Agreement on Preventive Health with a focus on the early years”; and “The National Healthcare Agreement”. *The National Early Childhood Development Strategy* also identifies gaps that need to be addressed, including the need to “improve support for vulnerable children and their families through improved service response and accessibility, particularly...children at risk of homelessness, some Indigenous and CALD children, children in jobless families, and children in or at risk of entering the child protection system” (Council of Australian Governments, 2009, pp.4; 24–27). Existing initiatives in the areas of overweight and obesity, healthy eating and physical activity are discussed below.

Overweight and obesity

Obesity is widely recognised as a major health issue with significant health implications for individuals, and more broadly, major national health and economic implications, as discussed in *Part Three*. As such, it is one of three priorities identified in the National Preventative Health Strategy, *Australia: The Healthiest Country by 2020*³¹ (Preventative Health Taskforce, 2009). The strategy aims to reverse the rates of obesity and overweight, making Australia the healthiest nation by 2020. To do so it has set numerous targets in three phases (from 2010 to 2020) that address physical activity and nutrition. The strategy also employs a collaborative approach involving schools, workplaces and governments.³²

Some of the major targets of the strategy are to “increase levels of physical activity and reduce sedentary behaviour” and “increase the availability and demand for healthier food products”. In addition, the strategy will “fund, implement and promote” programs that specifically address the needs of students, “people in low-income communities” and “Indigenous communities” in order to encourage physical activity and healthy eating and reduce the prevalence of obesity (Preventative Health Taskforce, 2009, pp.44; 14–15).

The strategy also seeks to involve the food and beverage and advertising industries (Preventative Health Taskforce, 2009b, p.44) to facilitate a reduction in the marketing of “energy-

dense nutrient-poor food and beverage products” by banning these advertisements on television, both “free-to-air and Pay TV”, before 9pm (Preventative Health Taskforce, 2009b, p.14). In addition, marketing will “encourage people to improve their levels of physical activity and healthy eating”, some of which will be specifically directed towards “socially disadvantaged groups” (Preventative Health Taskforce, 2009b, pp.14; 44).

The *NSW Government Plan for Preventing Overweight and Obesity in Children, Young People and their Families 2009–2011* incorporates a range of initiatives and agencies; its focus is “family or settings-based”. The plan advocates a collaborative approach geared towards behavioural change at the community and individual level that includes the “not-for-profit sector and communities”. The plan will market five key consumer messages: be active one hour each day, drink water, turn off the television, eat more fruit and vegetables, and eat fewer snacks (NSW Department of Health, 2009, p.5).

The importance of family based strategies is also reflected in current literature. Recent research highlights key practices that are relevant to child obesity prevention: “eating together as a family, parents’ control over the quantity of food consumed, eating in front of the television, and fast food consumption”. Research also suggests that strategies should focus on improving specific parenting behaviours. For example, it may be productive to inform parents from medium and low SES backgrounds about “the negative effects of eating meals in front of the television” and the importance of healthy school canteens (Pettigrew, 2009, pp.146; 149).

Obesity Prevention: Priorities for action, developed by the Obesity Policy Coalition, was established in 2007 “to progress the development of policies that will support obesity prevention, particularly for children” (Obesity Policy Coalition, 2007, p.2). Some of the Coalition members include The Cancer Council Victoria and Diabetes Australia – Victoria. The Coalition has identified three areas for “federal government policy initiatives to address and reduce the burden of overweight and obesity in Australia”. They are, a ban on all advertising of “unhealthy food” aimed at “children and adolescents under 16 in all media”, mandating a “front-of-pack signpost system” using the colours red, orange and green to indicate “levels of fat/salt/sugar”;³³ “addressing tax anomalies” by removing cereals with greater than 27% added sugar from the group of cereals that are tax exempt;³⁴ and implementing tax benefits for those who use public transport or bicycles (Obesity Policy Coalition, 2007, p.2).

Healthy eating and physical activity

Federally, the Department of Health and Ageing has developed the website *A Healthy and Active Australia* with a number of links to information and initiatives centred on “promoting healthy lifestyles, addressing obesity, and taking preventive measures to improve the health of all Australians”. Many of the initiatives are based on *Australia’s Physical Activity Recommendations for 5–12 year olds and 12–18 year olds*. The initiatives are:

- “Get Set 4 Life”, a guide for parents that provides practical information on key areas of health and development, such as: healthy eating, regular exercise, speech and language, oral health, skin and sun protection, hygiene and sleep patterns.
- The “Healthy Spaces and Places” project aims to promote continued development and improvement of environments where Australian people live, work and play.
- “Healthier Communities” is a federal government pilot program. Initially \$4.9 million of funding has been distributed among 12 communities to develop and implement initiatives that promote healthy lifestyles and physical activity.

- “The Stephanie Alexander Kitchen Garden, National Program” has been awarded \$12.8 million of funding over four years from the Australian Government so that the program can be implemented in up to 190 Government primary schools across the nation.
- “Healthy Active Australia – Community and Schools Grants Program” provides grants of between \$10,000 and \$200,000 to not-for-profit organisations to undertake healthy eating and physical activity initiatives in local schools and communities. The program will benefit the whole community as well as assist at-risk target groups such as children, adolescents, young women, families in lower socio-economic and rural/remote areas, and Indigenous communities to increase physical activity and healthy eating and promote healthy living.
- “Healthy Weight Website” is a guide to healthy eating with tips and information on physical activity and nutrition to help individuals to achieve and maintain a healthy weight.
- “The CO-OPS Collaboration”. In 2007–08, the Australian Government committed to funding, for a four-year period, the Collaboration of Community-based Obesity Prevention Sites (CO-OPS) to develop and implement the *Learning from Successful Community Obesity Initiative*. This initiative will bring together the lessons learnt from a range of community projects aimed at preventing obesity, ranging from whole of community sites to smaller community interventions. It will also analyse the data to determine which projects work well and share this knowledge with other communities and organisations.
- “The Active After-School Communities Program” is part of The Australian Sports Commission’s commitment to getting children more healthy and active, and making sport more accessible, fun and safe. It is the largest Government initiative of its kind. The AASC program provides primary school children with a fun, free and safe introduction to over 70 sports and 20 other structured physical activities and encourages life-long participation in sport.
- Previous public education campaigns include “Get Moving”, which targeted children (5–17 years) and parents of children aged 0–17 years to communicate the need to increase physical activity amongst children and youth. The campaign ran from February 2006 to June 2006. An external evaluation of the campaign was conducted comprising a national survey of parents and children aged 0–17 years and 9–12 years; a pre-campaign survey and a follow-up survey. Significantly, “a large proportion of both teenagers (84%) and children (93%) who saw the campaign believed it had prompted them to act” (Elliott and Walker, 2007, p.4).

The Australian Government also runs *Health Insite: Your gateway to reliable health information*, a web page with numerous links on child health topics. The Department of Health and Ageing also devotes part of its website to information about “Nutrition and Physical Activity”, which includes the National Health and Medical Research Council’s “Dietary Guidelines”, “Physical Activity Recommendations for Children and Young People” and information about “Promoting Healthy Weight”.

The Department of Health and Ageing is currently developing *The National Healthy School Canteens Project (NHSCP)*³⁵ in partnership with Flinders University. The underlying aim of the project is the promotion of good health. The NHSCP will assist school canteens nationwide to provide healthy food choices, and promote good health through healthy eating (Australian Government Department of Health and Ageing, 2010). The program has three components:³⁶ a *food categorisation system* to “provide an evidence-based guide to the selection of food and beverages for sale within school canteens”; “national training resources” to help with the implementation of the *food categorisation system* and an *evaluation framework* to measure the effectiveness of the *food categorisation system* (Australian Government Department of Health and Ageing, 2010).

The New South Wales Department of Education developed the *Fresh Tastes NSW Healthy School Canteen Strategy* (implemented January 2005), which requires all NSW government schools to provide a healthy, nutritious canteen menu in accordance with the Australian Dietary Guidelines for Children and Adolescents. It also provides resources, including a menu planning guide and information brochure for parents, to assist school canteen managers with this endeavour. It forms part of the *Student Health in Public Schools* policy, which also addresses other health and safety issues such as first aid, dispensing medication and caring for students who become unwell at school. The NSW Government also runs *healthykids.nsw.gov.au*, which is designed for parents/carers and contains lots of practical advice on improving children's nutrition and physical activity.

Another initiative addressing hunger and food insecurity is *Foodbank*, "the largest hunger relief organisation in Australia, distributing donated food in 6 states and 7 regions". It acts as an intermediary between the "food and grocery industry's donations" and the needs of the disadvantaged, "2,200 welfare agencies rely on Foodbank as their pantry". In 2009, Foodbank distributed more than 17 million kilograms of donated food that "helped feed 60,000 people a day" (Foodbank Australia, 2010).

In addition, the Australian Red Cross runs the *Good Start Breakfast Club*, which provides "a healthy breakfast and nutrition education every day to school kids in areas of greatest need around Australia, to help them start the day well and concentrate better in the classroom". Over 260 breakfast clubs are located in primary schools and some secondary schools in every state and territory of Australia, "serving in excess of 800,000 meals a year". Disadvantaged schools are the focal point of the breakfast clubs and each student in the school can take part, reducing "possible stigmas" associated with involvement. Coles is the industry partner of the *Good Start Breakfast Club*; in addition to financial support, it also provides "100 nutrition education workshops and physical activity days nationwide".

The *School Nutrition Program*, a sub-measure of the *Northern Territory Emergency Response (NTER)* announced by the Australian Government in June 2007 (Department of Employment, Education and Workplace Relations, 2009), provides breakfast and/or lunch to school-aged children from remote communities of the Northern Territory. It aims to support better school attendance and help with children's learning and motivation.

The Smith Family has developed numerous initiatives that address the health and wellbeing needs of disadvantaged children and young people. In the Northern Territory, The Smith Family's *Breakfast with a Mentor* program provides breakfast to children while they interact with their mentors. Children learn about health and nutrition by eating breakfast and helping with the preparation. The program encourages Indigenous parents and the broader community to become involved with the school to support their children and gain the best possible outcomes from their education. Generally, children involved in the program attend school more regularly and have better punctuality rates.

Another way The Smith Family addresses the health and wellbeing needs of disadvantaged children and young people is through its role as a facilitating partner in the Australian Government's *Communities for Children (C4C)* initiative. C4C caters for children aged 0–12 years and takes a whole of community approach. The activities are created to meet community needs and are shaped by the local context.³⁷

For example, The Smith Family's partnership with *Communities for Children (C4C Brimbank)* runs *Ready Set Go!*, a health and physical activity program for children (0–5 years). *Ready Set Go!* aims to promote healthy foods, increase fruit and vegetable consumption in preschools and

promote increased physical activity. *Ready Set Go!* contains three elements. *The Frugies* program, which promotes fruit and vegetable consumption; healthy cooking and education programs; and *Bluearth* which emphasises participation in physical activity (Savva, 2009).

A recent evaluation of *Ready Set Go!* found that *The Frugies* program contributed to children's increased fruit and vegetable consumption. In addition, positive changes in children's attitudes to fruit and vegetables were observed by early childhood teachers. The healthy cooking and education program led to improved food-related parental knowledge, behaviours and attitudes.³⁸ The *Bluearth* program contributed to behavioural changes that led to an increase in children's physical activity (Savva, 2009).

In Tasmania, The Smith Family supports the *Grown and Learn* program, which involves parents and their young children (in the municipality of Brighton), in garden-based activities on a regular basis. The program was developed in response to poor health outcomes in the community, a desire to increase attendance at early years programs and to support the home-to-school transition.

Through *Grown and Learn*, parents learn valuable skills including: growing and maintaining a vegetable patch; shopping and cooking on a budget; making healthy lunches; reading labels and comparing nutritional values of food. The program also provides opportunities for parents and children to play and learn together in a healthy, informal setting.

No program evaluation currently exists; however, anecdotal evidence indicates that participating parents and children now have the "knowledge and enthusiasm to grow their own vegetables", and parents reported improved understanding of nutrition (The Smith Family, 2010). Initially, The Smith Family supported the employment of two part-time coordinators for two years to establish the project; this period is now almost over. Local schools are now committed to continuing to provide an educator, based in the garden, from their own resources. In the future, The Smith Family will be able to provide some Learning for Life worker hours to support the program.

The *Nutrition Project* is another initiative of The Smith Family (C4C Fairfield) that addresses food insecurity within the community by providing nutritional information to families in a wide range of languages. Bilingual Community Educators are trained in order to provide additional support to families in their transition to the Australian food system. Families learn about what young children need to eat to make sure they start school healthy, strong and ready to learn. The project also involves other service providers who make information on healthy eating, oral health and breastfeeding more readily available.

Healthy Young Families is yet another initiative of The Smith Family (C4C Katherine) that aims to improve the physical health and development of children aged 0–5 years through the development and distribution of educational health resources across the Katherine region. It also aims to produce health interventions that are accessible, readable and understandable, to improve the health of children aged 0–5 years in the Katherine region.

Another program facilitated by The Smith Family that promotes health and physical activity is the *Changing Gears* school program, currently operating in 13 communities across Australia. Children receive bicycles, which they learn how to ride, improving their fitness and learning road safety and bike maintenance skills. The program promotes exercise, healthy eating and participation in an active lifestyle among school kids in a fun and engaging way.³⁹

Part Six: Health promotion programs and initiatives

Overweight and obesity interventions

A 2009 Cochrane review of lifestyle and other interventions,⁴⁰ using randomised controlled trials (RCTs) to treat obesity in young people (under 18) found 54 lifestyle interventions that met the inclusion criteria. Despite uncertainty about which obesity interventions work best for children,⁴¹ the evidence highlighted that “a combined dietary, physical activity and behavioural” approach appears to be effective (Luttikhuis et al., 2009, p.17). Evidence demonstrates that “family-based, lifestyle interventions” targeted at “changing diet and physical activity thinking patterns” contribute to significant weight decrease for children and adolescents⁴² (Luttikhuis et al., 2009, pp.16–18).

Further, parent participation is an important element of the “behavioural programs” targeting children; however, the degree of parent involvement is likely to decline as children get older. In addition, the effectiveness of interventions in reducing obesity varies and is determined by the participant’s age, metabolism, “nutritional needs, physical maturation and psycho-social development throughout childhood” (Luttikhuis et al., 2009, p.16).

The review observed an absence of interventions for preschool children and a low number of initiatives targeting adolescents.⁴³ However, the review acknowledges that the majority of the studies involved “motivated, middle class, Caucasian populations” and that the reporting of outcomes over more than one year was limited. The reviewers concluded that short-term and long-term outcomes need to be articulated for children and youths at various stages and advised that “habitual physical activity, healthy eating, and improved psychosocial outcomes” may be more useful indicators of effective initiatives for developing children than “weight loss” (Luttikhuis et al., 2009, pp.16–18).

Similarly, a recent review of school-based strategies for the prevention and control of obesity advocates nutrition and physical activity strategies in conjunction with “a parent or family component” in order to facilitate significant weight loss (Katz et al., 2008, p.1788).⁴⁴ This affirms The Smith Family’s collaborative approach, working in partnership with other caring Australians to help disadvantaged children and their families and supporting not only children but also their families and communities. In relation to health literacy, The Smith Family’s approach is also activities-based or ‘learning by doing’, to facilitate improved health outcomes for disadvantaged families.

Healthy eating and physical activity initiatives

Physical activity rates

Evidence of the impact of physical activity on children’s health is limited, partly because of the difficulty associated with measuring physical activity rates.⁴⁵ Further, there is limited evidence about interventions that have effectively contributed to increased and maintained levels of physical activity among young children and adolescents (Northern Territory Government, 2005). A 2009 Cochrane review of school-based physical activity programs found mixed results for the effectiveness of school interventions for increasing physical activity rates among children and adolescents. Two of the seven studies claimed a “significant increase” in the proportion of primary school children who were “physically active during leisure time”. However, it is unknown if these results were maintained long-term (Dobbins et al., 2009, p.19). One study reported no immediate impact on physical activity during leisure time but claimed an increase in the

proportion of participants who were physically active during adulthood.⁴⁶ The remaining four studies reported “no effect on leisure time physical activity” (Dobbins et al., 2009, p.19).

Significantly, the review found that although school interventions effectively increase time spent on physical activity at school, this did not result in increased physical activity outside of school hours.⁴⁷ These interventions did not lead to children and adolescents being more physically active in their leisure time. This highlights “the important role parents and communities play in promoting physical activity among children and adolescents”. Combined interventions are needed that complement school initiatives and “facilitate families being more physically active during leisure time”. The review concluded that there was inadequate evidence to recommend school interventions for improving the proportion of children and adolescents who are “physically active outside of school” hours (Dobbins et al., 2009, p.19).

Physical activity duration

The 2009 Cochrane review also found that school-based interventions are effective in increasing the time spent doing physical activity, especially during school time.⁴⁸ Five out of seven studies reported positive effects, and importantly, these five studies also tended to have longer intervention periods. Evidence also highlights the effectiveness of interventions that utilise combined strategies such as “school curricula, printed educational materials...physical activity specific sessions, and community-based initiatives”. However, more evaluation of the long-term benefits is needed; there was very limited evidence of the effectiveness of these interventions in adolescent girls’ “physical activity duration” and no evidence for boys (Dobbins et al., 2009, p.20). In addition, evidence highlights the ineffectiveness of school-based interventions for reducing BMI or limiting its increase over time.

The review recommended that lifestyle interventions be implemented for at least 18 weeks and that the community be involved in order to “promote multiple environments that support active living” as children transition into adulthood (Dobbins et al., 2009, p.21). In relation to physical activity, it seems clear that initiatives that address student diversity, namely “ethnicity, physical ability, gender and age” have greater impact in relation to participation and involvement (St Leger et al., n.d, p.8).

Research shows that initiatives that adopt a school-wide approach are able to inform students about food and diet. Changes in eating habits have been less successful, however some studies have reported a small increase in vegetable intake. Successful initiatives shared the following characteristics:

- “a whole school approach”
- “links with parents and food preparation at home”
- consistency between the curriculum and food available at school
- initiatives lasting more than three years with regular participant involvement in implementation and planning (St Leger et al., n.d, p.8).

Clarke et al. – Scotland

Intervention: an initiative designed to improve Scottish children’s (4.5–12 years) consumption of fruit and vegetables in eight schools. Sessions ran three days per week for three weeks (nine in total) for 15 minutes prior to morning recess. Teachers followed a strict timetable, outlined below:

- Teachers screen view one of six videos and/or read a letter from the Food Dudes.⁴⁹
- The day’s fruit or vegetable is prepared, delivered to the classroom and displayed.

- Children are invited to take a piece of the fruit or vegetable, and every child in the school receives the same fruit or vegetable on the same day.
- Children who taste the fruit/vegetable are given a jigsaw sticker that eventually forms a picture of the Food Dudes.
- Children who eat the entire portion of fruit/vegetable receive a small reward such as a pencil case, key ring, water bottle etc.
- At the close of the first week, children are given a fruit and vegetable diary to complete at home over the next two weeks and a leaflet with advice about eating fruit and vegetables.

Outcomes: the provision of free fruit and vegetables alone has a minimal, unsustained impact. The school-wide free fruit and vegetable initiative in conjunction with the “peer-modelling” behavioural elements “significantly increased” children’s reported consumption at school. That is, the number of portions consumed per day increased but consumption at home did not increase. Interestingly, 80% of parents surveyed reported that their children were consuming more fruit and vegetables, yet the children’s questionnaires documented no significant consumption increase. However, the study had some limitations, namely, the absence of a control group and the reliance on self-report or “unvalidated pupil questionnaires” (Clarke et al., 2009, pp.118; 121; 125).

Cardiac-kinder – Cottrell et al. – USA

Intervention: a four week, randomised controlled trial (RCT). Children and their parents (4–6 years) were given pedometers and a log to record the number of steps taken. Parents received information about “age appropriate” diet and exercise as well as advice about increasing exercise.⁵⁰ In the control group, only children received the pedometer and step log book. Parents received information about “age appropriate” diet and exercise. The study measured dietary intake and physical activity in the form of “step count”.

Outcomes: children in the intervention group consumed fewer sweets than the control group. In the fourth week, children in the intervention group had taken significantly more steps than those in the control group. Parents from the intervention group claimed “significant increases” in encouragement of their child’s physical activity (Hesketh and Campbell, 2008, p.66).

Changing Gears School Program – The Smith Family – Australia

Intervention: in 2009 this program, funded by the Federal Government Department of Health and Ageing, targeted primary students (Year 3 and above) in 13 disadvantaged schools around Australia. The program has two parts. Firstly, the Cycling Education component, delivered in five 90 minute sessions, included “bicycle riding, road safety, bike maintenance”. Secondly, participating schools were expected to “develop and implement” at least two nutrition and health lessons as part of the “healthy eating” element of the program. Nine hundred and thirty four students completed the program. Each of the 13 primary schools received: 16 bikes, 24 helmets, plus bike locks and a rack (The Smith Family, 2009, pp.2–9).

Outcomes: a primary focus of the program was to increase the levels of students’ physical activity and exercise in the long and short term. Another focus was the promotion of a healthy lifestyle, healthy eating and the benefits of physical activity. Post-program surveys revealed that: 86% of students acknowledged “the importance of physical activity”; “61% of students responding to the survey reported that following the program they rode their bike quite often or every day” and “82% of students responding to the evaluation reported eating breakfast”. However, it should be noted that survey responses were low for the pre- and post-program survey; less than 50% of participants completed the survey in both cases (The Smith Family, 2009, pp.2–9). Some

recommendations emerged from the evaluation, including the need to: outline “key nutrition messages”; develop a more detailed “content and delivery” framework for the nutrition and physical activity components; revise the program evaluation framework and survey items for greater clarity; and administer student surveys online to facilitate a higher participant response rate (The Smith Family, 2009, pp.2–9).

Saakslahti et al. – Finland

Intervention: a three-year, longitudinal, family intervention. Parents observed their children (aged 4 years approximately) at home and completed a “physical activity/sedentary behaviour” diary⁵¹ using nine activity categories. Parents also attended three intensive information sessions over the three years. They were advised on encouraging their child’s physical activity, “what to do outdoors” and given printed supplementary materials. The control group received information about the study and was shown how to complete the physical activity diary.

Outcomes: over the three years, the intervention group was “significantly more likely to play outside” and “time spent outdoors increased...more strongly in the intervention group” (Hesketh and Campbell, 2008, p.69).

Condrasky et al. – USA

Intervention: 15 parents of preschool-aged children participated in the Cooking with the chef program, which included cooking demonstrations, information on menu planning and cooking with fruit and vegetables. The program was delivered by a chef and nutrition educators. The classes focused on preparing low-cost, nutritious meals. A control group (14 parents) received the lesson material and recipes but did not participate in the program.

Outcomes: the authors reported that parents in the intervention group were more informed about preparing nutritious meals. There was no increase in adult fruit and vegetable consumption but there was an increase “approaching statistical significance” in the amount of fruit consumed by children in the intervention group (Hesketh and Campbell, 2008, p.23). However, this initiative was characterised by a small sample size, limited reporting and no post-program follow-up (Hesketh and Campbell, 2008, p.71).

McGarvey et al. – USA

Intervention: in this “parent-focused child obesity prevention program”, the control group participated in the standard Special Supplemental Nutrition Program for Women, Infants and Children (WIC) over a twelve-month period. There were six sessions in total, as well as two individual sessions with a nutritionist. The intervention group parents received the same amount of sessions but they were modified to reiterate six messages in the area of healthy eating and physical activity. These health messages were also promoted through other community organisations in the local area.⁵²

Outcomes: intervention parents were “significantly more likely to report increased frequency of offering their child water rather than sweetened beverages” and they were more likely to report active involvement in play with their child. No other differences were found between the control and intervention parents (Hesketh and Campbell, 2008, p.25).

Talvia et al. – Finland

Intervention: the focus of the intervention was fruit and vegetable consumption and reducing saturated fat consumption. Parents (540) received individual counselling from a dietician at 1–3

month intervals until the child was two years old and then biannually until the child was ten years old.⁵³ Parents recorded their child's food intake every six months (1–7 years), and then on an annual basis after the child turned seven years old. Parents in the control group were seen twice a year until the child was seven and then once a year until the child turned ten. Parents did not receive any dietary counselling apart from the recommendation that children over one should drink milk with at least 1.5% fat.

Outcomes: early dietary counselling of parents positively influenced children's diet, resulting in "reductions in total fat intake and maintenance of recommended dietary intakes of other nutrients" with "small but significant" increases in the fruit and vegetable consumption of boys (Hesketh and Campbell, 2008, p.74).

Johnson, Birkett, Evens and Pickering – USA

Intervention: the focus was communicating messages about reducing television viewing to disadvantaged families participating in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). The intervention included two modules focused on turning the television off during meal times and family participation in physical activity.⁵⁴

Outcomes: there was a statistically significant increase in the percentage of participants who reported watching "less than or equal to two hours of television per day". The changed viewing habits were strongest in homes with "lower parental education" and "non-white ethnic groups". There was also an increase in the number of parents who reported "never or rarely" viewing television during meal times. Some problems associated with the study include the impact of the season on time spent viewing television; more research is needed to discover the efficacy of this intervention (Hesketh and Campbell, 2008, p.29).

Alhassan et al. – USA

Intervention: this randomised controlled trial (RCT) addressed the physical activity of Latino children (3–5 years) in a preschool for "low-income children". Children in the intervention group (18) received twice as much free play time outside for two consecutive days (four 30 minute sessions). Children in the control group (15) received the standard two 30 minute sessions of outdoor free time. All children wore accelerometers for four days.⁵⁵

Outcomes: no differences were found between the intervention and control groups in the time spent doing physical activity. This suggests that increased time for outdoor play is insufficient to increase the physical activity levels of preschool children. Although it was a very short intervention (2 days) and the results may not be generalisable, this study suggests that opportunities for physical activity may need to be paired with modelling to create an actual increase in physical activity (Hesketh and Campbell, 2008, p.31).

Hip Hop to Health Jnr – Fitzgibbon et al. – USA

Intervention: twelve preschools attended primarily by Latino children were randomly allocated to an intervention or control group. The intervention group participated in three 40 minute sessions per week for 14 weeks. Each session consisted of 20 minutes of health and nutrition education and 20 minutes of aerobic physical activity. Parents received a weekly newsletter that echoed lesson content, and they also received 12 homework tasks (each requiring 15–35 minutes to complete). The control group children participated in 14 x 20 minute weekly education sessions covering health topics. Parents received a weekly newsletter containing lesson information (Hesketh and Campbell, 2008, p.76).

Outcomes: Body Mass Index (BMI) scores were calculated but no differences were found between groups. Parents reported their child's dietary intake using 24 hour recall, however, there were no differences between groups for "total saturated fat or fibre intake". Parents also reported their child's physical activity and time spent viewing television, however, there were "no differences between groups for reported frequency and intensity of physical activity or for TV viewing". In short, the intervention did not appear to have an impact on BMI, diet, physical activity or sedentary behaviour (Hesketh and Campbell, 2008, p.76).

Movement and Activity Glasgow Intervention in Children (MAGIC) – Reilly et al. – Scotland

Intervention: the intervention addressed BMI and sedentary behaviour among preschool children. A random sample of 36 preschools was selected to participate. Two staff from each participating preschool were trained in delivery of the intervention. Children participated in three 30 minute physical activity sessions each week for 24 weeks. Families received a resource pack containing information about increasing physical activity and reducing time spent viewing television. Posters on the theme of increasing physical activity were displayed in participating preschools. The control group received the standard preschool curriculum; parents did not receive a resource pack (Hesketh and Campbell, 2008, p.78).

Outcomes: the 24 week program had no impact on "BMI, physical activity or sedentary behaviour". However, the program led to an improvement in children's "fundamental movement skills" (Hesketh and Campbell, 2008, p.78).

Specker, Johannsen, Binkley and Finn – USA

Intervention: children (3–5 years) attending 11 child care centres participated in the intervention. Children participated in physical activity for 30 minutes per day, 5 days per week for 12 months. Each session consisted of jumping, hopping and skipping activities and a warm up and cool down. Children in the control group participated in activities designed to keep them "sitting quietly" for 30 minutes per day, 5 days per week for 12 months (Hesketh and Campbell, 2008, p.79).

Outcomes: there was no difference between the intervention and control groups for weight or total body fat during the intervention and at the 1 year follow up. The intervention effectively increased children's physical activity during the daily program. In addition, the intervention also increased participants' physical activity levels six months after the intervention. However, no differences existed between the control and intervention group after 12 months⁵⁶ (Hesketh and Campbell, 2008, p.79).

Dennison, Russo, Burdick and Jenkins – USA

Intervention: this randomised controlled trial (RCT) was part of a larger health intervention involving 16 early childhood centres for children (3–5 years). Children (43) participated in seven 20 minute sessions over six weeks. The final session was conducted after a month had passed. Additional materials were provided for child care staff and parents. Sessions and resources contained information about "television-free family mealtimes" and things to do instead of watching television. Parents were given stickers and a calendar to record the number of television-free days. The control group (34) received eight monthly education sessions and health-related education materials (Hesketh and Campbell, 2008, p.36).

Outcomes: children in the intervention spent "significantly less time" viewing television than children in the control group. "Significantly fewer" children who participated in the program watched more than two hours per day⁵⁷ (Hesketh and Campbell, 2008, p.36).

Tooty Fruity Vegie – Adams et al. – NSW

Intervention: ten New South Wales primary schools participated in a two year, multi-strategy program designed to promote fruit and vegetable consumption. The program involved several settings, including the classroom, canteen, home and community. In particular, the program utilised parent volunteers at school to try to maximise the effectiveness of the program (Adams et al., 2003, pp.187; 188). Research indicates that parent involvement can positively influence the effectiveness of some primary school interventions. In this program, parent involvement adopted a practical, whole-school approach and included activities such as cooking classes and the distribution of fruit and vegetable merchandise (Newell et al., 2004).

Outcomes: children who participated in the intervention reported “positive changes in access to fruits and vegetables at home and encouragement to eat them”. In addition, the project “significantly improved children’s fruit and vegetable knowledge, attitudes, access and preparation skills”. Parent knowledge and involvement in fruit and vegetable promotion at school and beyond also improved (Newell et al., 2004, p.293).

Garden projects

The limited number of relevant publications that were identified is discussed below. School-based garden projects are a popular initiative and research evidence highlights their benefits. Teachers reported that gardens also served as tools “to teach traditional subjects such as English, Mathematics, Science, Art, Music” (Somerset et al., 2005, pp.30; 31). Similarly, in a review of school gardens in California,⁵⁸ principals reported that school gardens “appear to be predominantly used by most schools to enhance academic instruction through teaching subjects such as science, environmental studies, nutrition, language, arts and math” (Graham et al., 2005, pp.149; 150). In addition, a recent survey of thirteen primary schools⁵⁹ near Brisbane that had “or previously had” vegetable gardens found that “although nutrition education was not generally considered a primary motive” for establishing vegetable gardens, most schools listed it as a “useful consequence” (Somerset et al., 2005, p.30).

Gardening may also serve as an “alternative [nutrition] education tool” for students with low literacy, “learning or behaviour difficulties”. Specifically, participant schools reported that “disruptive students responded well to the different class setting and improved their disruptive behaviours”. In addition, “improvement in the self esteem and confidence of children was a common theme” expressed by teachers (Somerset et al., 2005, pp.30; 31).

Stephanie Alexander Kitchen Garden Program – Victoria

Initiative: the aim of the Kitchen Garden Program is “pleasurable food education for young children” in order to “positively influence children’s food choices”. The focus of the program is children’s involvement in growing, harvesting, preparing and sharing food. Each participating school employs two part-time staff, a garden and a kitchen specialist, and also relies on the assistance of several volunteers. In participating schools, children (Years 3–6) spend at least 40 minutes per week designing, building and maintaining a vegetable garden at school⁶⁰ (Stephanie Alexander Kitchen Garden Foundation, n.d.).

Children also spend one and a half hours each week in the kitchen preparing and sharing meals created from garden produce. The program links the garden to the kitchen and the table: “the emphasis is on learning about food and about eating it”. In addition, the program is integrated into the school curriculum; “it is a compulsory part of the school’s program for four years of a child’s life”. The classroom teacher and the program coordinator, who is also a school staff member, are

responsible for supporting the program and ensuring that content from the Kitchen Garden Program is integrated into the school curriculum (Stephanie Alexander Kitchen Garden Foundation, n.d.).

Outcomes: the program evaluation was a longitudinal, “matched comparison trial” conducted by a team of researchers from Deakin University and the University of Melbourne. Evaluation schools were randomly selected from all schools participating in the Kitchen Garden Program. A variety of qualitative and quantitative measures were used. Data was collected over two and half years (2007–2009) from six program and six comparison schools. The evaluation included: school principals; teachers, parents and volunteers (focus groups); kitchen and garden specialist staff; teachers, parents and children (pre and post questionnaires) and participant observations (four program schools on three occasions) (Block and Johnson, 2009).

The evaluation found “strong evidence of increasing child willingness to try new foods including a significant difference between program and comparison schools”. In addition, children involved in the program were “significantly more likely than children from comparison schools to report that they liked cooking ‘a lot’”. There were also “statistically significant increases in child knowledge, confidence and skills in cooking and gardening”. Further, the program effectively engaged children who were at the “lower end of the academic achievement scale” or demonstrated problematic behaviours. Although additional research is needed, it appears that the program “may be of greatest benefit to students of greatest disadvantage” in terms of “addressing health inequities” (Block and Johnson, 2009, pp.6–7).

The evaluation also observed broader benefits of the Kitchen Garden Program. For example, the program helped link schools with the community. In addition, benefits of the program flowed into the homes of students, including the consumption of a “wider range of foods”, many of which were vegetables. Many children reported they were now cooking more at home. Parents reported that their children’s interest in cooking had increased and they were actively involved in preparing meals (Block and Johnson, 2009, pp.33; 34).

Note that although qualitative aspects of the evaluation found “strong evidence of positive social outcomes for children, schools and communities” involved in the program, this was not reflected in the quantitative measures of the program. There were no “statistically significant results” in relation to the “social and learning environment of participating schools”. This may be due to the small sample size or perhaps some positive social and learning outcomes can only be measured after a longer period of time (Block and Johnson, 2009, p.26).

Bulgarr Ngaru Aboriginal Medical Service – NSW

Initiative: in Grafton, a partnership between the Aboriginal medical service and Baryulgil Public School led to the development of a “market garden and fruit and vegetable program” within the school. This initiative identified improved availability of fruit and vegetables as part of the solution for improving the health of Indigenous people. During the program, a dietician assisted with the development and delivery of sessions (Aboriginal Health and Medical Research Council, 2009, pp.15; 16). Program details are very limited; no information about the number of sessions or session content is provided.

Outcomes: as a result of the initiative, “kids had daily fresh fruit and vegetables at school, and learnt about preparing healthy meals and budgeting”. In addition to improved nutrition, other health benefits were attributed to the program: “hearing problems were greatly reduced and skin infections had just about disappeared”. It was claimed that as a result of participation in the study, “after two and a half years, 82 percent of students had normal hearing” (Aboriginal Health and Medical Research Council, 2009, p.15). Prior to implementation of the study, only 42% of

students had normal hearing (Aboriginal Health and Medical Research Council, 2009, p.15). The ability to hear would undoubtedly contribute to enhanced learning.⁶¹ As a result of this initiative the provision of “subsidised fruit and vegetables” was extended to assist a total of 50 families in five communities⁶² (Aboriginal Health and Medical Research Council, 2009, pp.15; 16). An evaluation of the program’s impact is being developed.

Outreach School Garden Project – Viola – Queensland

Initiative: the Outreach School Garden Project (OSGP) was developed to teach nutrition to students in two remote, Indigenous school communities. During the six months of the project, nutrition and garden content was integrated into the key learning areas (KLAs) of the curriculum.⁶³ Participating grades were selected by the school principal at each school. Participants in community 1 were in Years 7–9. Participants in community 2 were in Years 4–6. The community dietician had been working in these communities for three years; during the study she continued to visit the communities for 3–5 days every 6–8 weeks. Each school also appointed a project co-ordinator to assist with the project. The evaluation provides clear and detailed information about how nutrition content was integrated into the key learning areas of the curriculum (Viola, 2006, pp.233–235).

Outcomes: several data collection instruments were developed to measure students’ knowledge and skills in nutrition and gardening over a six-month period. The data collection instruments were: the “healthy dinner plate” and “pyramid activity” worksheets and “a curriculum matrix, semi-structured interviews, reflective journal and an event log”. The evaluation concluded that “students’ knowledge and skills in nutrition and gardening were increased over the six-month period and positive improvements in the physical and social environment at the school were observed”. Further, the project was more effective in the primary school community, motivation was “more easily stimulated in younger children and the primary school curriculum...more adaptable to capacity building activities”. The evaluation identified numerous project obstacles. In particular, progress was inhibited due to: high rates of student absenteeism, teacher turnover, “community transience”, the remote location of the schools and the limited evaluation time frame (Viola, 2006, pp.233–235; 238).

Somerset and Markwell – Queensland

Initiative: a 12 month garden project⁶⁴ located in one state primary school in a “low socio-economic area of Brisbane” (students were 8–13 years old). The project funded one teacher (11 hours per week) who had experience with establishing and maintaining gardens. The teacher liaised with all teaching staff to coordinate the incorporation of garden-related activities into the curriculum. The garden teacher had other responsibilities, including maintaining the garden, scheduling class access, planning weekly activities, running sessions on aspects of garden maintenance and developing relevant teaching resources. However, this, along with the small sample size, limits the generalisability of the results (Somerset and Markwell, 2008, pp.218; 219; 220).

Outcomes: over 12 months all classes participated in weekly garden activities, sharing responsibility for “planting, tending and harvesting”. The garden initiative enhanced participants’ confidence in preparing fruit and vegetable snacks.⁶⁵ “The study also observed that a vegetable garden within a school can enhance a range of personal factors associated with fruit and vegetable consumption”. For example, there was an increase in the proportion of respondents⁶⁶ “answering ‘yes’ when asked if their friends ate lots of vegetables after the intervention”. There was also an increase in the proportion of students in Years 4 to 6 who indicated that “they liked to eat vegetables every day”. However, in Year 7 there was a decrease in the proportion of students who responded yes to this item, leading to the assertion that school gardens may be most

effective at enhancing “vegetable and fruit consumption” among “younger age groups”. An improvement in students’ ability to identify specific fruits and vegetables was also associated with the project,⁶⁷ which could potentially contribute to increased consumption⁶⁸ (Somerset and Markwell, 2008, pp.218; 219; 220).

Summary of key findings

Health literacy

- An individual's level of health literacy is shaped by their education level and proficiency in English (Australian Bureau of Statistics, 2009b).
- Health literacy helps determine an individual's health, particularly through the decisions they make about diet, exercise and lifestyle on a daily basis.
- Lower levels of health literacy contribute to poorer health for disadvantaged children and young people, potentially contributing to decreased life expectancy, higher levels of disease-causing factors and reduced use of preventive health services.
- Parents model food consumption and food attitudes to their children (Pettigrew, 2009; Vereecken, Keukelier and Maes, 2004). Parents also model decisions about food to their children through choices made at the supermarket. To do this effectively, parents need to be able to comprehend the nutritional information on food labels (Barreiro-Hurle, Gracia and de-Magistris, 2010).

The link between poor health, disadvantage and education

- Parental modelling of positive food choices is shaped by socio-economic factors including the mother's level of education (Vereecken, Keukelier and Maes, 2004).
- Disadvantaged children are burdened with significantly higher rates of obesity (Australian Bureau of Statistics, 2009d). They are also more likely to suffer from poor nutrition.
- Research highlights the link between ethnicity, low socio-economic status (SES) and obesity with "those of lower SES having a consistently greater prevalence of obesity than their higher SES peers" (O'Dea, 2008 p.4).
- In CALD populations, obesity may be up to four times more prevalent among young people from Middle Eastern and Pacific backgrounds, compared to those with Anglo/Caucasian backgrounds (O'Dea, 2008).
- Research highlights positive associations between parent employment, higher levels of parent education and better health outcomes for children (Spurrier, Sawyer, Clark and Baghurst, 2003).

Key health and nutrition issues

- The key health and nutrition issues affecting children and young people's learning are: overweight and obesity; food insecurity and access to affordable, healthy food; dental health; and eye and ear problems.
- Early childhood is a focal point of some initiatives in recognition of the importance of developing a life-long, healthy approach to food and exercise from an early age (Sorhaindo and Feinstein, 2006).
- The health of Indigenous children and young people is "significantly worse than that of other Australians". "Poor health outcomes linked to poverty and reduced life chances generally commence at birth and continue throughout the life cycle" (Australian Medical Association, 2006, p.1).
- Indigenous health problems highlight "the link between poor health and impaired educational opportunity" (Australian Medical Association, 2006, pp.1; 4).
- In 2004–05 over half (57%) of Indigenous people 15 years and over were overweight or obese.⁶⁹

- 22% of Indigenous children were categorised as “developmentally vulnerable” in the “physical health and wellbeing domain” of the Australian Early Development Index (AEDI).
- “Australia is the only developed country with high rates of undernutrition in its Indigenous population” (Ruben, 2009, p.1290).
- Recent research found that Aboriginal and Torres Strait Islander children had higher rates of dental caries and lower rates of dental treatment than other Australian children (Jamieson, Armfield and Roberts-Thomson, 2007).
- Problems associated with oral disease include tooth loss, problems with speech, and decreased self-esteem (Low et al., as cited in Jamieson, Armfield and Roberts-Thomson, 2007).
- Among Indigenous children, the occurrence of “ear/hearing problems” and middle ear infections is three times higher than among non-Indigenous children (Australian Bureau of Statistics, 2007, p.6).
- Trachoma is the most common cause of infectious blindness. Between 20% and 30% of Indigenous children in “rural and remote Australia” are afflicted (Crengle et al., 2009, p.85).
- Parent participation in behaviour programs targeting children typically declines as children move into adolescence (Luttikhuis et al., 2009).

Enhancing learning through improved health and nutrition

- Research has reported varying degrees of improvement in academic performance as a result of physical activity interventions, ranging from benefits associated with increased activity to benefits associated with reduced screen time (Salmon et al., 2005).
- There are important but immeasurable benefits associated with school meal provision that may contribute to a more positive experience of school, including improved concentration and reduced illness (Kristjansson et al., 2009).
- Although research exploring the links between food and learning has limitations, “the evidence for promotion of physical activity and a diet low in fat, salt and sugar but high in fruits, vegetables and complex carbohydrates remains unequivocal in terms of health outcomes for all schoolchildren” (Ellis et al., 2008, p.933).
- The relationship between breakfast and learning is complex. There is widespread acceptance that skipping breakfast has a “transient detrimental effect on cognition in the late morning” and that eating breakfast is beneficial (Grantham-McGregor, 2005, p.155).
- Positive associations between breakfast consumption and learning include improved attendance and punctuality where a breakfast program exists (Fernald and Grantham-McGregor, as cited in Taras, 2005).
- The nutritional quality of the food consumed for breakfast is important; it is not enough to simply eat breakfast (O’Sullivan et al., 2008).
- There is evidence of a link between disadvantage and the consumption of poor quality breakfast (O’Sullivan et al., 2008).

Current health promotion strategies

- Reducing the levels of overweight and obesity among Australian children and young people is a major focus of health promotion initiatives in both government and non-government sectors (Preventative Health Taskforce, 2009a; 2009b).
- Consequently, health initiatives targeting nutrition and physical activity are another major focus (Preventative Health Taskforce, 2009a; 2009b).

Recommendations: What are the implications of the research for policy and practice?

The following recommendations have been derived from the research and could be incorporated into future policy or practice initiatives seeking to effectively address the health and nutrition needs of children and young people, including children from CALD and Indigenous backgrounds.

Skills

- Appreciate that garden projects have the capacity to develop children's nutritional knowledge and improve their diet.
- Equip parents with skills to help them become better models of healthy eating (Vereecken, Keukelier and Maes, 2004).
- Develop parents' interest in eating healthy food; this has the greatest potential to contribute to more prevalent use of nutrition information on food labels (Grunert, Wills and Fernandez-Celemin, 2010).
- Assist Australians to develop adequate levels of health literacy, which is associated with employment, English proficiency and higher levels of formal education (Australian Bureau of Statistics, 2009b).

Capacities

- Develop young people's capacity to make positive decisions and adopt healthy behaviours over a lifetime.
- Assist children, young people and their families to live a healthy life by promoting the consumption of a healthy diet and regular physical activity.

Relationships & Attributes

Family/home

- Create initiatives that educate parents and target specific behaviours related to nutrition and physical activity. For example, time spent engaged in sedentary activities.
- Acknowledge the important influence of parental behaviours and attitudes on children's healthy eating, physical activity and obesity prevention.
- Provide family-centred, lifestyle initiatives that target physical activity and healthy eating to increase physical activity outside of school hours (Luttikhuis et al., 2009).
- Help parents understand the importance of a healthy breakfast for children and young people.

School and community

- Develop students' proficiency in literacy and numeracy.
- Address the link between lower levels of health literacy and poorer health for disadvantaged children and young people (which potentially contributes to decreased life expectancy and higher levels of disease-causing factors).
- Consider collaborative approaches that involve the family, school and local community to address and promote key health priorities, including increasing physical activity levels and improving children and young people's dietary intake (i.e. high fruit and vegetable consumption and low salt, sugar and fat intake).
- Implement collaborative approaches that incorporate education and support to improve the nutrition and physical activity levels of all children.
- Promote preventive health approaches through public education campaigns.

- Assist children, young people and their families to understand the impact of physical inactivity on health.
- Ensure that health initiatives targeting nutrition and physical activity are culturally and contextually appropriate.
- Improve the support available for families with vulnerable children, including some Indigenous and CALD children and those living in jobless households (Council of Australian Governments, 2009).
- Address the high rates of dental disease among Indigenous children through preventive dental health strategies.
- Understand that education and preventive measures could make a significant contribution to reducing the risk of eye and ear problems and preserving vision and hearing.
- Recognise the value of interventions from early childhood for the development of positive, healthy attitudes and behaviours over a lifetime.
- Incorporate family centred, lifestyle and behavioural approaches when addressing overweight and obesity among children and young people (Ambrosini et al., 2009).
- Address the social factors associated with food insecurity, including inadequate transport, parents' skill level and knowledge, as well as the cost of food (Temple, 2008; Nolan et al., 2006).

Conclusion

There are seven key literacies that underpin The Smith Family's work with disadvantaged children, young people and their families. Health literacy, which involves the ability to access and comprehend information in order to improve or maintain good health, is one of The Smith Family's key literacies. The Smith Family's approach to health literacy is shaped by the understanding that good health, in part, depends on an individual's ability to make decisions and adopt positive behaviours over a lifetime.

The key health and nutrition issues that impact upon the learning of children and young people in Australia are overweight and obesity levels and food insecurity. Obesity may be up to four times more prevalent among some young people with CALD backgrounds compared to those with Anglo/Caucasian backgrounds. In addition, disadvantaged children are burdened with significantly higher rates of obesity.⁷⁰ They are also more likely to suffer from poor nutrition, which contributes to diminished school performance, lower levels of education attainment and poorer health. However, the range of supports that children and young people need to address these health and nutrition issues is currently not well developed beyond early childhood.

Evidence suggests that learning, inclusive of focus, motivation and academic achievement, can be enhanced through initiatives that address nutrition and physical activity. In relation to nutrition, the importance of the ready availability of nutritious food for the health of all children is supported by research and justifies the promotion of a diet low in fat, salt and sugar and high in fruit and vegetables, in conjunction with regular physical activity. Time spent on physical activity in school does not impact negatively upon academic performance and may even be beneficial. Research has documented positive associations between a healthy diet and learning, ranging from increased school attendance to improved health and, in some cases, better test results.

Dental health and eye and ear problems have a particular prevalence among Indigenous children and young people, which can lead to hearing, sight and speech impairment. This can clearly affect a student's self-esteem and ability or willingness to communicate, all of which detrimentally impacts upon learning and development. In relation to dental health and eye and ear problems, much can be gained from public health education campaigns focused on communicating preventive measures, such as the importance of dental and facial hygiene.⁷¹

Current health promotion initiatives advocate collaborative approaches for improving the nutrition and physical activity levels of children that involve the family, school and community. Preferences for collaborative approaches are also echoed in research:⁷² "it's time for a concerted national approach to the wellbeing of children and young people – in effect, a master plan for meeting the developmental needs of children and young people in Australia" (Australian Research Alliance for Children & Youth, 2010). In addition, evidence suggests that early interventions are beneficial for the development of life-long, positive attitudes and behaviours that facilitate good nutrition, physical activity and general health.

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Endnotes

- ¹ These *National Headline Indicators* are shared with *A Picture of Australia's Children 2009* (Australian Institute of Health and Welfare, 2009).
- ² Note that in relation to children's nutrition, there are no guidelines for specific quantities of food for children aged 2–3: *2007 Australian National Children's Nutrition and Physical Activity Survey: Main Findings* (Australian Government Department of Health and Ageing, 2008a).
- ³ Quality early years education is also advocated in *Fair Society, Healthy Lives: The Marmot Review executive summary* (Marmot et al., 2010).
- ⁴ The other domains are "social competence, emotional maturity, language and cognitive skills (school-based), communication skills and general knowledge" (Centre for Community Child Health and Telethon Institute for Child Health Research, 2009, p.2).
- ⁵ In addition, risk-taking behaviours including drug use were raised as problematic (Australian Institute of Health and Welfare, 2008, p.280).
- ⁶ Along with eating disorders, obesity and substance use (Nagel, 2007, p.13).
- ⁷ The other two risk factors are tobacco and alcohol (Australian Bureau of Statistics, 2009e, p.2).
- ⁸ This represents approximately 600,000 children (5–17 years).
- ⁹ Other studies have documented similar rates. *A Picture of Australia's Children* (Australian Institute of Health and Welfare, 2009) found that in 2007, 22% of children 2–12 years were overweight or obese. Also the *2007 Australian National Children's Nutrition and Physical Activity Survey: Main Findings* (Australian Government Department of Health and Ageing, 2008a) discovered that 22% of boys and 24% of girls aged 2–16 were overweight and obese.
- ¹⁰ For women, "the second leading cause of disease burden". Overall, the current leading cause of disease burden is cancers followed by cardiovascular disease (Australian Institute of Health and Welfare, 2010, p.x).
- ¹¹ It is estimated that annual health costs just for type 2 diabetes could increase from \$1.3 billion in 2002–03 to \$8 billion by 2032 (Goss, J. as cited in Preventative Health Taskforce, 2009b, p. 8).
- ¹² Whereas the obesity rate for girls (5–17 years) did not change over the same time period.
- ¹³ From survey data collected in 2004–05.
- ¹⁴ In contrast, 25% of people aged 18 and over were categorised as obese in the *National Health Survey* (2007–08) from a sample of over 17,000 dwellings Australia-wide (Australian Bureau of Statistics, 2009c).
- ¹⁵ Refer to the discussion on the health issues impacting upon children from CALD backgrounds – *Part Three Overweight and obesity*.
- ¹⁶ Based on the "frequency, intensity, and duration" of activity (Australian Bureau of Statistics, 2009a).
- ¹⁷ Although this was a "cross-sectional representative population survey" (Hardy, Dobbins, Booth, Denney-Wilson and Okely, 2006, p.534), the data collection was limited to NSW.
- ¹⁸ The study defined dietary adequacy as compliance with Flemish dietary guidelines.
- ¹⁹ Two of the strategies that participants favoured were "local food production" and "improved transport to food outlets" (Nolan et al., 2006, p.252).
- ²⁰ In 2005, 15.2% of parents (of 5–11-year-old children) who usually visited the dentist for a problem reported that cost prevented them pursuing the recommended treatment.
- ²¹ NSW figures reflect this trend, reporting "children from lower socio-economic groups experiencing twice as many caries" (Legislative Council Standing Committee on Social Issues, 2006. *Dental Services*). In the quote, "dmft" stands for decayed, missing and filled teeth.
- ²² Tooth decay falls under the "healthy lives" strategic area for action.
- ²³ The Smith Family's *Reconciliation Action Plan* (RAP) was completed in July 2010.
- ²⁴ See also Castelli & Hillman, 2007.
- ²⁵ In this case the small sample size and cross-sectional data make it difficult to "establish a causal relationship between eating patterns and overall performance" (Fu, Cheng, Tu and Pan, 2007, pp.1935; 1942).
- ²⁶ Once again, there were limitations, including the small sample size and the short duration of the study (Viola, 2006, p.238).
- ²⁷ The implication is that breakfast is one way of supporting disadvantaged children, and research suggests that the provision of a quality breakfast has positive impacts upon student learning and health. In the Northern Territory, The Smith Family's *Breakfast with a Mentor* program encourages Indigenous parents and the broader community to become involved with the school to support their children in successful transitions and gain the best possible outcomes from their education. The program provides breakfast while children also interact with their mentors. Children learn about health and nutrition by eating breakfast and helping with the preparation. They also attend school more regularly and arrive on time more often.
- ²⁸ Particularly because there are many variables to consider, some of which cannot easily be measured, such as the quality of the breakfast consumed (Rampersaud et al., 2005, p.754).
- ²⁹ However, reviews of existing research have highlighted design problems of many of the studies, making it difficult to generalise about the findings. Some of these design problems include the way "breakfast consumption is defined" (Rampersaud et al., 2005, p.643) and the existence of "alarmingly few well-designed studies conducted over at least one school year" (Grantham-McGregor, 2005, p.156; Ellis et al., 2008), making it difficult to ascertain the long-term impact of breakfast on learning (Taras, 2005, p. 213).

In addition, measuring learning or academic achievement is problematic as it such a broad term, incorporating many elements including “mood, motivation, knowledge, application and capability” (Ellis et al., 2008, p.932) as well as the student’s “biological state and the quality of the school” which incorporates the “classroom environment” (Grantham-McGregor, 2005, pp.155–156). Consequently, many studies have relied on subjective measures of educational attainment. These inadequacies in study design have created an evidence base that is “limited and inconclusive” (Ellis et al., 2008, pp.930; 933). As with the impact of physical activity on learning, more longitudinal research is needed in the area (Rampersaud et al., 2005). Nevertheless, it is important to consider these findings to explore the connection between breakfast and learning with a view to informing future interventions.

³⁰ “after adjustment for a number of sociodemographic and lifestyle factors” (O’Sullivan et al., 2008, p.257).

³¹ The precursor to this was the *National Obesity Taskforce*, a four-year plan to tackle obesity and overweight. The focus of *Healthy Weight 2008* was people 0–18 years and their families (Commonwealth of Australia, 2003).

³² At federal, local and state levels.

³³ Red products contain the highest levels of fat, salt and sugar. This system would allow consumers to easily compare products.

³⁴ Goods and Services Tax (GST).

³⁵ Endorsed by Australian Health Ministers in 2006.

³⁶ Implementation of NHSCP will be at the discretion of state and territory governments.

³⁷ Including AEDI data.

³⁸ Findings from the Sudanese women’s group also indicate positive changes to attitudes to healthy eating.

³⁹ Refer to Part Six for a more detailed discussion of this program.

⁴⁰ Interventions had to run for a minimum of six months and report on at least one of the primary outcomes – height, weight or BMI – to be eligible for inclusion in the review. These outcomes had to be measured, not self-reported.

⁴¹ Depending on their “age, gender, socioeconomic background” (Preventative Health Taskforce, 2009, p.94).

⁴² Compared to other approaches, including self-help.

⁴³ However, the authors warn against generalising and directly applying study findings to other children and young people (Luttikhuis et al., 2009, p.18).

⁴⁴ Katz et al. (2008, p.1788) also warned that no single intervention can sufficiently “reverse the childhood obesity trend”.

⁴⁵ Self-reports are unreliable in children under 11 years.

⁴⁶ “All three of the studies reporting a positive effect” targeted primary aged children, used printed materials, and physical education staff delivered the intervention (Dobbins et al., 2009, p.19).

⁴⁷ Possibly because school interventions are too focused on the school (Dobbins et al., 2009, p.19).

⁴⁸ Such interventions are also effective in reducing time spent viewing television (Dobbins et al., 2009, p.20).

⁴⁹ The Food Dudes are animated heroes who fight General Junk. This is a peer modelling approach.

⁵⁰ Children with BMIs above the 85th percentile were also given guidelines on reducing calorie intake.

⁵¹ Diaries were completed by parents one weekend in April and one weekend in September in 1995, 1996 and 1997.

⁵² Staff were encouraged to participate in six “staff wellness challenges” to help model the healthy behaviours (Hesketh & Campbell, 2008, p.24).

⁵³ After seven years, children and parents received separate dietary counselling.

⁵⁴ Each module contained educational material, posters, leaflets for participants, plans for group sessions, children’s colouring resources and support information.

⁵⁵ Two days prior to the introduction and the two days of the intervention.

⁵⁶ Note that physical activity levels were not measured for all participants 6 and 12 months after the intervention.

⁵⁷ 19% versus 41% (Hesketh & Campbell, 2008, p.37).

⁵⁸ 4,194 California school principals completed the questionnaire.

⁵⁹ This represents 24% of the original sample (54 schools).

⁶⁰ Organic principles are followed.

⁶¹ Particularly since “hearing problems were so bad [at the start of the program] that teachers had resorted to using ‘surround-sound’ in the classroom” (Aboriginal Health & Medical Research Council, 2009, p.15).

⁶² Families were asked to pay \$5 per week and received \$40 worth of fresh fruit and vegetables. This scheme was subsidised by the *Bulgarr Ngaru Medical Service*.

⁶³ Maths, English, Health, Science and The Arts.

⁶⁴ It is important to note that the intervention involved the provision of “resources and assistance for the establishment and maintenance of the garden” but did not specify how it should be “integrated” into the school; this allowed the intervention to develop in an unrestricted way (Somerset and Markwell, 2008, p.7).

⁶⁵ Two questionnaires were administered; one required one-word answers, the other was a 3-point Likert scale response.

⁶⁶ In grades 5–7.

⁶⁷ Note that the small numbers of students in a single school limits the generalisability of the results.

⁶⁸ The garden also facilitated the development of community within the school, serving as a “focal point” for activities such as “fund-raising, media promotion and meal sharing” (Somerset and Markwell, 2008, p.215).

⁶⁹ In comparison, 25% of people aged 18 and over were categorised as obese according to the National Health Survey (2007–08).

⁷⁰ Refer to the discussion of overweight and obesity in Part Two.

⁷¹ To prevent the spread of infectious trachoma.

⁷² Refer to the discussion in Part Three.